

PostDigital Art - Proceedings of the 3rd Computer Art Congress

Edited by K. Zreik, R. Gareus

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PostDigital Art

Proceedings of the 3rd Computer Art Congress
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Edited by
Khaloun Zreik
Robin Gareus

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Foreword

The third Computer Art Congress (CAC.3) is dedicated to PostDigital Art. It is a making in many senses and invites artists, intellectuals, scientists and technologists to share their imaginations, creations, inventions and visions of the post digital art.

CAC.3 observes that the world has never appropriated any technology in the same manner than the digital. This technology has penetrated and dominated almost all facets of our everyday life. It has had, obviously, important impacts on our culture, economy, society, . . . and cognition.

We believe that our ways of perception, interpretation and reasoning have not been same before and after having dealt with the digital world. Whats more digital technology has become more than part of our life, it has nearly become transparent. Nicholas Negroponte declared the digital revolution over in 1998¹: “like air and drinking water,” digital would be noticed only by its absence, not its presence. Simon Jenkins recalled this point² “Don’t tell me you are still putting e- and i- in front of your product or talking ‘platforms’, like some naughtiest nerd. That is so yesterday”, and he persisted that “Post-digital is not anti-digital. It extends digital into the beyond. The web becomes not a destination in itself but a route map to somewhere real”.

The term *Post Digital* has recently come into use in the discourse of digital artistic practice³. The term aims to call attention to “an attitude that is more concerned with being human, than with being digital”³. Roy Ascott considers distinction between digital and “postdigital” is part of the economy of reality³. For Mel Alexenberg⁴, postdigital as adjective, addresses the “humanization of digital technologies”.

About PostDigital Art, Adam Tinworth⁵ points out tow important facts :

- “Theres a rule of thumb in the real estate business that if you want to know which part of a city is going to go up-market next, look at where the artists go to work.”
- “Everything we do is influenced by digital technology. Just as air and water, the property of being digital is only noticed when it is not there, not when it is there.”

For all those reasons, and in order to preserve the artistic (and humanistic) part of the computer art, the advisory board of CAC retained, during the last congress in Mexico (in 2008), the Post Digital Art as the main topic for CAC.3.

In that sense, CAC.3 considers PostDigital Art as an open creative way to draw out the evolving of our relation to information and communication technology as a dominant in the globalization paradigm we are living.

PostDigital Art experience has to be considered as intellectual therapy that challenge actors of the society to rethink their innovation approaches and the way they perceive the world, to explore new dimensions of our space, to go forward, to trace their own path, to be followed CAC.3 count on the abilities of artists to explore digital and extra digital spaces in order to anticipate new technological issues that can influence our post digital world.

¹Teressa Iezzi & Ann-Christine Diaz, May/24/2010, “Are we Post-Digital Yet?”, <http://creativity-online.com/news/are-we-postdigital-yet/144055>

²Simon Jenkins, Dec/1/2011, *The Guardian*, <http://www.guardian.co.uk/commentisfree/2011/dec/01/post-digital-world-web>

³Wikipedia contributors, “*Postdigital*” Wikipedia, The Free Encyclopedia (accessed October/27/2012), <https://en.wikipedia.org/w/index.php?title=Postdigital&oldid=483815596>

⁴Mel Alexenberg, 2011, *The Future of Art in Postdigital Age*, Intellect Books

⁵Adam Tinworth, Jan/2012, “Can a new culture grow from Post Digital art?”, <http://nextberlin.eu/2012/01/can-an-new-culture-grow-from-post-digital-art/>

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The search for emergence in New Media Art practices

Abstract

As a follow up of the long pursued ideal of Art as Life, or better, as Creation of the Creation, in this paper we intend to explore the use of Emergent dynamics in Art practices linked to Science and Technology. We articulate this research through the analysis of those significant fields of New Media art practices that have approached to the emergent properties as a key force field in their development.

Keywords

emergence, complexity, new media art, digital art, a-life art.

1 Introduction

The concept of emergence has a long history, during which it has acquired different meanings in the several areas of knowledge where it occurs. If nowadays different theoreticians speak about complexity as a paradigm of the new millennium, emergence seems to become the explanation of how complexity is evolving. Complexity is considered an emergent phenomenon, and emergence, which is produced by self-organizing systems, is considered a way of understanding natural phenomena such as hurricanes, ecosystems and complex organisms as human beings and life itself, to mention a few examples.

Certainly, the concept of emergence became a very inspiring and quite controversial term, in which reductionist postures live together, such as Bertrand Russell's, to whom the emergent qualities are just epiphenomena without any scientific meaning, since "through analysis we may arrive to a structure in which the properties of the complex can be inferred from those that come from the parts,"¹ with other positions, such as those

discussed by physicist Doyne Farmer, to whom emergence "is not magic, but it feels like magic."²

2 Definitions of Emergence and its relevance in Art.

Although there are several definitions of what may be recognized as emergence, one of the more accepted is the one proposed by Jeffrey Goldstein in the inaugural edition of magazine *Emergence*. For Goldstein, "emergence happens at the roots of the appearance of new and coherent structures, patterns and properties during the self-organization process in complex systems. The common features are: 1 - radical novelty (characteristics that have not been previously observed in systems); 2 - consistency and correlation (meaning integrated "wholes" that keep intact during a period of time), 3 - a macro or global level (with some quality of "totality"), 4 - being the product of a dynamic process (it develops), and 5 - being "ostensible", that is to say, it can be noticed."³

Although that definition may be widely accepted in the scientific community, it doesn't include all the different shades and definitions associated with the same term, because, as Goldstein himself says, "emergence works not so much as an explanation, but rather as a descriptive term that points toward patterns, structures or properties that are exhibited in a macro scale"⁴. Although there is no universal consent about its definition, we may explain it, recognize it and measure it through its behaviors. We can recognize an emergent behavior when it is a complex behavior that happens as a result of a construction "bottom

²WALDROP, M.M. (1992). *Complexity: The Emerging Science at the Edge of Order and Chaos*. New York: Touchstone Simon & Schuster

³GOLDSTEIN, J. (1999). "Emergence as a Construct: History and Issues". *Emergence*. Vol. 11, 1999, pp. 49-72

⁴GOLDSTEIN, J. (1999). "Emergence as a Construct: History and Issues". *Emergence*. Vol. 11, 1999, pp. 46

¹ RUSSELL, B. (1927). *The Analysis of Matter*. London: Allen & Unwin. pp. 285-286

up", produced from a series of simple behaviors (for example, simple rules). Therefore, we may say that emergent properties are properties of the global system that appear from the complex interaction among its parts, that is to say, they refer to the properties or processes of a non-reducible system to the properties or processes of its constituent parts, obtaining, in many cases, totally unexpected results and hardly deducible from them, as well as their local interactions.

Thus, we would say that the emergence concept is not a product of an organized, rigorous unique theory, "but a set of ideas that have in common the notion that within dynamic patterns it may exist an inscribed simplicity that is capable of being partly discovered through analytic, logical and conceptual developments⁵. The diversity of theories of emergence and their possible applications are enormous and, therefore, difficult to synthesize, but we could highlight some features that are common to the different postures relating to emergence. These emergent properties, on the other hand, are also explored in the scope of the artistic practice linked to techno-sciences, where this exploration seeks in some way the materialization of the utopian ideal of fusion between art and life, and it is connected with the issue of creation itself.

In this sense, the theory of complexity models the material systems using techniques proper of non-linear dynamics, through the demonstration of the topologic features of diversity (the distribution of singularities) that affect the series of trajectories in phasic space, revealing patterns (indicated by the attractors in models), thresholds and the required intensity of those systems' *triggers* (events that move systems toward thresholds that activate patterns).⁶ Thus, showing the spontaneous appearance of indicators of patterns and thresholds in models of complex systems' behavior, the theory of complexity enables us to think material systems in terms of their potential of immanent self-organization.⁷

⁵LISSACK M. R. (1999). "Complexity: The Science, its Vocabulary, and its Relation to Organizations". *Emergence*. Vol 11: 1999, pág 112

⁶PROTEVI, J.; BONTA, M. (2004). *Deleuze and Geophilosophy: A Guide and Glossary*. Edinburgo: Edinburg University Press.

⁷PROTEVI, J. (2006). "Deleuze, Guattari and Emergence". En: *Paragraph*. 29:2, pág 19-39

3 Eighth Steps towards Emergence in Art practices linked to Technoscience.

Even though there is a long history of intersections between art, science and technology in History, it is true that since the development of digital technologies, (and moreover the whole information and communication technologies) changes and transversality processes between different fields have been considerably accelerated. ICTs are everywhere and act between fields connecting bridges and constructing easier ways of collaboration and transdisciplinarity works.

These digital technologies have pushed forward the New Media Art practices, including new technologies and new sciences as key contextual discourse, techniques or materials to be based on. And this has occurred in parallel with the study of emergent properties, that have been progressively gaining relevance in contemporary technoscience and culture due their relevance in complexity systems.

We have focused In our research in the crossing between emergence and new media art practices through what we consider are the different key steps towards its pursue. We have then divided it in eighth steps that, with different approaches and types of technologies and art practices, have approached to the study of emergent propperties.

3.1 Life and Emergence in Bioart.

We should then start saying that in relation to life, emergence itself has been the underlying cause of the evolution of emergent phenomena in biological evolution, since they are the synergies produced by organized systems, which allows to articulate the same emergence later on. A modification in any of the parts may affect the synergy produced by the whole, for better or for worse. A mutation associated to any feature can be "the difference that makes the difference," said Bateson. From a synergistic perspective, the functional effects produced by the *wholes* have much to do with the explanations of the parts. But once life is reduced to gene by the discourse of Biotechnologies, then, in the context of a "geneticized" life, the part, the gene, designates the whole, life, and the emergent dynamics as explanatory cause of life itself is reduced to the control of the information coded in the gene, devoid of context. For example these are some of the main critiques inscribed in BioArt practices, such as Critical Art Ensemble or artists Oron Catts and Ionatt Zur from Symbiotica, dealing with alife

materials and the biotech discourses that are constructing an hegemonic narration of life.

3.2 Robot Art and the Body-Mind emergence.

As to the role of the body, we may observe that in present-day theories it becomes the basis of cognition, that in its turn becomes the process of life. The enactive conception of the organism proposes a mind inextricably linked to the body, now understood as embodied mind, in which perception is not just activated in response, but elapses from the action on the environment, as movement.⁸ Cognitive structures emerge from recurrent sensitive patterns, and the organism becomes the construction of a certain selection of virtual multiplicity of what the body might become. That enactive cognition represents a story of the structural coupling of the body that makes a world to emerge, and it acts through a network formed by several levels of interconnected sensorial-motor subnets. And thus the mental contents draw in their own organization -- self-organization -- a sensible noticed world that is partly an emergence, an autopoietic creation that proceeds from the ordering in classes of those same mental contents. Thus, reality-world and mental phenomena would meet in a continuous, transforming dialogue, and this new model would demand a re-evaluation of developments in the field of robotics, by means of trying to create an embodied artificial intelligence, that emerges from the interaction with the environment and with the machine's own materiality, thus configuring new adaptive computer devices. For example Robots by researcher Luc Steels, from SONY Lab Paris and Vrije Universiteit Brussel (AI Lab), explore the emerging creation of language, while Rodney Brooks tries to focus on artificial intelligence based on the robots emerging behavior.

3.3 Computational Emergence in A-life Art.

Regarding emergence in the context of artificial life, we see how in the artistic practices that use those technologies, emergence and complexity are constantly evoked, with unexpected results ascending from a pre-designed technological substratum. But this technological pre- design is exactly what confers to it a differentiated status of "computational emergence," which, nevertheless, we could say is not an authentic emergence, because it is restricted to the technological computational model itself. Hence, artificial life

⁸VARELA, F.; THOMPSON, E.; ROSCH, E. (1991). *The Embodied Mind*. Cambridge: MIT Press.

escapes from the design of human computational models, and finally turns into something uncontrollable, with some structures that are not restricted by stable knowledge, formal relationships or causalities. Because the restriction of the technological frame in which one tries to reproduce emergence as a constituent of life hampers the creation of emergence, while trying to formalize emergence itself. At this point, it should be pointed out how the cultural dynamics of art are a much more viable substratum for emergence, enabling the art objects to become open, emergent and unpredictable. Ironically, emergence in the artistic practices with artificial life does not reside so much in simulations, as in the form in which those artistic practices modify what we think and feel about the world. An example of this computational emergence can be explored in the work *LifeWriter* (2006), by Christa Sommerer and Laurent Mignonneau, explores the metaphor of scripture as a generator of life, through the emerging behavior proper of the artificial life technologies used in the piece. Or another example can be found in José Manuel Berenguer explores the computational emergence in *Luci* (2008), an installation inspired by the bioluminescent behavior of Kuala Selangor's fireflies.

3.4 The emergence of/in Artificial Intelligence and Art.

Regarding the different theories of cognition that account for the different approaches on Artificial Intelligence, we can observe the evolution from the early theories of information processing to connectionism and the emergent theories of artificial intelligence. Based on the attempt of simulating the brain's natural processes by the connectionists, one fell in the romantic ideal of equality between mind and machine. Knowing through experience, rather than through received instructions, gave place to the formation of artificial neural networks capable of learning and providing feedback to the system, establishing connections and values suited to its elements. Later on, the progresses of emergent artificial intelligence have linked, in an implicit and explicit way, computers to the world of the humans, through all kinds of biologic and social metaphors. The strong program of research in Artificial Intelligence gave way to the weak program, simulation gave way to emulation and constructionism, which in a pragmatic way uses systems of diffuse logic, artificial neural networks, parallel computing and quantum computing to make a world experience to emerge in a computational way. Some artists as Ken Feingold or David Rokeby have been exploring the

possibilities of AI and the emergence of communication patterns through their artworks. In Rokeby's (n)chant a community of entities linked by a network. intercommunicate, and through doing so, 'synchronize' their individual internal 'states of mind'. As Rokeby explains "When left uninterrupted to communicate among themselves, they eventually fall into chanting, a shared stream of verbal association. This consensus unfolds very organically. The systems feel their way towards each other, finding resonance in synonyms and similar sounding words, working through different formulations of similar statements until finally achieving unison."

3.5 Software art, Calculability and emergence

Relating to calculability and programmability, inscribed in the software and the programming languages, these gain relevance while they construct ways of seeing, knowing and making the world, which in their turn contain a model of that part of the world to which they belong, and which they shape each time they are used. We see the Cartesian metaphors that have articulated their evolution assigning categorizations, where the software comes to be considered an abstraction of the hardware, or even the hardware becomes a metaphor in itself, when algorithms may work on any imaginable material. A Cartesian dualism that separates body and mind, and that, if it were abandoned, might abandon the supposition that the software is immaterial and the hardware, material, and start considering the software as the material inscribed in the coded and stored algorithm, in one more step towards the materialism proper of the emergent dynamics approached.

3.6 The Virtual, the Real and the Actual.

Regarding the concept of virtual, which we may approach through virtual-reality technologies and their artistic appropriation, we might expose how it seemingly articulates as an oxymoron, while intending to effect the programming of a complete simulation of reality. But that relationship between virtual and real is more of a co-presence, and different of the possible, where potency is something future to real, but contained in it, and virtual is co-present with real, but different from it. For such, we must understand that the potentiality of a thing resides in the fact that any of its material properties is updated in the future, and thus the child becomes a man, etc. But according to the virtual, there are certain properties that correspond

indeed to the object, but are not materials, in principle. The unit, for example, is a predicate of objects, but is not a material property, and although the unit may be considered as one of the transcendental categories of knowledge, we could also consider it immanently as a virtuality, that is, belonging to matter itself and not originating from the exterior by a transcendental understanding. In virtuality, the same emergent origin produces different forms not contemplated by potency: soap bubbles, crystals, embryogenesis, migratory movements, economic transactions, and so on.

3.7 The Digital in Art.

Regarding the digital, present in the relationship between art and computer science, we can analyze the different attributes that characterize it, the epistemological and ontological shifts that bring about those new ways of proceeding with information processing, that emerge structurally devoid of the context that receives it, providing the processing of images, sounds and texts of new properties and, therefore, of new possibilities that, in the context of art and of engineering, have been progressively explored. Under the enclave of the theory of information and later on of cybernetics, a scope of knowledge is structured that departs from a series of presuppositions that model a particular idea of mind and that, somehow, explore the ideal reach of a computational mind. Starting from those information devoid of context, properties as the fact that it is converted to numeric representation, that it may be modulated, automated, variable and transcodifiable prosper. Those properties have revealed fundamental for the understanding of the development of computer technologies, that have been trying to approach emergent phenomena. In this sense for example we should visit Canvi & Temps (2009), of Bestiario and Arts Santa Mònica, are two navigation spaces as much historical as traverse, offering a wide and relational vision of the strategies, methodologies and topics of interest that were developed in the science of complexity field.

3.8 Art, Networks and emergent properties

In the case of networks, one should keep in mind their centrality in the context of the theory of complexity and of emergent phenomena. On the other hand, we can observe in details how systemic thinkers have applied network models to all systemic levels, contemplating organisms as networks of cells, organs and organic systems, in the same way the ecosystems are understood as networks of individual organisms. The same vision of the living systems as networks gives another perspective to the hierarchies of nature with its

distributed structure, in which life itself becomes a network of networks. However, we could also speak of a law of development of networks based on the Darwinian theory of networks, where the stronger nodes of the network, based on the context of their functional properties, will expand and will be the largest and more central, at the expense of the other nodes⁹. And this analysis of the dynamics and typology of networks allows us to observe emergent phenomena in the networks themselves, as in the case of the ant behavior as a model of spontaneous self-organization in nature.¹⁰ However, this is not totally correct, because although the machinery of cybernetic control is distributed, the behavior of ants is guided by instructions, and not by laws.

4 Conclusion

On approaching the history of interrelationships among art, science and technology, from the materialistic perspective, that redistributes the relationships between matter and form, and from the observation of the properties of self-organization inherent to matter itself, we may expose the way as art, mathematics and physics have interrelated, based on different space conceptions; the way how art and telecommunications have explored the meaning of networks and of remote communication; the way how digitality and the ideal of computational mind structures the relationship between art and computer science, the thinking on the virtual in artistic practices with virtual-reality technologies, the approaches between art and software based on exploring their calculability potential and, therefore, of algorithmic programming, the theories of cognition inscribed in the relationship between artificial intelligence and artistic practices, the simulation of the emergence present in the artificial life and artistic appropriation technologies, the concept of body in the relationship between robotics and art, and, finally, the conceptions of life present in the current relationship between artistic expressions and biological knowledge, and even more especially in the development of current biotechnologies.

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⁹BARABÁSI, A.L. (2002). *Linked: the New Science of Networks*. Cambridge: Perseus Publishing.

¹⁰JOHNSON, S. (2001). *Emergence: The Connected Lives of Ants, Brains, Cities and Software*. New York: Charles Scribner's Sons.

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Abstract. -

This paper ponders on the identity and its technological manipulation, through the use of the fingerprint.

Same, is voiced with the help of a software (Photosong 1.04fm) that converts in sound the gray values corresponding to the green matrix taken from a fingerprint photography, performed at 8 bits color depth.

This manipulation featured as a result in the work of artist Marcos Salazar Delfino, contributes as an argument to postulate the need to strengthen attention practices in the academic processes of teaching art, with the purpose of contributing to an atmosphere of peace, of the anonymity's dissolution and to the making of stronger active participation.

Keywords. -

Fingerprint - anonymity - attention - art - peace.

1 Brief Reflection on the Anonymity

The fingerprint as a pedagogic resource, in the understanding that the preparation of any instrument conceived for teaching is a creative fact, essentially proposes a way that draws itself in the passage of a question:

What shall be the meaning of all making or doing product, that links us to the notion of ourselves as feeling?

The answer is in the didactics and is none other than the practice of the autognosis or, in the same sense, "of art".

The fingerprint is one of the recourses that identifies us as "unique in the world".

As original creation.

As deployment of constructive rhythms that are modeled in the mother's womb in order to accommodate a new code of life that expresses itself and is kept registered in time as an imprint, as witness.

Thus, a picture of this fingerprint is translated into a grid of grays that becomes a

score of gray values that are converted into sounds.

The identity is translated, is transferred, is transduced, is recorded, is transformed and it turns into unique and alike sound.

Foreign but loaded of soul.

It is an inter-generative experience that only serves for the very moment, to valorize itself in its own scarcity, in its proper sense that transforms a pause in remembrance and question. Just as the moment of art.

A simple matrix of numbers between 0 and 255, the result of a reading of a picture taken at an 8 bits depth, translates the fingerprint into a repertoire of values to be rhythmic and nonrhythmical interpreted as a sound experience.

90 seconds of recurrent coldness unfold as from a preconceived randomness basis taken to sounds played on FM.

In the certainty that promotes the ignorance in front of the technological fact; alien.

Divested of precepts

Of scruples

Of academic postures

The apparent interactivity promoted in the inter-generative art, is nothing but an alienating power game that we authors make over the users who come in the search for new questions, and are seduced and trapped.

I make your view mine

Mine your desire

I reconceive you wish

And I seize your attention

Your anger

Your memory

Only a host of voices aloof from any participation resound for you, as a result of your graphic contribution, of your fingerprint, of your absence.

It is an empty time

Where you're not longer there

That's the eternal beholder's agony

The outrageous and delusional apathy that suspends the courage and promotes the anonymity in front of the technological fact

I live behind a picture, a footprint, behind the uproar that suspends the wisdom in the trade that is prompted from the aesthetic experience.

Is the promotion of the anonymity that installs inside the viewer; that separates her/him from her/himself.

I know a form with name and imprint.

But it is in the fact that saves where the hope lies and resides the doorway from the maze of impressions.

In the shock itself of that that is shaken.

The arts education in schools and universities should be

permanently aimed at drawing the attention on this matter.

To raise attention towards the fact itself of what thrills beyond the mere trade that is established as from the permanent flow of impressions.

Practicing the autognosis conceived as a training for the concentration of the attention upon the bodily sensations in front of the work of art, is an exercise that promotes peace, and in its praxis it should accompany all the academic apparatus that has been built around the teaching of art.

2 The technological art

In art, the optical-luminous and spatiality have been until now the fundament of almost all the composition issue.

However, in recent years, largely thanks to the development of technology, the very notion of spatiality and distance, as well as the use and conceptualization of space in art, begins to transcend that traditionally visual, to other notions supported in audio and tactile expressions, not only through the use of technical tools, but by the instituting of new interaction and participation dynamics.

In addition thereto, the use of media in contemporary art allows us to establish a systemic perspective in which the language of art is no longer exclusively confined to the relationship of a thematic axis and the significant values ranked in its environment for building up a speech, but that the technological means used in the processing of audio-visual information are profiled as significant themselves, acquiring in some cases an absolutely central value in the discourse's built up. In this regard, it is necessary to reflect

on the possible transdisciplinary dynamics in art leading us to the encounter of a synergy that, just as Mayz puts it:

"... since it is not simply optical-luminous, it not only overcomes the mind's gambling nature... but at the same time, that of the subject as a simple spectator of the otherness. Reciprocally - instead of being a mere spectacle looked at, contemplated or seen by it - the otherness becomes deed or workmanship caused by the active dialogical intervention of the synesthetic system of the soma or body thereof".

In this respect and to conclude this brief overview of the topic in question, it is essential to specify in a preliminarily manner the slopes lining the notion of meta-technical logos, by incorporating an extract of its creator's work, Dr. Ernesto Mayz Vallenilla (1990), which shall help us keeping in mind the concept of such logos:

"But within such meta-technical project (which theoretic foundations so far have not been expressively stated with due rigor) can be glimpsed at least three aspects or directions of a new mode of technical operation in front of the otherness..."

1. - There is a first aspect which expression is represented by a set of instruments and devices that, as manmade artificial senses, alter and transmute the inborn human sensory boundaries and functions - and therefore, the man's original psychic-somatic constitution - introducing radical changes in the apprehension,

organization and intelligibilization of the otherness in general.

By a similar procedure - as illustrated by the use of radars, detectors and ultrasound viewfinders or thermal sensors that guide the << vision >> of certain missiles - the innate human body sight limits and functions are modified and extended through the use (with optical purposes) of sonic waves or thermo-tactile stimuli. But, just as those mentioned above, it is conceivable that for similar purposes other means or procedures can be used... widening in such a manner the << vision >> spectrum, up to dimensions and substrates that result absolutely inaccessible for the possibilities of the human eye.

2. - A second meta-technical aspect is found represented by instruments or apparatuses that - upon introducing changes or modifications to the layout, grades and codes of man's (or of other beings') own somatic and psychic structures - alter their congenital or innate functioning..., creating or encouraging variations or innovations so much in its behavior, as well as in the deployment and distribution of the energies thereof.

The meta-technical instruments, in this sense, build a new otherness... which own ontic-ontological structure imposes concomitant variations so much in its eventual epistemological objectification and intelligibilization, as well as in the field of its built and redesigned teleonomy.

3. - The third and final aspect - perhaps the most complex and recent of them all - is constituted by instruments or devices that limitlessly transubstantiate the

energy (and/or matter) trans-forming and trans-muting the entities' profile and the universe as a whole. Its ultimate plan is to progressively convert otherness in general in a system or trans-finite energetic holos in a constant trans-mutating becoming.

Such apparently alchemical purpose - stripped of any irrational or magical reminiscence - is the one charring the powerful and very complex technical processes of the disintegration, conversion and utilization of atomic or sub-atomic energy..., as a threshold or a prelude of that outlined guiding idea feeding this variant.

Each of these mentioned aspects - like, even more, their combination and confluence - suppose an attitude where the progressive fading and parallel overcoming of the anthropomorphic, anthropocentric and geocentric limits and characters of the traditional technique is demonstrated. This all doesn't come harmless or innocent. As we shall see in due course, their projections are critical to understand the radical changes taking place at the ontology and epistemology level - and therefore, on the human instituting in general - on a par with our own time."

It is in that progressive fading of the boundaries and anthropomorphic, anthropocentric and geocentric characters of the traditional technique, where the cause reinforcing the anonymity is founded. But we no longer talk of the anonymity in front of the otherness, of concealment of the face, of name, of whichever any identity form.

We speak of anonymity in front of the mind's mirroring experience, as opposed to the 'myself'.

It's like when you lose the time of the stroke, the craftsman's accomplished doing, the violinist's instrument strike; this is when the aurous being's fingerprint vanishes, is absent and the metanarrative of the authorship and the identity loses its symbolic effectiveness.

3 Conclusions

90 seconds of recurrent coldness -

in the certainty that ignorance promotes -

in front of the technological fact -

aloof therefrom -

divested of precepts -

of scruples -

of academic postures -

just a pile of voices strange to all involvement -

delighted in its absence full of sounds -

in an empty time where the passing thereof only distances from poetry -

from the dying axiom ethics has condemned -

to agonize forever -

outrageously -

in the apathy's clash that suspends wisdom -

that suspends courage -

and promotes the anonymity.

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Future Potentials for ASCII art

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Abstract

ASCII art is a text-based expression that traditionally is concerned with remediating images, words and objects. The paper describes its historical connections to poetry, programming, literature and hacking and defines ASCII art as a genre, consisting of several categories. The authors identify a number of movements towards novel forms of ASCII art that explore medium specific characteristics for drawing, design, advertising and conceptual art. The authors also argue that the popularity of digital media, which for example leads to scarcity in URLs, increases the potential for ASCII art to play a more active role in human communication.

Keywords

ASCII art, textmode, graphics, ANSI

1 Introduction

In his book *Gramophone, Film, Typewriter* Friedrich Kittler identifies the typewriter as the symbolic medium par excellence (Kittler 1986:15). With a highly limited set of characters, humans have managed to formulate grand texts to symbolize laws, religions, politics and myths. But the material characteristics are normally invisible to us. This is why the typewriter can be considered as a key symbolic medium. It paved the way for the computer keyboard which at the moment, using the Unicode standard, supports up to 110,000 characters.

Text characters have been used for visual art for thousands of years, and seems to be gaining momentum. One reason is that digital media, by virtue of programming languages and protocols, is tightly connected to the text characters of e.g. ASCII and Unicode. Studying the foundations of digital media, often indirectly means to study flows of text characters - just like in the Matrix, according to some. Another reason is what

Reynolds (2011) calls retromania, the large-scale cultural development that re-approaches previously popular forms of expressions in order to explore “new” options.

2 Brief History

Before typewriters and computers, calligrams were likely the most common form of text art. A calligram is an image built with words or text characters that relate to the content. Simmias of Rhodes’ *Axe* (325 B.C) is one early example. Micrography is a Jewish form of calligraphy, which is said to be a method to bypass the restrictions on images of the Second commandment. In some examples of printed texts, illustrations were also created through the careful organization of typographic ornaments¹, note at end of page.

The typewriter disseminated text art to a broader public. A secretary by the name of Flora Stacey made a famous picture of a butterfly in the 1890s, by moving the paper in the typewriter while typing. People such as Julian Nelson and Alan Riddell popularized this technique for hobbyists as well as artists and poets. Sylvester Houédard was a priest and concrete poet who used typewriters to make abstract art.² *Like Contemplation* (1972) shows many abstract shapes, which gives little indication of being made with a typewriter.

In 1921 Marcel Duchamp and Man Ray produced the magazine *New York Dada*, well known for its cover which displayed a small readymade collage surrounded entirely by the typewriter generated words *New York Dada* backwards. In this example the words become a pattern and incantation that reinforces dada aesthetics (Ades 2006:146,158). Theo Van Doesburg, more likely known for his paintings and contribution to *De Stijl*, created the visual design for the four-issue dada-constructivist magazine

¹Examples are available at

<http://pplspcoll.wordpress.com/2011/05/02/analog-ascii/>

² See for example *Fun With Your Typewriter* by Marge Roemer, 1956

Mecano. Each issue included the name of the magazine as a text-diagram and presented a direct relationship between the the type characters, the image design they created, in addition to being conceptually significant (Ades 2006:261,270). Dada artists' interest in the use of language perhaps created a unique avenue for experimentation with printed text that was visual, verbal, conceptual, and sometimes political.

Concrete poetry functions by placing equivalent importance on the form that the typographical characters are given and their semantic meanings. An early and popular example of this is Guillaume Apollinaire's *Il Pleut* (1913-1916) where the meaning of the text is enhanced by its diagonal and linear presentation. This approach was also employed by many artist/poets, such as bpNichol³. Other Literary movements, including Oulipo, experimented with language and text using algorithmic methods like Raymond Queneau's *Cent Mille Millions de Poèmes* (1961) in which the fourteen lines of ten sonnets are interchangeable⁴. The configuration of the printed text is based on how the reader interacts with it. These examples demonstrate the interest of artists and poets in how we interpret the printed word based on its presentation and design. There is the potential for meanings to be generated through the visual organization of the text and the language used that can reinforce each other as well as become conceptual investigations. In his historical analysis of pre-1900s visual texts, *Pattern Poetry*, Dick Higgins refers to this relationship as the "synthesis of visual and literary experience" (Higgins 1987:3).

2.1 From Teletype to ASCII: Textmode

While typewriter art allows the user to position text characters arbitrarily by moving the paper, ASCII art traditionally works in so called textmode. A textmode screen is a grid of equally sized cells, where each cell can contain one text character. It uses a monospace typeface, meaning that all the characters receive exactly the same amount of space, allowing for the same amount of characters-per-inch or line.⁵ The number of characters per line usually varies between 32 and 80. Modern text inputs use a variable-width typeface, which is not possible in textmode.⁶ As such, textmode graphics can be described as a form of mosaic that uses a strict grid and a set of typographic symbols. An

³ Numerous examples exist on the artist/poet's website : <http://www.bpnichol.ca/>

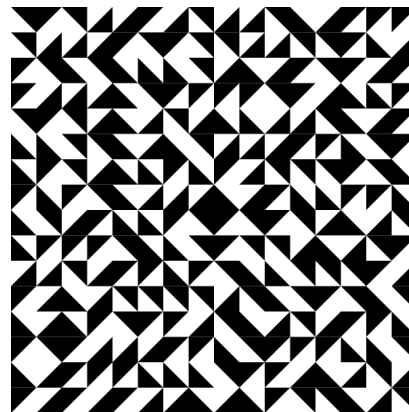
⁴ Interactive online version available at http://www.bevrowe.info/Queneau/QueneauRandom_v4.html

⁵ More on non-grid based ASCII art and proportional fonts see http://www.andrewhurler.com/17/17_pages/17.html

⁶

important aesthetic precedent can be found in the rationalization and atomization of visual communication in the 1920s - both among artists and marketers (Manovich 1993:11). Later on, pattern artists such as Peter Struycken or Dominique Douat would generate early computer graphics with similar ideas, also connecting to the 18th century works of Sebastian Truchet.⁷

It is also worth mentioning tile-based graphics, common in videogames in the 1980s. In order to save resources, graphics were constructed from a set of tiles, similar to a font but often using more colours. People like NoteNdo who hack old game consoles therefore often end up with a mosaic aesthetics similar to textmode.⁸ The similarity comes from the consistent grid that is used to either display graphic tiles or fixed-width type characters.



Sebastian Truchet, 18th Century

Teletype, which appeared around 1850, was the first telematic medium for text communication⁹. It was similar to morse telegraphy in converting text characters into sounds, but it used typewriters and printers as interfaces. The oldest preserved teletype graphics are from the 1960s, but the practice is most likely much older than that. In order to standardize the communication, teletype focused on the Baudot code which predated the ASCII-standard by almost 100 years.

ASCII appeared in the 1960s - the same decade as the first computer art exhibitions. There were computer artists/engineers who worked with similar methods to ASCII art. Ken Knowlton and Leon Harmon exhibited a textmode version of a nude at the

⁷ For more on grid based art see <http://radicalart.info/AlgorithmicArt/grid/index.html>

⁸ Examples of noteNdo's work can be seen on the artist's website <http://notendo.com>

⁹ Royal Earl House and David Edward Hughes introduced keyboard-based telecommunications 1844-1857.

MOMA in New York in 1968. By calculating the brightness of each text character using a computer, they converted a photograph into a mosaic-like textmode picture. It is the same technique used by e.g ASCIImeo.com and the VLC media player, to convert video into ASCII animations.

2.2 Replicating the Pixel

At the end of the 1970s, text art was popularized through two digital media: computer games and teletext. Early computers like PET, TRS80 and ZX81 were usually better at using text rather than pixels, which made them suitable for text adventures (interactive fiction). The character sets of the computers had symbols that were well-suited for graphics. For example, several platforms added symbols that enabled a technique similar to pixel graphics. Larger custom texts and images could be generated by combining symbols that represented different portions of text characters. One 'pixel' was one section of a text character.

Teletext worked in a similar way. It was a TV-service with text-based information sent in parallel with the standard TV-signal, originally intended for subtitles. The graphics were completely text-based, built with a graphics-friendly character set which was also used in home computers such as ABC80 and MicroBee. The teletext standard was also used for videotex, which was a modem-based precursor to Internet that allowed for two-way communication. In France, this service was in use until 2012.¹⁰

2.3 Networked Communications

Around the same time, the home computer revolution brought with it a modem-connected network of Bulletin Board Systems (BBS). Along with e.g videotex, they were the social networking sites of the 1980s and 1990s where users exchanged messages and software. The interfaces were completely text-based, which created a demand for high-quality ASCII menus and logos. In the early 1990s, these graphics started to appear as separate artefacts, known as ascii collections or art packs (Polgár 2005:121). It used a rather distinct mixture of graffiti, leetspeak poetry and pixel art aesthetics. This ASCII art style is still mostly seen in hacker contexts on FTP-sites, IRC and in read_me files for cracked software.¹¹

ASCII art became very popular in the demoscene, which is a subculture dedicated to audiovisual hacking that at the time depended on BBSs for quick distribution. They frequently worked under very

¹⁰ Examples of artistic and commercial works can be found at text-mode.tumblr.com

¹¹ [Textfiles.com](http://textfiles.com) is an extensive resource on this topic.

restricted conditions, such as making a "music video" using only 1 kilobyte, and would therefore often use textmode graphics together with chipmusic. Also known as chiptune, this genre uses digital waveforms found in the soundchips of old computers and consoles, much like text graphics uses the fonts of these systems. Since there are both technical and cultural connections between the two, chipmusic and ASCII art frequently appear together in demos, crackintros and keygens (programs that generate software licenses).

On the Internet, ASCII art most likely reached its high point of importance before it was available to the general public in the early 1990s. At that time it was distributed mostly through e-mail listservs and BBSs (Danet 2001:208). Connection speeds were slow by today's standards and transferring the smaller size text files was done much more quickly than a traditional image file. ASCII art was a primary means to 'decorate' or display images content. Later, a new form of ASCII appeared which doubled the amount of available characters. These new characters, along with ANSI escape codes that enabled the use of colours, created a new generation of ASCII art that is usually referred to as ANSI art (see Hargadon 2011). A number of Usenet newsgroups developed and further distributed ASCII art.

The World Wide Web allowed for access to ASCII art in a different way. Originally, those involved in newsgroups and listservs made their work available to others in their groups through FTP sites. Files had to be transferred and then viewed offline. The web enabled artists to show text graphics in online "galleries". The work could be seen on the site and copied or downloaded as needed. In addition, it became easier for artists to share technical information about their process. ASCII art images and FAQ files were combined into large collections and website databases allowing for the accessibility that has made them now ubiquitous.

In the art world, text-based network media were normally used more for words than images. Exhibitions such as *Interplay* (1979) and *La Plissure Du Text* (1983) experimented with networked storytelling in a similar way to some mail art, but in real-time. In 1997 Steve Deitz began directing Gallery 9, one of the first specifically digital collections housed within a more traditional contemporary art museum, the Walker Art Center and included works like Mark Amerika's *PHON:E:ME*.¹² Hypertext and experimental electronic text more commonly fall within the digital humanities, since they are generally more concerned with semantic meanings than visual appearance.¹³ It is also worth noting the practice of generating larger letters and

¹² <http://phoneme.walkerart.org>

fonts, such as the FIGlet collection¹⁴, out of smaller ones.

One of the more widely known ASCII artists is Joan Stark whose collection carries a wide range of works, most of which include her signature 'jgs'. Her site is still hosted by one of the earliest free web hosting services Geocities.¹⁵ It is a good example of a common format for sites focused on ASCII art in that it includes a collection of ASCII images as well as information about the history of the form, FAQ, tutorials, and links to other ASCII collections. Stark's work is largely done 'by hand', meaning that the artist created the images by typing in text editing software. This relates directly the tradition of typewriter art within a textmode grid while other opportunities exist that use software to convert images into their text equivalent. Because of Stark's method, the images have an elegant and engaging simplicity of form. Browsing her site reveals the reason she is commonly referred to as the 'Queen of ASCII art'(Figure 1).

2.4 Internet Art uses of ASCII

Loading the website of the artist duo Jodi (Joan Heemskerk and Dirk Paesmans)¹⁶ creates something that reads like a glitch - it appears as gibberish, as if the site creators didn't debug the page. It is an underscored, center-aligned block of neon green text, unreadable and incomprehensible (Figure 2). A casual observer today might still read the page as if it was simply a mistake. It is as if the page that has loaded is nothing more than random configuration of text characters. Behind this assumed mistake, in the source code, we find something much more meaningful. The potential that is explored with this work is held between the code and display levels of the browser. It exploits the fact the code level whitespace is ignored when the web browser renders the page. Jodi's source code shows us ASCII art diagrams. The page is a bomb and we see the aftermath within the browser window and the bomb itself in the source code. The ASCII art is hidden away from view and we see the text characters unformatted where we typically expect to see something legible (Greene, p. 41).

The approach to ASCII employed by Jodi is typical of the way that artists working on the early Internet adopted and used existing media for creative and conceptual experimentation. At the core of their approach was the realization that within the machine, a computer, the meaning held in language is not

necessarily interpreted, it is processed. All text and images that are displayed are converted through standards like ASCII into a format that is more easily understood and processed by the computer. The use of ASCII in early Internet Art was a way of revealing what is going on within the machine and perhaps a way of making it aesthetic. Vuk Cosic's *Deep ASCII*¹⁷ (1998) demonstrates this by exploring the relationships between the porno and game industries by developing a method to display video images with ASCII on a Pong game console. The graphic simplicity of green text on a black screen, although unnecessary in the late 1990s, reinforced the aesthetic quality and history of writing code - a language meant to be interpreted by a machine but instead displaying one of the most recognizable pornographic films as a sort of visual raw data (Figure 3). The site *ASCII Rock* (2003) by C505 (Yoshi Sodeoka) combines ASCII art video processing of popular rock music videos accompanied by General MIDI music.¹⁸

In these examples, ASCII art moves away from the line-based aesthetics of e.g. Joan Stark in order to explore the conceptual relationship between text-as-code and text-as-image. Stark's ASCII is a form of manual craft made by hand, where the success of the work lies in a correct remediation, or stylish interpretation. With Jodi, Cosic, and Sodeoka that translation is automatized and less significant. What matters is what has been translated, and why. Both types of work maintain references to the subject and are therefore still representative. However, with the more conceptual ASCII work, our attention is drawn towards how computational processing relates to human language and visual perception.

3 Terminology and Categories

ASCII, Morse code and Unicode are character encoding systems (also known as character sets) that assigns numbers to every symbol.¹⁹ The symbols are letters, numbers and cultural glyphs like arrows and squares, but there are also non-visible control characters such as tab, return and clear screen. These control characters date back to Baudot and Morse codes.²⁰ The characters can look different depending on which typeface is used and what size it has, and the characters can be positioned in a textmode grid or more arbitrarily. The appearance of ASCII art can also change according to the screen used. For example, an old cathode-ray screen can be important for the experience of the graphics, as Ian Bogost

¹⁷ <http://www1.zkm.de/~wvdc/ascii/java/>

¹⁸ http://www.c505.com/vvvvvv/projects/ascii_rock/index.html

¹⁹ A list of Internet-compatible character sets can be found at <http://www.iana.org/assignments/character-sets>

²⁰ For example, BEL is a code that usually makes a warning sound which originates in the Baudot code.

¹³ See Electronic Literature Organization at <http://eliterature.org>

¹⁴ <http://www.figlet.org/> and <http://is.gd/UIDCKe>

¹⁵ <http://www.geocities.com/spunk1111>

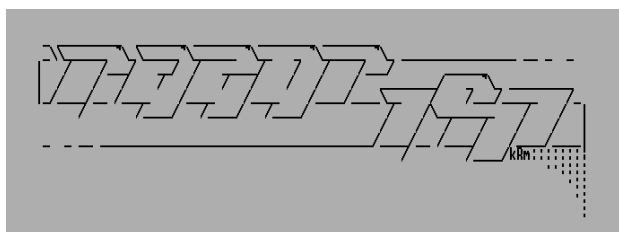
¹⁶ <http://www.jodi.org/>

argued with the television simulator.²¹ From this it is possible to define several different levels to discuss ASCII art.

Symbols → Character Encoding → Typeface →
Typography → Screen → Perception

ASCII originally referred to a standard from the 1960s which encoded 95 printable characters, but the meaning of the term has shifted over time.²² Today, the term ASCII normally refers to any text-based expression, regardless of the character encoding system used. For example, text-based art online is called ASCII although it most likely uses Unicode. The term ASCII art is used accordingly in this text; as an umbrella term for any text-based art that uses a preset font in textmode. As such, we consider ASCII art as a genre which consists of several categories. Some of those categories are direct consequences of the platforms used, such as PETSCII (early Commodore computers) and ATASCII (8-bit Atari computers). These terms refer to both the character encoding and typeface. Shift_JIS is a similar term, used in the west to describe Japanese text art (in Japan usually called AA, short for Ascii Art). Technically, Shift_JIS is a group of character encoding systems for Japanese characters. They are used with various typefaces - both monospace and variable - and are not fully compatible, which has made Unicode encoding more popular in recent years.

Amiga ASCII uses a 7-bit character encoding and has a particular style due to fonts like Topaz and P0T-N0oDLE which made it possible to make continuous lines with /-signs. Therefore, skewed logotypes are more popular here than in other ASCII art. In the early 1990s, dedicated ASCII art groups started to release collections of their work, which can be viewed online with the right encoding and fonts at asciarena.com.



Razor 1911 by Karma. Taken from asciarena.com.



Block ASCII is the informal name given to a standard developed by IBM in the late 1970s. It was

²¹ http://www.bogost.com/games/a_television_simulator.shtml

²² ASCII contains a total of 128 characters, but 33 of them are control characters which are used to affect how text and space is processed. The original meaning of the term ASCII is today known as US-ASCII.

an 8-bit character set which contained several characters that enabled a pixel-based approach to ASCII art. Block ASCII is essentially a black and white form of ANSI art, and it was very popular among MS DOS users, particularly in the “warez scene” (see Rehn 2001).

ANSI art uses 8-bit encoding²³ and offers 16 predefined colours. It is arguably the ASCII art that is most similar to pixel graphics. The combination of Block ASCII characters and colours creates an appearance similar to pixel graphics and some characters that mimic dithering. The underground community of artists that work with ANSI is often called The Art Scene, and they release art packs²⁴.

With each of these styles of ASCII art, it is easy to see the relationship between the text characters used and the way in which pixels were eventually used for graphical display. The different styles reproduce the concept of pixels in different ways because of the different character sets they utilize. For example, something created in a Block ASCII style might use something like a ‘dark shaded block character’  and is visually similar to the PETSCII character .

4 Non-representative ASCII

It is a natural tendency for images to be recognizable and interpreted easily. For ASCII art this means that the visual experience outweighs the verbal connotations of text. In some cases the text used is significant because it reinforces the purpose or meaning of the image created as in concrete poetry. ASCII art is normally successful when it renders correctly, it is decoded properly, the communication is received successfully - as with most media art. But ASCII art can move beyond its traditional functions and expand while still carrying its aesthetic significance.

Text-based visual art is commonly not meant to be executed or interpreted as in software and language. It could become simply a visual language on a screen made up of both code and image marks to be interpreted by the viewer. This works on the basis of imagination and recognition: that the code is not code in the typical sense but is preformatted to generate an image or graphic. It works in an avenue between writing and drawing; not explicitly one or the other but with aspects of both. It is decoded by the viewer as with the tradition of other image forms like painting or drawing. The marks are decoded and an image constructed individually by the viewer. The potential for non-representational ASCII art begins to

²³ http://en.wikipedia.org/wiki/Code_page_437

²⁴ <http://16colours.net>

form around the consideration of the textmode characters as marks on a digital surface.

The ASCII character set is a limitation unique to digital environments and in contemporary uses of computers it is somewhat arbitrary. In most cases, it is irrelevant to know or understand the character set because it happens ‘behind the scenes’. However, this characteristic is what ties together experimental literature forms like concrete poetry and Oulipo with the conceptual aesthetics of early Internet artists. The constraints placed on visual display by a deliberately chosen set of text characters opens the potential for a digital aesthetic that speaks about how humans use language different than machines. It is perhaps a visual language somewhere between them that creates avenues for new meanings to be generated. With this understanding, the ASCII character set becomes like a digital mark-making tool that could be used as a more complete analog to drawing or painting than software remediations of brushes or pencils. As the typewriter and letterpress opened up room for experimentation with text as image, so does the keyboard.

One of the major characteristics of new media identified by Lev Manovich is that of modularity (Manovich 2001:30). In the context of ASCII as a standard, the individual text characters are modular and portable between almost any software application. In addition, entire ASCII art compositions are modular and can be copy/pasted intact from one document to another or from application to application without changing the fundamental text nature of the composition. For example, one could copy a drawing directly from Joan Stark’s site, paste it into a text document and edit, then copy the edited version into animation software and create a moving typographic sequence. At each stage of that process the drawing is a modular unit that functions across software applications or operating systems. It is a modular structure within a textmode grid.

4.1 Current Tendencies

ASCII art websites still exist and their communities thrive.²⁵ In addition, new uses of the format have been taking form on other Internet-based platforms. Under the hashtags #TWITTERART, #140art, and #sYmBoLaRt, a range of users draw within the 140

²⁵ Some examples include utf8art.com, chris.com/ascii, [alt.ascii-art](http://alt.ascii-art.com), asciimator.net

character constraint of Twitter (Figure 4). The posts under this tag include type graphics, cartoons, drawings, and simple patterns. The works *crashtxt* and *reCAPCHAT* by jimpunk use Twitter to different conceptual ends.²⁶ The former presents the viewer with a web-based Unicode keyboard and processes the input directly into the *crashtxt* Twitter (Figure 5). The latter asks users to use a traditional ‘captcha’ form and posts to the *reCAPCHAT* Twitter.²⁷ These works share the modularity of ASCII art but not its traditional, pre-Unicode aesthetics. Our attention is turned to the way we see and interpret textmode characters on the web.

Other artists use the characteristics of social networking sites as an invitation to look for and exploit bugs with aesthetic intent. The Facebook account *glitchr* run by Laimonas Zakas, has been known to break outside of the normal formatting and layout of the networking site.²⁸ Posting status updates made up entirely of obscure Unicode characters and diacritical marks, *glitchr*’s feed was made up of floating marks over, around, behind, and on top of other page content (Figure 6). The posts, in essence, broke or hacked the Facebook layout and transformed it into a place where text characters were “emptied from their primary communicative signifiers and repurposed as formalized, aestheticized objects”.²⁹ Screenshot documentation of the Facebook account and Tumblr eventually served as a way to preserve the posts as the websites fixed the bugs *glitchr* exploited.³⁰ What became visually challenging and aesthetic was the breakdown of the tightly designed site called forth through the insertion of a form of ASCII art where normally one might find banal text.

Daniel Temkin’s work *Unicode Frenzy* randomly chooses Unicode characters and organizes them into multi-layered designs.³¹ Like *glitchr*’s broken Facebook displays, Temkin’s Unicode layouts turn our attention to the aesthetics of individual text characters and how they are arranged in web display (Figure 7). Disregarding the type grid and the preformatted nature of traditional ASCII art, their

²⁶ Available at <http://jimpunk.com/reCAPCHAT/> and <http://jimpunk.com/crashtxt/>

²⁷ <https://twitter.com/#!/crashtxt>, <https://twitter.com/#!/reCAPCHAT>

²⁸ <https://www.facebook.com/glitchr>

²⁹ <http://rhizome.org/editorial/2012/mar/29/diacritics-glitchr-draft/>

³⁰ <http://glitchr.tumblr.com/>

³¹ <http://danieltemkin.com/UnicodeFrenzy/>

work generates a visual aesthetic from broken language. A more simplified way of viewing this breakdown might come from another project of Temkin's, *Unichar*, which creates a sort of 'Hot or Not' for the Unicode character set.³²

5 Conclusion

The relevance of ASCII art falls within its unique position in between human language, programming language or code, and visually aesthetic language or image. Its potential, however, lies in our ability to use ASCII as a way to blur those boundaries. When text characters are used independently from their function as language and when images are generated with no representational reference, then text characters become their own modular visual units. Those units might maintain their other significances, but can also generate new meanings.

These potentials are already explored by artists, but will likely spread to other fields. With the popularity and power of text-based media such as Google Search, Twitter and Facebook Ads comes new possibilities and requirements for strategic communication. Companies, organizations and other brands can improve their visibility through ASCII art. One example is the car rental company Sixt who added ASCII art to Google AdWords in order to receive more attention (Figure 8). Following this logic, it is not surprising to see artists and fashion designers incorporating ASCII art as print on clothing.³³

Similarly, the scarcity of available URLs and account names have led to difficulties in registering new unique names. ASCII art is a way to tackle this issue, which so far has been most notably in music. Prince replaced his name with a symbol in 1993, and more recent examples include acts such as :), ??? and !!! . In so called witch house it is common to use names with odd Unicode characters, like †‡† and ▼◻◻◻◻◻◻. According to Matt Sheret at Last.fm, "it's not so much anti-Internet as very clever Internet" since it makes it easier for the fans to find the music (Watercutter 2011). But in order to talk about these names, there is a need to develop words or sounds for it.

In that sense, ASCII has gone from object to subject. It is no longer only an invisible transmitter, but an active ingredient in the way humans communicate. Not only is our online language and behaviour conditioned by Unicode, but our verbal language is affected by which Unicode characters are

popular. From that perspective, ASCII art will likely gain momentum over the next few years with potentials for many different artistic, practical, political and corporate uses.

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³² <http://danieltemkin.com/Unichar>, <http://hotornot.com>

³³ See Kayla Mattes ASCII Catz :

<http://www.kaylamattes.com/index.php?knit/90s-knit-collection/>

6 Illustrations

Figure 1. Joan Stark

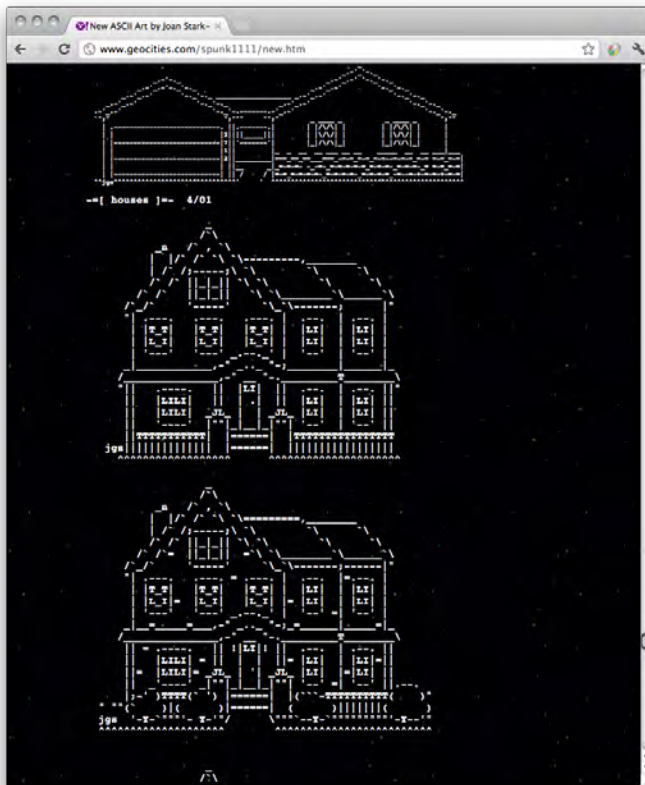


Figure 2. Jodi

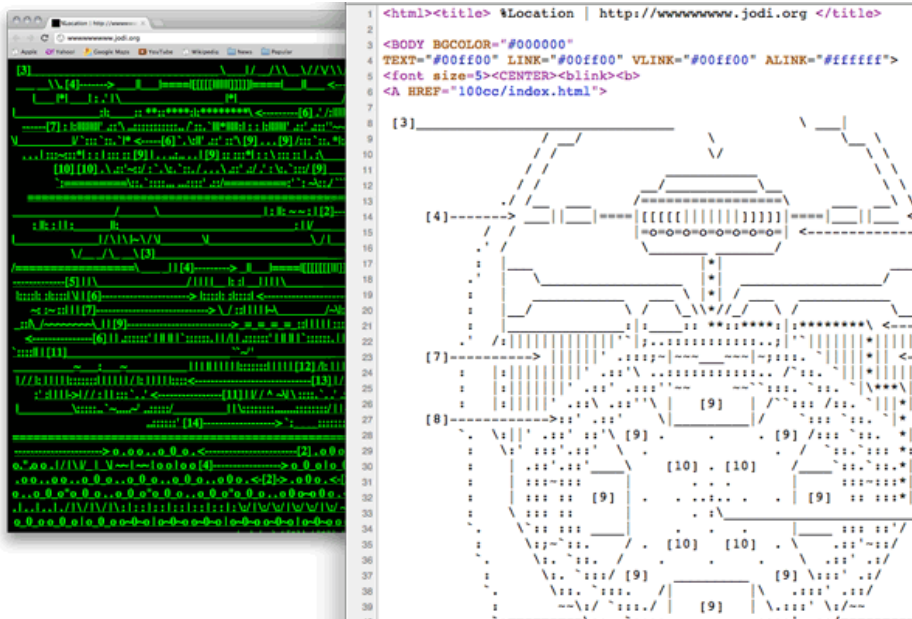


Figure 3. Vuk Cosic



Figure 4. #TwitterArt



Figure 5. jimpunk

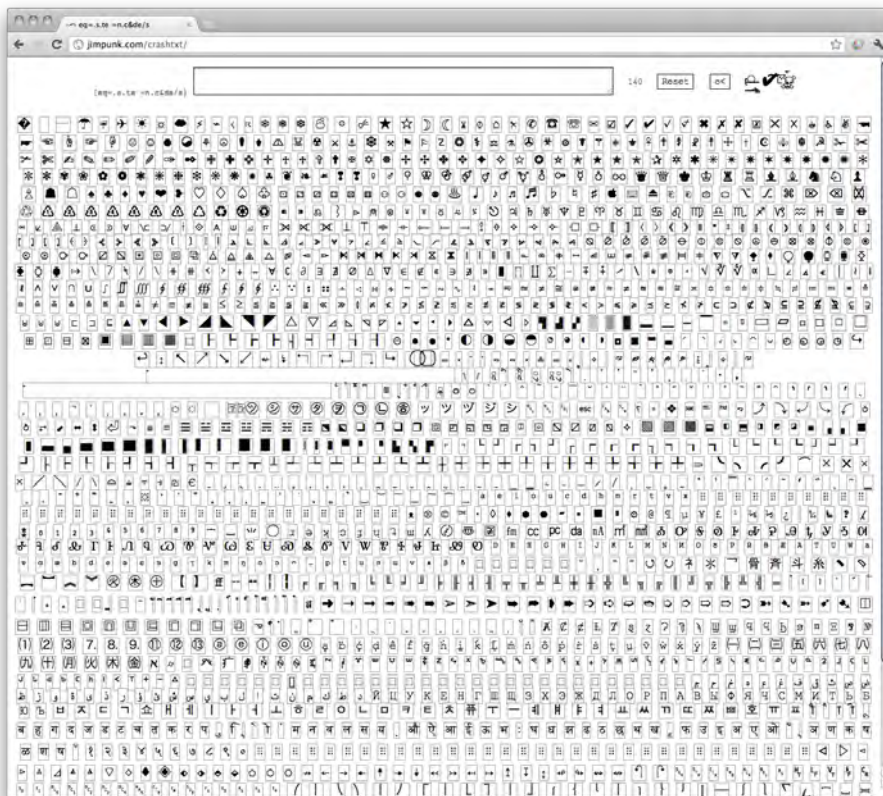


Figure 6. glitchr

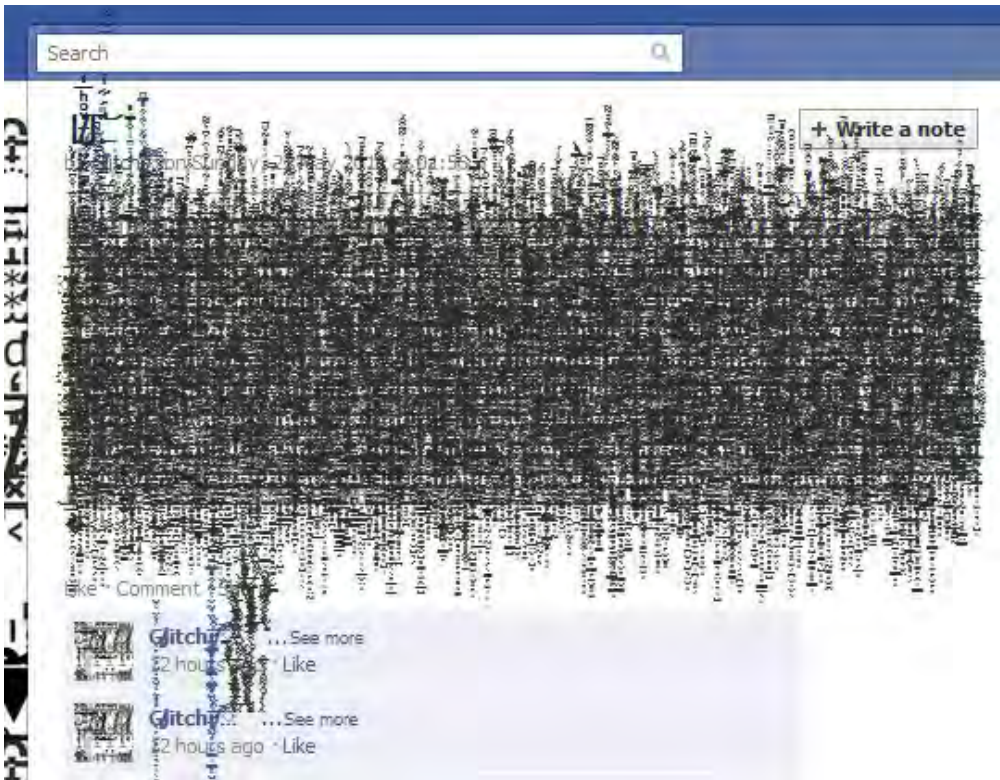


Figure 7. Daniel Temkin

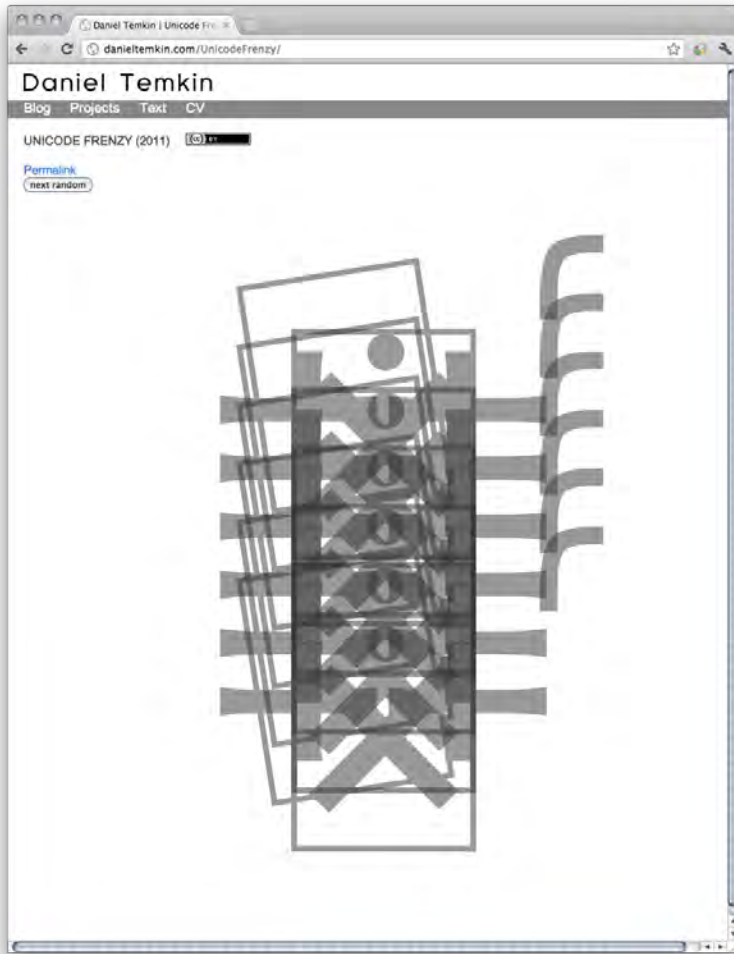


Figure 8. Sixt ASCII adwords



Hyper-Production and the Value of Exquisite Corps on the Web

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Abstract

The real and the virtual worlds around us are becoming louder while generating change at an unprecedented rate. The great volume and pervasiveness of information, products and experiences distributed throughout multiple media creates a need for faster response times and greater production volume. In this atmosphere, an individual finds him/herself under pressures to deliver in a similar manner. In order to perform in the heightened economy, the production, taking place on the Internet, is expected to grow while its value drops. Throughout the history of the Western world we have seen different permutations of the phenomenon of labor. Today, we are finding ourselves addressing the old questions in the new electronic medium. An artistic intervention provides a potent background for a discussion of labor and play in the virtual spaces.

Keywords

Internet, Social Media, Production, Invisible Labor, Leisure

1. Introduction

As the demand for faster and more expansive production on the web increases, the labor performed is marginalized and often reclassified as a leisure activity. This state of affairs inspires a reflection on possible outcomes of this trajectory. Often, individuals express their desire to clone themselves, figuratively speaking, in order to meet the demands for productivity. Fortunately, personal production can be magnified through the increase in the result of one's actions. The Hyper-Generator is an art piece creating an environment conducive to such production. The result is an agglomeration of data arranged according to a

principal, which creates an aesthetic specific to the digital world.

The genesis of the project comes from a reflection on the intensity of the world surrounding us. The sheer volume and pervasiveness of information repeated throughout many platforms creates a sense of pressure for an individual. The sensory stimuli available to us either through entertainment, transportation or by simply living in the world provides intensity previously unmatched by life. Our environment has grown louder and more aggressive in demanding our attention. In an effort to meet the challenge coming from the outside, we amplify and distribute ourselves as well. The Hyper-Generator is a project that facilitates self-amplification through multiplication of the effects a single person has in the world.

This intensification finds its reflection in a number of human endeavors such as work, play, economic and social currency and modes of expression. In this paper, I will first examine the state of labor and production relationships in the amplified economy. Then, I will formulate the essential issues addressed by Hyper-Generator as they relate to the amplified economy. I will conclude with a possible direction to approach expression in the digital world.

2. Hyper-Labor

Throughout the history of the Western world we have seen different theoretical approaches to the phenomenon of labor. The term initially coined by Marx in the context of class struggle stood for commodity that can be bought and sold. "Labor does not only produce commodities; it produces itself and the laborer as a commodity and that to the extent to which it produces commodities in general." (Marx, 1977) Further,

Marx explains how such conceived production escapes the original worker and becomes alienated. “What this fact expresses is merely this: the object that labor produces, its product, confronts it as an alien being, as a power independent of the producer.” (Marx, 1977) The alienation of the product from the producer leads to a schizophrenic situation, in which the maker is not entitled to fruits of his/her efforts nor the work itself. In this gesture the relationship between the worker and the product is distorted such that work does not appear to originate from the worker.

This line of thought has been taken a step further by Second-wave Feminist thinkers. They adopted the Marxist rhetoric to talk about the invisible labor of women and minorities in order to expose the social bias against work performed by those groups. The work done at home and at menial jobs was and some would argue still is not rewarded with pay or high social reputation despite the skill and dedication it requires. A woman cannot be even alienated from her domestic work because the work is not acknowledged as real. “The more successfully women perform this concrete work (...), the more invisible does their work become to men. Men who are relieved of the need to maintain their own bodies and the local places where they exist can now see as real only what corresponds to their abstracted mental world.” (Harding, 1996) Thus, the domestic labor fails to be conceptualized as an activity that generates value. I believe that there are parallels between the labor performed on the web and the invisible labor as defined by Second-wave Feminism.

Today, the economy of labor is undergoing another shift. The majority of the population in the developed countries lives immersed to a different extent in the virtual world provided by the Internet. Similarly to regular life, the virtual medium requires work in order to develop, function and thrive. Simultaneously, the virtual world subtly infuses every aspect of our lives. Through our constant use and reliance on the medium, we often forget its complexity and are only snapped back to reality by an annoying error message or dysfunctional user interface. The workforce ensuring the smooth operation,

variety and usefulness of the content remains hidden behind the screen.

Online work is organized along two major trajectories: the development of the infrastructures such as specific platforms and production of content. Because of the ephemeral nature of the medium, its lack of tactility and cryptic development process, the understanding of work required escapes most laymen. This leads to unrealistic expectations and the notion that only minimal work is required in designing, building and maintaining online structures. Somehow this misunderstanding is perpetuated and exaggerated to a point where the development process is expected to be economically minimized, if not rendered completely invisible.

In parallel, the production of content is increasingly performed by unpaid labor. This tendency reaches its peak in social networking sites, where personal information and content is handed over to the site’s proprietors by means of a contract. In effect, we are building complete demographic profiles of ourselves for the advertisers turning ourselves into a commodity as a worker and as a product. This is also the point where leisure becomes indistinguishable from work. While in keeping with the traditional approach, one is not being paid for their leisure activities, the proprietors of the content still capitalize on the products of those activities. The work is contextualized as play. Since there is no monetary value placed on the products of play, the process by which they come to exist becomes economically invisible.

The distinction between leisure and labor activities may not be a sufficiently complex conceptualization when it comes to online content production. The feminist theorists have been struggling with a similar delineation applied to housework. Sandra Harding talks about the example of time-budget studies “which regard housework as part leisure and part labor – a conceptualization based on men’s experience of wage labor for others vs. self-directed activity. But for wives and mothers, housework is neither wage labor nor self-directed activity.” (Harding, 1996) The distinction coming from the outside male

perspective fails to represent the experience of the person performing the activity.

Similarly, maintenance of multiple social profiles, as experienced by an average user (with the exclusion of advertising professionals), is neither leisure nor wage labor activity. There is a certain peer pressure to keep up with the production of fresh content, which feels like work, yet the activity is performed during the time when one is not working. This ambiguity allows for manipulation of what it means to produce content on the Internet. The final conceptualization is dictated by the pervasive power structure. In case of the feminist view, it was provided by the masculine perspective while in today's online economy, this judgment is passed by the owners of the digital platforms. In either case, the worker/producer has no say in the economic categorization of their own efforts.

It is additionally interesting to note that the sheer volume of online production undermines quality. In fact, quality becomes an obsolete concept no longer useful in a world of countless permutations. The reshuffling, re-contextualizing and reclaiming of the content already available is the new pass time or production. By the virtue of exercising one's taste, namely liking something, one brings an object into one's sphere and incorporates it into the personal collage. The act seems frivolous but is latent with rich economic meanings, which in turn become monetized. Of course, this activity retains its economic significance only as long as it's tied to a living, breathing and buying human being.

3. Hyper-Production

With the advent of the invisible labor on the web and the recent economic meltdown came additional pressures to perform continuously at peak capacity. The web is viewed as a phenomenon that comes to be almost spontaneously and above all mostly for free. Yet in order for this perspective to hold true, legions of developers and content producers work around the clock and around the globe. In the mean time, the pace is only increasing and

demands are still becoming more ambitious. We are reaching the limits of human capacity in the final stretch for hyper-production.

In response to the high demands for volume, low price points and speed, one attempts to imagine the world capable of providing just that. The Hyper-Generator is an environment, which translates casual actions performed by a human in a course of going through one's day into online production. The result of one opening a refrigerator or turning on a water faucet is recorded on the web as a concrete action or number of actions, which amount to producing a profile on one or many of the social networking sites. This human enabled system arranges content without direct human intervention and produces assemblages shaped by the rules of the specific site. While the content is pulled randomly from the web, the action mimics user behavior, in which different pieces of content are sampled and liked becoming part of a single profile.

Beyond the increase in production volume, the Hyper-Generator also results in an increase in intensity of each action. In such system, each action having multiple results becomes more and louder than its original. The labor that serves as the catalyst is not only optimized but also amplified through the increased production. Additionally, actions become distributed across platforms and encrypted as results not reminiscent of the original. Therefore, the system accomplishes two tasks: increase in productivity while hiding the labor even further. I imagine this perverse exaggeration as a possible result of the trajectories, which we are already following as described above.

4. The Exquisite Corps

The profile created by the Hyper-Generator unfolds in a manner similar to an exquisite corps. The random information from the web is pulled together into a common context. The silhouette of the profile serves as the unifying logic and suggests connections between the arbitrary parts. Thus created profile has the capacity to go through a multitude of permutations in a gesture that suggests

collaboration, which is not aware of it happening.

The trope of an exquisite corps embraces randomness and poetical serendipity. Both of those follow the modernist ideas of world as a coherent entity, where the mind creates connections even in a face of discord. On one level, the created profile is a pure random data inserted into prearranged categories or a template. Then, the human viewer employing interpretation performs work, which reestablishing the psychological continuity of the whole on a purely instinctive level. Andre Breton, one of the inventors of exquisite corps, talks about this suspension of reasoning mind as a success. “Finally, with the Exquisite Corpse we had at our command an infallible way of holding the critical intellect in abeyance, and of fully liberating the mind's metaphorical activity.” (Breton, 1948)

The Dadaist, at the beginning of the last century, worked in a context of a society already filling up with information and disturbances such as World War I. Their reaction to the increasing complexity of the world was to positively make sense of it through play and discovery. Our present paradigm proves that it is possible for the information to accumulate infinitely. Faced with this predicament, can we still embrace the discovery process and draw pleasure from embarking on a voyage to encounter new sea monsters, to use a Dada metaphor, such as the generated profiles?

Perhaps this is the new creative act: data design and arrangement as opposed to data creation. The profiles undergo a certain design procedure according to a set of rules. In thus created system the content is almost secondary while the logic framing it endows the system with an aesthetic form recognizable to the human mind. This notion is congruent with the popularity of distribution platforms, which often make a bigger splash than the content being channeled through them. For example, Tweeter is worth fantastically more than any of its single posts. Similarly, a new online music player will create much more of a buzz and for a longer time than a new song that can be heard through it.

An exquisite corps as a design idea implies a possibility of data aesthetic understood on its own as just data. The Dadaists invented their game in an effort to move away from the tradition of mimicking the real world in art. As Andre Breton energetically postulates: “These drawings represent total negation of the ridiculous activity of imitation of physical characteristics, to which a large and most questionable part of contemporary art is still anachronistically subservient.” (Breton, 1948) In a similar way, data is still harnessed in the service of communicating and mimicking an outside world, which the data is not. In effect, we can never deal with the digital world as such since we experience it as a metaphor of the physical world. Perhaps, rearranging data is the first childlike gesture that honestly deals with the medium itself.

5. Conclusion

The Avant-garde project claimed its place in the society by eluding established constructs and challenging existing modes of expression. These actions have been rendered futile every time the established institutions and economies reabsorb such gestures into the mainstream culture. The Hyper-Generator creates products, which in a similar way escape present web economy. While being tied to actions of a person, the profiles don't represent data that relate to a potential buyer since their aggregation is randomized. In this gesture, the system temporarily escapes the established economic construct and exists only for its own sake.

In evading the online market place, the gesture reclaims the meaning given to our modes of production on the Web. The actions contributing to the construction of the online profiles are not representative of an individual and consequently cease to have any marketing value. Thus, the work performed is rescued from the limbo positioned in between leisure and wage labor. Participating in Hyper-Generator is play and requires no additional effort to just being in a space. One does not reproduce oneself on the Web in a form of a more or less accurate profile, which could be

bought or sold. Instead, the production results in abstractions created for the sheer joy of reshuffling data.

If we are to exercise our leisure time on the Web, let it be just that: a play outside of the tedious economies of labor and production. The intensified world can then return to being an expanded playground unaffected by the economic struggle. History, however, teaches us otherwise. In the end, the Avant-Garde gestures become reconciled with the powers, which have been previously evaded. The hegemonic system incorporates the rebellion as part of itself. Regardless, the fun of inventing new spaces for play continues.

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21st Century Brazilian Computer (Experimental) Art

Abstract

In this essay is presented the emergence of (Experimental) Computer Art in Brazil, its historic contextualization and general developments. This kind of art, immanently connected to computers, emphasizes sensory, poetic and aesthetic experiences inter-mediated by computational devices, which became also the artworks support/media. It is an art focused on the trilogy: artists, computers and public. The Art Institute at the University of Brasilia created and promotes Computer Art courses, exhibitions and the theoretical-practical methodologies described here, such as the concept of meta-installation. Since then we here propose to examine this artistic production which, in our view, expresses an emergent Brazilian identity in contemporary art.

Keywords

Brazilian Computer Art, meta-installation, University of Brasilia

1 Introduction

Sometimes a flickering thought points to something that has floated shapelessly in our mind giving it meaning, making us understand that such an apparently thoughtful moment had a cathartic significance. As a bolt of lightning such

happening brings an exhilarating sense of joy and clarity. It was something similar to this that drove us to write this essay related to a blossoming experimental Computer Art in Brazil. An art related with sensory experimental experiences; an experimental art, strong, bold, eager to explore its technological environment as its support, breaking boundaries, appropriating scientific concepts, rethinking and contaminating them with poetic and aesthetic values.

First we will begin with a brief introduction to the emergence of Computer Art in Brazil, nominating some of the pioneer artists and events. Secondly, a description of how the related art works are integrated into specific exhibition spaces by applying what Tania Fraga introduces as meta-installations. Some examples are described and illustrated. The idea of different kind of spaces for innovative works of Computer Art have been projected and mounted. Aware of the risky task we propose, this essay has begun to delineate the field's profile as a symbolic feedback into Brazilian Computer Art. Finally, we point to some possible developments of such art.

2 Historical Contextualization

In Brazil, around the year 1987, a small group of artists and scientists named Infoesthetica Group¹, began to explore an art form that was emerging at the time, in which sensory, poetic and aesthetic experiences would be inter-mediated by computers. These computers acted as devices capable of responding to procedures, such as processing and answering interactors² requests, and, at the same time, were the artworks support/media. Such procedures characterized the artworks proposed at that time in very specific ways, and required from the artists programming knowledge to “break the codes”[1]. Their main goal was not the development and research on computer science algorithms but to acquire this type of knowledge in order to create meaningful sensory, poetic and aesthetic environments. Such art was referred to, at that time, as Numeric Computer Art or Cybernetic Art.

The Brazilian group did not come up with those terms or definitions. They were already in use by artists such as Bernard Caillaud (France), Waldemar Cordeiro (Brazil), Yoshiro Kawaguchi (Japan) Paul Brown (UK), Hebert Franke (Germany), Nicholas Schoeffler (Hungary), John Whitney (USA), Lilian Schwartz (USA), Frieder Nake (Germany), to quote just a few. Theoreticians such as Arlindo Machado (Brazil), Lúcia Santaella (Brazil), Vilém Flusser (Czechoslovakia-Brazil), Philippe Queau (France), Edmund Couchot (France), Roy Ascott (UK), among others, had also written about this emergent art form.

It is important to point out that Brazilian computer artists have suffered strong influence of the Brazilian theoreticians quoted above – mainly the art critique and curator Arlindo Machado, the semiotician Lúcia Santaella, and the Czech-Brazilian media philosopher Vilém Flusser – who have been instigating artists about the experimental potential of computer technologies. Flusser lived in São Paulo for 30 years. His articles inquired about the role of artists and philosophers in post industrial age in contemporary society, pointing to the possibilities of technical objects³ become “carriers of meaning” and the transformation of “people into designers of meaning in a particular process” [2].

The name, Numeric Computer Art, was frequently questioned, mostly because at the time there was a need to insert computers into the art practice in a *softer* way, maybe as *media art*, or *electronic art*, or *web art*, even *Internet art*, among others terms. Other Brazilian art groups also begun to work⁴ with computers, but some of them did not approach it’s insertion in such a strict sense⁵, meaning that the procedures and processes of computing were explored conceptually, or instrumentally, but not always immanently by going after the 'breaking of codes' themselves.

In this essay we assume the term **Computer Art** to determine the specific artistic production in discussion. We consider such art as immanently connected to computers, which are active agents in the following trilogy:

1. Artists, the ones who conceive fields of actions creating customized software and hardware, and environments where sensory,

poetic and aesthetic experiments happen as expressive, affective and cognitive events;

2. Computers (or an environment of microchips, sensors and actuators), that process data answering requests and filtering actions according to their programming;

3. The public, designated as interactors, who are the ones causing changes into the computers environments, provoking answers to such actions.

This visceral trilogy is immanent to the ontological and epistemological Computer Art set up.

It is also important to state that “experimental art has had a strong role in Brazil maybe because the art market did not offer significant possibilities for artists that did not follow the current paradigms. Some of these experimental artists were so radical that they were, during their life, strongly rejected by the mainstream Western art. For example, the today incensed artist Lygia Clark⁶ was almost expunged from Sorbonne, in France, in the 70’s, because she dared to experiment with visceral body sensations and feelings using ordinary materials such as onions skins, pebbles, plastic bags, among others, having the participants bodies as supports for her work” [3].

The pioneer artist Waldemar Cordeiro began to use computers in visual arts in Brazil by the end of the 60's⁷ [4]. He was part of the Ruptura and the Concrete Art Poetry Groups in São Paulo. In 1971, he showed his computer artworks at the exhibition Arteônica [5] and presented a manifest with the same name influencing many Brazilian

artists. He said on that occasion that “in Brazil, Computer Art found methodological background in Concrete Art” [6]. In 1972, he created the Arteônica Centre at the Art Institute of the University of Campinas, UNICAMP [7], which has had a pioneer role for the development of algorithmic art research in image generation [8].

In 1994, after much struggle, these ideas begun to be more generally accepted by the Brazilian art community and the first Brazilian art graduation program, focusing these issues, was created at the Art Institute of the University of Brasilia, in Brasilia, capital of Brazil. Other artists such as Gilberto Prado, André Parente, Milton Sogabe and Diana Domingues also accepted the challenge and a few years later were also coordinating researches in Computer Art at the states of São Paulo, Rio de Janeiro and Rio Grande do Sul.

In 1995, Fraga presented her PhD research with the exhibition *Stereoscopic Simulations* at the São Paulo Museum of Image and Sound and in 1996 she organized the first online Internet exhibition for the International Visual Semiotics Congress held at São Paulo Catholic University, PUC-SP. In 1995, Domingues curated the exhibition *Art of the XXI Century* at the Museum of Contemporary Art of the University of São Paulo and in 1999 a portal at the Mercosul Biennial in Rio Grande do Sul. In 1997, Daniela Bousso curated the exhibition *Mediações* at Itau Cultural Institute aiming to “take out art from its conceptual towers and from the ascetic modern domain in order to allow it to dialogue with the public” [9]. Latter on, as director of the Museum of Image and Sound she created the first Brazilian

media lab and instituted, for the first time in Brazil, an artist-in-Residence program for young artists.

Since 1997, the Brazilian Itau Cultural Institute has had a leading role in the field of Computer Art. It has been showing and awarding artists working with art and technology and has promoted very important international art and technology biennial exhibitions named *Artificial Emotion*. Many artists quoted in this essay have won awards and commissions from this institute.

A second generation of artists, working with art and technology, was rising around the years 1996-2008: Anna Barros, Carlos Praude, Cleomar Rocha, Daniela Kutschat, Douglas de Paula, Dulcimira Capissani, Edgar Franco, Eufrasio Prates, Francisco Marinho, Guto Nóbrega, Gisele Beilgman, Ivani Santana, Kátia Maciel, Lucas Bambozzi, Lúcia Leão, Luisa Paraguai, Luiz Duva, Lygia Saboia, Marcos Bastos, Maria Luiza (Malu) Fragoso, Martha Gabriel, Raquel Kogan, Raquel Zuanon, Rejane Cantoni, Rosangela Leote, Sandro Canavezzi, Silvia Laurentis, Simone Michelin, Valseli Sampaio, Wilton Azevedo, among many others. Some of them are not specifically 'code breakers' but explore computer systems in collaboration with programmers.

Theoreticians Priscila Arantes and Monica Tavares, Art Historian Nara Cristina Santos, curators Francielle Filipini, Wagner Barja, Paula Perissinoto, dance curator Maira Spangero, following Machado, Bousso and Santaella's leadership, have begun to investigate this specific type of art. Even curators such as Christine Mello

who used to work only with Video Art has organized exhibitions including Computer Art installations.

2.1 Meta-installations: study-case

Meanwhile, at the University of Brasilia, what used to be a small biannual meeting was transformed in an annual International Congress always held with a Computer Art exhibition. The theoretical practical methodologies developed to set up such exhibitions and subsequent results from these experiences were the triggers for this essay.

In 2004, during one these annual congresses quoted above, which commemorated ten years of the University of Brasilia graduate art program, the exhibition $\geq 4D$ (*Greater or Equal to 4D*) was held at Bank of Brazil's Cultural Centre in Brasilia. For that occasion Tania Fraga and Wagner Barja curated the show and Fraga introduced the concept of meta-installation, where the focus of almost of all works was interactivity. The idea was to create space-time dialogues among these artworks, and not a set of separated independent installations. The meta-installation project for $\geq 4D$ not only gave an organic coherence to the exhibition's space but integrated the art pieces exploring their poetic proposal. The architecture of the $\geq 4D$ exhibition was conceived mirroring virtual reality technology navigation's models. "The meta-installation consisted of works by artists and researchers working mostly with this type of art. These works breach the architectural space-time structure, creating tunnels of events that allow the public to dive into their content; they ensure the non-linear

nature of the routes through the meta-installation, reconfiguring the architectural space of the galleries, re-directing the gaze and the modes of perception of those moving through it” [10].

Therefore, the structural organization of the exhibition environment was designed to stretch the concept of installation, generally used for contemporary works of art, where each artist produces and organizes his or her micro space individually. This organization aimed to unveil the significant aspects that were being trans codified into sensations, which could be felt and shared. “In general, the works on display cluster images, sounds, tactile sensations and movements, as the outcome of collaborative processes among the artist, the public, the machines and the many minds whose intelligence is embedded in them”. Human and artificial intelligence were united to create a symbiotic communion among the interactors' mind, artists and machines. The exhibition was held in two galleries. The “tunnels of events in the upper gallery wander through fields of possibilities contained within the synthesis of images, sounds, abstract concepts, tactile sensations and possible isomorphisms among these categories. (...). The lower gallery offers a hybrid telluric field where images of synthesis and material culture blend, breaking through the barriers of what is normally called the real” [11].

The artists at this exhibition were: Bia Medeiros, Chico Marinho, Daniela Kutschat and Rejane Cantoni, Diana Domingues, Gilberto Prado, Luisa Paraguai, Lygia Sabóia, Margarita Schultz (curator presenting the work of a collaborative Latin America group⁸), Malu

Fragoso, Silvio Zamboni, Suzete Venturelli and Tania Fraga. These artists stand out for their innovative and original proposals, mainly in terms of exploring the potential of computer languages, extracting and deploying new poetics.

Computer languages were not created for artistic expression, but some artists have subverted their use, allowing the appearance of new art forms. Human sensorial apparatus enables 'aisthēsia'⁹. When artists create different ways of perceiving the world, intermediated by computational devices, they are re-inventing 'aisthēsia'. Meta-installation's design provided this experience consequently promoting aesthetics.

The works displayed at the exhibition represented and integrated boundaries, amalgamating music, as well as visual and scenic arts, with a broad-range of scientific areas. By showcasing this type of production this exhibition valued the pioneers who faced unimaginable difficulties in developing their output, placing Brazil and Brasilia in a leading position within the international Computer Art community

Bellow, Figures 1, 2, 3 and 4, a sequence of images of the $\geq 4D$ project.

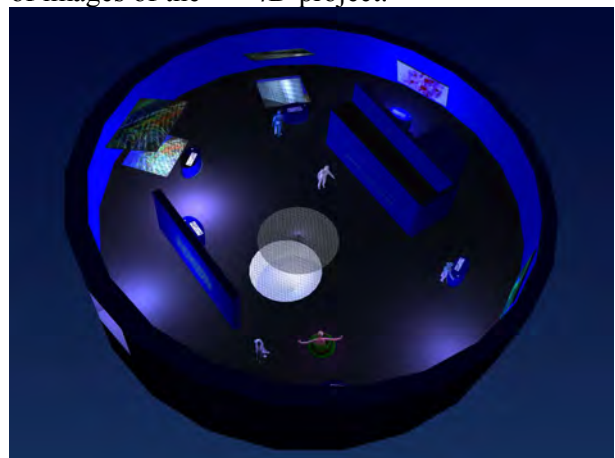


Figure 1: Upper view of the first floor

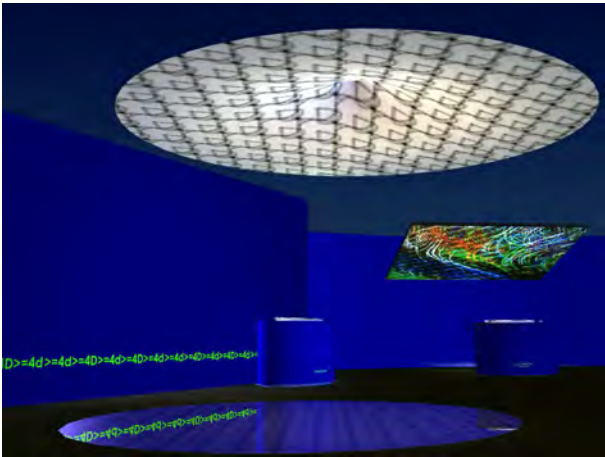


Figure 2: Simulation: Simetrias (Lygia Saboia) and Op-era (Daniela Kutshchat and Rejane Cantoni)

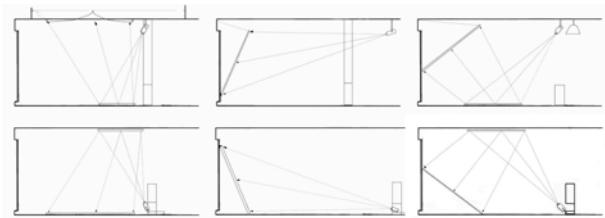


Figure 3: Lay out of six different artworks



Figure 4: Vestis by Luisa Paraguai

Since 2008¹⁰, a set of exhibitions named *EmMeio* have gone forward with projects having similar approach to $\geq 4D$. *EmMeio* is translated literally as *InBetween* in Portuguese but *meio* also means *media* creating a playful game of words.

They have been conceived and produced with the support of the Art Institute of the University of Brasilia and the Brasilia Republic's National Museum.

The concept of meta-installation has been applied for these exhibition spaces in such way that the proposed set ups have allowed the emergence of new meanings resulting from space-temporal relations created among art pieces, re-signifying the original proposal of the artist or artist's groups¹¹. The curatorial approach to these exhibitions begins by defining the physical space of the exhibition, so to say, all areas designated for the artworks, which will help create an architectural design that consequently promotes a sort of self organization for the montage. Also, the process of selecting the artworks for the exhibition has been related to the concepts of meta-installation and self-organization. In the case of the *EmMeio* shows three areas have been available:

1. Indoor museum installation's space for audiovisual artworks with and without Internet connection;
2. External space, outside the Museum (a big white cupola for night projection presentations);
3. Two auditoriums, used for concerts, performances, music and VJs shows.

Following, in Figures 5, 6, 7, 8, 9 and 10, we present *images* from these exhibitions.



Figure 5: *EmMeio#1*, exhibition entry hall, 2008



Figure 6: *EmMeio#1*, installations, 2008



Figure 7: *EmMeio#1*, performance by Eufrazio Prates, 2008



Figure 8: *EmMeio#3*, set up design, 2011



Figure 9: *EmMeio#3*, set up design, 2011

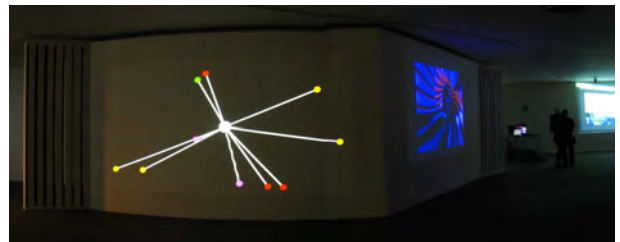


Figure 10: *EmMeio#3*, panoramic view, 2011

EmMeio's curatorial approach desires to bring together some of the main aspects in Computer Art research and production in Brazil, with projects such as:

- 1 Artworks using computer as tools to create images of synthesis, sounds, photographic and video-graphic images, interactive or not;
- 2 Artworks conceived to be broadcast through the Internet;
- 3 Open space for participation and self-organization using video conference software.

- 4 Music shows, performances and VJs having computer art as background for their work.

3 A Visionary Dream?

The present essay aims to begin a reflection on Brazilian experimental Computer Art and artists' processes pointing to a field of different possibilities for artworks produced through computer coding. What is the difference between them and other means of creating art? Seeking this differentiation does not intend to enhance the value of one while depreciating the other, but rather to understand the singular aspects that characterize them [12].

At a time like the present, experience leads us to seek a better understanding of the foundations and possibilities of Computer Art looking for the convergences and divergences it propitiates with other art forms [13]. Art in general deals with expressive poetic sense experiences and so does Computer Art. But Computer Art deals with mathematical concepts in order to achieve poetic expression within the perceptive field of human sense and affective experiences. More specifically Interactive Computer Art deals with responsive affective and sensory fields containing sets of sense experiences interpreted as signs and expressed as processes. These sets establish different relations allowing many differentiated readings in different moments of their responsive repertoires. Repertoires whose kaleidoscopic capacity open them to successive and varied interpretations [14].

The sensory stimuli establish a complex network within the sensory and affective fields

creating possible organizations that may not have been predicted by the artist-programmer. It is as if the interactor is allowed to play and experiment with a finite set which has limitless boundaries. Therefore Computer Art becomes much more than Combinatorial Art. It becomes virtual realities.

As illusory sense impressions and representations it points to a classical art tradition while going after programmed actions, perceptions and sensations it approaches Constructivism, Concretism and Minimalism art movements [15]. Within such context notions such as reality, virtuality, visibility [16], and affect must be revised [17].

The virtual worlds are arbitrary creations of human minds and the interactors attribute a meaning to them in their own minds evoking a labyrinth of representations. The attribution of a 'real' experience to a virtual object creates very interesting ambiguities and also allow a lot of misunderstandings.

The setting of virtual objects and the 'existence' of virtual worlds emerge from the sense impressions they produce as subjective sensations since the perceptions result from illusions. These subjective sensations are nothing more than mental connections. Maybe these connections are the bound that entwines mathematics and art. The sense experience the interactor experiments and its subjective sensations are facts leaving one generally in awe. The comprehension of this emerging sensory order re inventing 'aisthēsia', as the result of numeric relations and functions, is a mystery we may never understand.

The support for computer artworks is also material but their technological settings are characterized by a system of applications that will perform the work. This system trans-codifies signals into subjective sensations using numerical, logical and symbolic languages. The resulting work of art is the combined product of tasks coded through these languages and stored in computer records. “If we wish to feel the texture of a painting by Pollock, we would damage the painting, as it was not created for this purpose. A Pollock working through computer codes in a technological setting created for this purpose could offer the public the feeling of touching these paintings. It may be argued that in this case, the work would lose its visceral aspect – a fact that seems to be a constant in the nature of art, as whenever something is gained, something is also lost. However, the loss is for the artist, selecting one medium to the detriment of the other. Meanwhile, the public gains a possibility of experiencing both alternatives, should this hands-on experience be available” [18].

4 Conclusion: Reverberations

In Brazil nowadays we see the blooming of hack labs and garage labs and many universities have begun to focus on Electronic Art and a few in Computer Art. The fields of architecture¹² and design¹³ have also begun to focus on these ideas. As an example of the opening of the art field to these issues we may quote the engineer Marcos Cuzziol¹⁴ PhD thesis at the School of Communication and Arts of the University of São Paulo, presenting proposals “for the creation of a new mathematical model for 3D games, inspired

by the Everett interpretation of quantum mechanics” showing through practical examples “how this new model could generate 3D games that adapt automatically to user specific skills, and how this new model could facilitate the creation of truly interactive story lines” [19].

In South America we also see the awakening of such approach in Argentina, Chile and Colombia under the leadership of Jorge la Ferla, Ricardo Dal Farra, Margarita Schulz, Iliana Hernandez Garcia and Raúl Niño Bernal, to quote just a few.

It is important to note that as the field of Computer Art is firming up, in-depth reflection is required on the issues related to its reverberations within society. Certain philosophers affirm that art is something that remains. Paradoxically, art produced through computer coding is ephemeral in its material aspects and, with the advent of interactive technologies, the role of the interactor alters the established system of relationships since the participation of the public is one of the core issues of this type of art. The character of the re-invented artwork alters its process of coming into being each time it is enacted.

Magnetic records and even digital versions of these artworks are perishable. However, the computer program that runs them is recorded in hard copies that, like theatre plays and music scores can be decoded, provided one has the knowledge of the computer languages they were written. Consequently, they can be re enacted and reinterpreted, just like musical scores or theatre plays. These interpretations may appear different

to future public, just as old scores sound different on our instruments today.

The artist is as creator of metaphors clustering hypotheses, conjectures and intuitive perceptions, without the intention of demonstrating them, as scientists do. However, when studying art history, it becomes clear that many concrete artists intuited the possibilities we are living at the present time. The art produced through the programming of computer codes we are dreaming of today will perhaps shape a near future.

Obviously, the skill resulting from manipulating computer languages trans-codified into feelings and sensations is still very limited. Brazil may play a leading role in this field due to the rapidity with which Brazilian society has been absorbing the changes prompted by the development of computer technologies. Brazilian artists have been challenged by theoreticians to develop new identities for a society which desires development and access to technologies and the benefits they bring to contemporary life. Computer Art may become one of the answers for these quests.

As it was said before, the University of Brasilia was pioneer in developing research projects in this area. Its Master of Arts degree – offered for more than a decade – was the first art course in Brazil to discuss and focus on these issues and an undergraduate bachelor degree in Computer Art is in process of governmental approval. This type of research answers to the commitment that guided the establishment of Brasilia as a hub of contemporary values,

appreciating the blend of Brazilian culture with the arts, while fostering an integrated development.

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- 1 The group: Aloisio Arcela, Bia Medeiros, Homero Picollo, Paulo Fogaça, Suzete Venturelli and Tania Fraga.
- 2 This term was coined by the theoretician Arlindo Machado.
- 3 Flusser in his book *Writings* used the expression technical images.
- 4 Mainly Gilberto Prado, Milton Sogabe and Artemis Moroni.
- 5 Regina Silveira, Júlio Plaza, Augusto e Haroldo Campos, Moises Baumstein, Sandra Rey, Diana Domingues, Silvio Zamboni, Carlos Fadon.
- 6 It is a pity that she is dead and can not acknowledge her own success.
- 7 See:
http://www.itaucultural.org.br/aplicexternas/enciclopedia_ic/index.cfm?fuseaction=artistas_biografia&cd_verbete=3529
<http://www.cibercultura.org.br/tikiwiki/tiki-index.php?page=Waldemar%20Cordeiro>
<http://www.mac.usp.br/mac/templates/projetos/seculoxx/modulo3/ruptura/cordeiro/bio.html>
http://www.acervos.art.br/gv/artistas_brasileiros/bio_wcordeiro.php
<http://www.pitoresco.com.br/brasil/cordeiro.htm>
- 8 Accessed April 11th 2010
- 9 The Colaborarte Group
- 10 'Aisthēsia' from Greek.
- 11 We also have had international researches participating in these exhibitions and events such as: Brian Kane, Maida Withers, Margarita Schultz, Oliver Grau, Raúl Niño Bernal, Tanya Dahms and Chantal DuPont.
- 12 Of course the exhibition guidelines are accepted by the artists beforehand who must agree with these approach although we accept their opinions and suggestions when they are present at the exhibition montage, which we strongly try to do in a self organized way. Since our budgets usually are very low only with the artists collaboration we have been able to mount these exhibitions.
- 13 For example the Brazilian architect Gilfranco Alves is developing prototypes of models for movable architecture using Arduino boards.
- 14 The Brazilian designer Arlindo Stephan also defended a thesis related to similar issues [21].
- 15 Marcos Cuzziol is a Brazilian winning game programmer and is the Director of Itau lab at Itau Cultural Institute.
- 16 <http://www.springerlink.com/content/d8u21638134u834g/export-citation/>, vol 21

The Post Digital Art is made of Paper, Cardboard and ABS¹

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Abstract

This article describes a tactic for media and digital art which is based on the displacement of native digital concepts to physical reality. Such *media displacement* aims to generate fissures rather than promote continuity and transparency by contradicting the process of *media remediation*, giving the spectator the opportunity to reflect and understand the mechanisms and effects produced by the complex media web surrounding us. The concept of *media displacement* was applied and tested during an artist residency the results of which support the pertinence and potential of such tactic.

Keywords

Displacement; Aesthetics; Remediation; Digital Art.

1. Introduction

Media and technology as extensions of our body are found everywhere and range from eyeglasses, to wheels of a car or mobile phones and pocket tablets [10]. Lately electronic and digital media appear infiltrated in all manifestations of human life. We are surrounded by thousands of invisible waves and by all kind of gizmos and appliances that share our space and time, connecting us with the others. Behind the most basic device there is a design strategy to make it appear as intuitive as possible to the end user. As a consequence of such transparency, the user is immersed in a complex digital maelstrom of information, data production and consumption which makes critical awareness of media use difficult to attain. Jean Baudrillard observes that the society of spectacle and the drama of alienation have been substituted by the ecstasy of communication, upholding the existence of “a pornography of information, communication, circuits and networks.” [2]

The author points out that “it is no longer the obscenity of the hidden, the reprised, the obscure, but that of the visible, the all-too-visible, the more-visible-than-visible; it is the obscenity of that which no longer contains a secret and is entirely soluble in information and communication.” [2]

Our perspective in line with the famous Marshal McLuhan’s “The medium is the message” regards the medium not only as a vessel for content and message transmission, but rather as a powerful, consequent actor, which is able to transform the way we communicate, live in society and define ourselves [9].

The long History of art tells us that technology and media have been the subject of artists’ inspiration, research and declarations for centuries, although this practice seems to be of increasing importance in a society highly saturated by information and under media influence.

The article aims to analyze how contemporary artistic practices can expose media functioning modes rather than making them transparent, and how artists can make their audience critically aware of their relationship with media and technology by using a tactic of *Media Displacement*.

The observation of recent manifestations in the field of media art, evidences a displacement movement of digital native concepts to the physical world, contradicting the flow of *Remediation*. Despite the increasing number of observed objects, such tactic has been already observed in artistic practices, which are not digital based.

In a digital paradigm, the representation of metaphors such as “window”, “friend” or “recycle bin” are certainly familiar to most of us. However, what happens if we displace concepts like “pause”, “undo”, “pixel”, “ftp” or “hyperlink” to a non-digital/electronic paradigm? Is this displacement capable of highlighting incompatibilities between these paradigms? Is it meaningful to us as human beings, constantly mediated and surrounded by media?

¹ABS: Acrylonitrile butadiene styrene is a thermoplastic commonly used in 3D printing.

Can this tactic render visible the workings of media, breaking the spell of transparency and making us aware of how media shapes our perception?

In order to gain insight on the tactic of *Media Displacement*, the first part of the text analyses the strategies and efforts of media design to render the medium transparent, reviewing the theory of Remediation by Jay Bolter and Richard Grusin. The second part of the text, analyzing the work of Aram Bartholl, Christopher Baker, Jens Wunderling and Hiroo Iawata, examines some examples, which fit into the tactic of *Media Displacement*.

Finally, and as this tactic was tested during a multidisciplinary artist residency constituted by artists, designers, engineers and architects the last section of the text describes this experience and results.

2. Strategies for transparency

The desire for unmediated interaction and experience seems to be the engine for thousands of designers, engineers, ergonomists and an endless array of other actors that work everyday to minimize the presence of the medium during the users' interaction. This research follows the rules of a consumer society in search for empowerment in faster, smaller, fluid and eye-candy technological extensions. The process of miniaturization and media dissemination has infiltrated all ramifications of the personal, social and political, becoming ultimately inseparable.

At least two types of immersion are at the origin of media transparency. The first type derives from the pervasive nature of media and describes our actual situation and relation to media. We are immersed by media and have a dependence relation with it. The character of this dependency is rendered visible when, for instance, we lose our mobile phone or when the Internet connection is "down". Such situations are normally causes for frustration and rage rather than moments for detached reflection.

The other type of immersion is related to the former but it is more specific to the moment of interaction with the interface itself. While using a certain medium, the degree of immersion seems to be inversely proportional to the degree of awareness of that medium and the more we experience it, the more transparent it becomes. The medium seems to appear when we experience some kind of error, bug, glitch or latency; otherwise we remain submerged under its spell. Heidegger calls this moment being *present-at-hand*, observing that we normally use a tool *ready-at-hand*, without reflecting on its structure or mechanics, although if a hammer breaks while using it, it becomes *present-at-hand* [7].

A problem seems to arise when art practice uses the same kind of logic, hiding the medium to provide a frameless space of immediacy and illusion. In this moment of media sovereignty, the artist needs to understand and make visible the workings of media. They should thus first try to understand how media design is thought to be efficient, clear and immersive.

This takes us to the theory of *Remediation* which, according to David Bolter and Richard Grusin, is a process that characterizes not only new media design, but older media as well [3].

2.1 The double logic of Remediation: Immediacy and Hypermediacy

David Bolter and Richard Grusin argue that contemporary culture seeks to multiply media and to erase the sense of mediation in the same process [3]. *Remediation* is not regarded as a phenomenon characteristic of digital media but rather as a process that has already been observed in previous mediums like painting, photography, video or virtual reality. The authors claim that a medium cannot be considered in isolation since it is always presented as a refashioned, improved version of a previous one [3]. *Media remediation* works depending on two logics: *immediacy* and *hypermediacy* [3].

The desire for "live" or real-time, without the sensation of being mediated demands a design following a logic of immediacy. In order to create more consistent images and interfaces, designers and creators assemble different types of media to enhance the sensation of immediacy, using a logic of *hypermediacy* [3].

As we demonstrate below, both logics are found in the use of different media such as video games, cinema, photography, web, virtual reality, etc.

2.2 Immediacy

According to the authors, *immediacy* is already detected with the advent of linear perspective, *trompe l'oeil*, the *Camera Obscura* and with photography, since the latter follows the rules of linear perspective, achieving transparency through automatic reproduction [3].

Bolter and Grusin use as contemporary examples for immediacy live TV shows transmitting scenes of war, high-speed persecutions or the cockpit of an F1 car that give the feeling of almost being there. The logic of immediacy aims to give to the spectator/user an experience that is "mediumless" or "interfaceless." [3]

The already classic *Graphic User Interface* was built following a design of *immediacy*. When we observe popular metaphors like trashcan, window,

file, folder, desktop or mailbox, we realize that these were concepts directly imported from our physical world so we immediately understand how to use them. Today, interactive design research has been struggling to produce even more intuitive and transparent interfaces, mixing digital worlds with physical objects that are not just restricted to mouse, joystick or keyboard but to all kinds of objects that can exist in our physical desks and allow us to empty the trashcan or to accomplish any other task in the virtual desktop.

2.3 Hypermediacy

Bolter and Grusin characterize the logic of *hypermediacy* as a representation of multiple acts that become visible. They claim that if there's a desire for *immediacy* it is also obvious the desire for media [3]. They give as examples for *hypermedia* the medieval illuminated manuscripts, Renaissance altarpieces, Dutch paintings, baroque cabinets or photomontage.

In relation to Richard Hamilton's photomontage the authors observe that:

“We become hyperconscious of the medium in photomontage, precisely because conventional photography is a medium with such loud historical claims to transparency.” [3]

If *immediacy* is supposed to hide the medium and *hypermediacy* to render it visible then there seems to be a paradoxical relationship. Bolter and Grusin explain this contradiction using the Phenakistoscope as an illustration. While a logic of *immediacy* is found in the moving images that seek for a realistic effect, we go out of the image to contemplate the mechanics and the working mechanisms of the medium [3].

Hypermediacy is not always used to render the medium visible but rather it contributes to the effective workings of *immediacy* and, despite the different types of media in use, the medium becomes transparent. Bolter and Grusin give as an example of this use the mix between computer generated images and 35 mm video images in film production and the saturated media environments of TV news that use text, split screens displaying video footage, live video, motion graphics, static computer generated images and photographs to provide a consistent an informative environment that keeps the spectator immersed [3].

3. From Digital to Physical: A Tactic for New Media Art

The complexity of the times we live in is revealed not only by the amount of new codes, signs and

symbols which “naturally” infiltrate our daily routines but in the quick overlapping and combination of paradigms – the digital, physical, online and offline have become interdependent and difficult to isolate. As the last section will show us, the design process and the construction of virtual and online digital worlds is characterized by a strategy of *remediation*, which allows for an easier adaption to media users.

In this refashioning process, old concepts are imported from previous paradigms but as soon as new functions and characteristics appear, new medium-specific concepts fill-in our routines, although they are designed to integrate our lives in natural ways rather than to originate reflection or disruption.

“Societies have always been shaped more by the nature of the media by which men communicate than by the content of communication.” [11]

McLuhan and Fiore argue that each medium is an extension of a human faculty or sense. The wheel is for the foot as the clothes are for our skin and the electric circuitry is for our nervous system. For them each of these extensions affect the way we act and perceive the world, leaving “no part of us untouched, unaffected, unaltered”. The medium is a pervasive massage that “works us over completely” and in order to understand social and cultural change one needs to understand and to be aware about the media functioning modes and effects [11]. Today, in almost every step and action we do, we are surrounded and mediated by all the kind of technological prosthesis that, as McLuhan conveys should be inspected by artists and theoreticians [10]. On my way to the office I take a picture with my mobile phone, while listening to the last Sonic Youth album. Seating on the bus, I still have 10 minutes before the next stop so I start adjusting the photo's colours and add some effects using a small app. I then send it by email to my friends, and post it on Facebook, sharing it with my extended network of friends around the world. At work I turn on my computer, type my password, login and I'm automatically connected to Google, Skype, Facebook, Tumblr, Wordpress, YouTube, Vimeo, and Flickr and many other services which I'm even forgetting to mention here. I jump from page to page, feed to feed, and in-between blog and chat windows, mail manager and text editor, where I try to focus on writing the article I should deliver tomorrow. My work ends and I go back home distributing my attention between SMS's, phone calls to my friends and Facebook news. Finally I

arrive home and I turn on the TV while I'm cooking a recipe found by Google. The day ends in the bed with the laptop by my side and the mobile phone under the pillow. My eyes slowly shut in front of a short film playing on YouTube.

What this brief analysis of my routine shows is not so much the contents but the enormous quantity of communication processes we are intertwined with during a single day. Following a strategy of *hypermediacy*, media appears as a continuum, and is constructed in a logic of compatibility where everything is connected all the time, everywhere. The out of format or protocol quickly become obsolete in a system of objects that converges to homogeneity.

When a considerable amount of the world population spends the day mediated by communication protocols, and by all kinds of media we need to agree with McLuhan when he says: "the serious artist is the only person able to encounter technology with impunity, just because he is an expert aware of the changes in sense perception" [10]. As the mariner caught by the whirlpool in Edgar Allan Poe's *The Descent into the Maelström* the artist, the spectator and the media consumer should be able to understand the "action of the whirlpool" or the "electrically-configured whirl" to "staved off disaster." [11]

"If we start to examine the general laws of perception, we see that as perception becomes habitual, it becomes automatic. Thus, for example, all of our habits retreat into the area of the unconsciously automatic; if one remembers the sensations of holding a pen or of speaking in a foreign language for the first time and compares that with his feeling at performing the action for the ten thousandth time, he will agree with us." [14]

Shklovsky claims that actions, as they integrate our routines and habits, become part of our unconsciously automatic [14]. Media is no exception to this, immersing the user and leaving them no opportunity for a distanced view, which shows his relationship with media. Bolter and Gromala suggest the existence of an aesthetic of reflectivity, which is according to them a necessary counterpart to transparency that "treats the surface as a mirror in which the viewer is invited to reflect on her relationship to the work of art on the process and the various physical and cultural contexts of production" [4]. However this concern for an "appropriate rhythm between transparency and reflectivity" seems to consider mostly the practice in

the field of digital design. As the authors show, digital art has been developing a consistent body of reflective works and digital mirrors, which explore the sensorial relationship between object and spectator, although this reflection which at first might appear as an uncanny moment, quickly becomes a factor that augments the participant's engagement with the object. This kind of reflectivity is then a factor which contributes more to the account of playfulness and sensorial-reflectivity than to build a critical account in digital art.

At this point we should inspect the concepts of *Endo-aesthetics* and *Anti-environment* as potential models for de-automatization and critical reflection in aesthetic experience.

Claudia Giannetti's endo-aesthetics derives from the concept of endo-physics. The latter considers that humans are unable to observe the world from the outside since we are living inside it. As follows, in order to make this observation possible we need to build model-worlds or simulations [8]. The same happens with our relation to media. If we take the model of endo-aesthetics into account, the artist should create new points of view about media by building anti-environments and counter situations, temporarily transforming the fixed point of view of the spectator into its own [11].

The tactic of *Media Displacement* is about the constitution of such media anti-environments. The basic principle of this tactic can be found in this observation by McLuhan:

" (...) the meeting of two media is a moment of truth and revelation from which new form is born. For the parallel between two media holds us on the frontiers between forms that snap us out of the Narcissus-narcosis. The moment of the meeting of media is a moment of freedom and release from the ordinary trance and numbness imposed them on our senses." [10]

Following the idea of media hybridization described by McLuhan in the lines above, we argue that the displacement of native digital media concepts and their implementation in the workings of physical world is able to provide a moment of release and critical detachment from the medium, creating a fission and displaying the incompatibilities between both paradigms. Out of gear, the media fails to work, becoming absurd and uncanny. This moment of disconnection and discontinuity should be a source for amusement and critical awareness rather than frustration or a disinterested relation between spectators and object. In order to better understand this tactic, the following sub-section analyses some

artworks that fit to this trend. These works show how complex and mediated the world has become and, how the definition of reality itself has been transformed by media. Today virtual and online worlds are so wired to our physical “reality” that the binary opposition between virtual and real has lost its sense [12]. In this text we avoid to use the words “real” which refer to our unmediated reality or the world of physical atoms and the word “virtual” that is related to digital, numeric and online worlds that mediate our relationships.

3.1 Displacing Media

The tactic of *Media Displacement* has been observed more commonly in three types of artworks. The first type uses non-electrical and non-digital media materializing concepts or situations, which are normally immaterial and native to a digital-online paradigm. In the second type of work, the artist normally uses digital media, although there’s also an on-going materialization process. In the works of Christopher Baker and Jens Wunderling for example, online data becomes materialized, occupying the physical space in the form of paper. Finally, the artist might perform this transposition by using digital devices or apparatus, which transform our relation with the physical reality, re-creating a perspective or phenomenon that is characteristic to the digital worlds. An example of this would be a device, which allows us to undo an action in the physical world or to pause and freeze time like in a video game.

Aram Bartholl has been working with non-digital media, creating objects and performances that use raw materials like paper, cardboard, plastic or other ordinary low-tech objects. The strength of his work resides precisely in the use of such simple materials that tell so much about the mechanisms of high technology and about our relationship with them. Bartholl has been mainly interested in the displacement between online world and offline worlds. *de_dust* is one of the world’s most famous maps from Counter Strike, an online first-person shooter game. Thousands and even millions of online gamers know this map better than the map of their own city or the neighbourhood they live in. So, departing from this idea, Bartholl built an Abs plastic sculpture, which is a 1:1 scale replica of *de_dust*. This replica is the model for a large-scale building that people should be able to visit in a near future as a “monument of cultural game space heritage” [1]. With this sculpture, Bartholl reminds us about the place that technologies and media occupy in our life, shaping our bodies, memory, relationships and society. He shows us that today the “real” and “virtual” worlds are deeply intertwined

and despite the immateriality of the latter, it changes our perception and our cognition. Observing this sculpture or visiting the *de_dust* building in the physical world eventually give gamers the uncanny experience of already knowing that shape or architectural space even though it is the first time they are seeing or visiting it. In *WOW* a public performance by Bartholl, the artist analyses online multiplayer role games and other online environments observing that avatars are always identified by a username, which is normally located slightly above the character’s head. He displaces this concept of avatar identification to the physical world of human social interaction, by constructing the same kind of identification using cardboard and a very light and transparent structure to hold it over a person’s head. This social experience displaces a pervasive specificity of online digital environments, that is familiar but at the same time transparent to us. The uncanny experience created by Bartholl highlights not only formal and functional incongruities between a physical and digital paradigm but more importantly asks: “what happens when a person’s customary anonymity in the public sphere is obliterated by the principle operating in virtual worlds?” [1]

The work *default to public: tweakleak* by Jens Wunderling seems to share similar concerns as *WOW*. In this networked public installation, inside a café in Berlin, we find a printer installed inside a monolith which prints twitter messages in small sticker strips. Each time a tweet is sent in the surroundings of the coffee, a sticker with the tweet’s content is printed in the café and the author is notified over twitter with the message: “Your tweet has been taken away” [15]. With this apparatus, Wunderling connects two spheres which are normally separated and work very differently, first questioning the sense of privacy online and in the physical world and then creating an awareness of self-exposure [15]. By leaving the digital online world, the tweet enters the physical world that has different mechanisms of information processing and the author loses track of his message as anyone can take away the sticker and use it as they want. This loss of control seems to highlight the incongruities between both paradigms and, instead of solving them the artist uses it as part of the work’s statement. By informing the tweet’s author that his message has been delivered and set “free” into the physical space, the artist is producing a kind of *distancing effect* allowing the user to reflect on the medium’s functioning mode and on his own use of it [5].

The intense and unstoppable activity of Internet produces a quantity of information that would be impossible to manage and to archive in a physical paradigm. A big part of the information, which constitutes this flow, is related to personal data and emotional information from users. This data is recorded, archived and in some cases eventually sold to marketing corporations. *Murmur Study*, an installation by Christopher Baker, transforms a body of immaterial data, into a huge mass of paper which is dumped and printed by 30 thermal printers [6]. In the long lists of paper that progressively form a chaotic hank on the ground, one is able to read “emotional” messages that are continuously taken away from twitter status in words like: arghh, meh, grrrr, oooo, ewww, and hmph [6]. But Baker doesn’t want us to read all these messages, but rather to place us in front of the impossibility to access all this data. By doing this he is allowing us to reflect on the medium and on the way we use it, alerting us for the fact that one can use that information as they want without even being noticed. This non-functional way of displaying information is opposed to a strategy of *remediation* design, showing the works of media. The apparatus brings to light incongruities between the digital world of twitter and the protocols of information exchange in a non-electrical paradigm, that is not equipped to process, display and archive data in the same way digital media does.

The third type of displacement is observed in *The Floating Eye*, a work by Hiroo Iawata, in which the artist builds an apparatus that allows the users to see themselves from above, as if the person was the avatar from a video game. Iawata displaces the person’s field of vision by placing a camera in a small airship floating a few meters above the head of the participant. Then the captured image is sent to a small monitor installed inside the helmet carried by the participant [9].

The experience unfolds by acting in a world where the spatial perceptual space appears distorted. Here shape, size and distance affect the way we move around and our visual perceptual system is affected by the wind that we need to take into account when moving. The strangeness of this experience is caused by the slightly random character of vision (originated by the wind) and by the disconnection between movements and visual field.

Iwata explores the concept of first person view, familiar to gamers in first-person games, building an experience that acts like a mirror for our bodily actions and functions. More than reflecting on the use of the medium, this experience produces intermodal conflicts between sensory stimulation,

proprioceptive and sensorimotor knowledge of our bodies. It transforms one of the more natural, familiar and transparent tasks – walking around – into a new uncanny experience which demands an additional effort, eventually causing a reflection in our “internal” processes which are normally invisible and taken for granted.

Normally, the process of interface and digital design as explained by Bolter and Grusin adopt an inverse logic, embedding physical familiar objects that surround us in “new” sophisticated objects and interfaces that smoothly enter and adapt to our routines. The works by Bartholl, Baker and Wunderling displace digital and online medium-specific concepts to the world of physical matter not to make our life easier, faster and simple as on a design basis, but rather to call our attention to the workings of media that we have allowed to enter our lives without questioning. These displacements then produce uncanny experiences by transforming familiar concepts into contemplative and opaque objects that become freshly new to us. Domenico Quaranta argues that our reaction to these objects might vary according to our experiences, background and relationship with them. They will however always produce a shock and an uncomfortable sensation to us [13].

This tactic can be further explored and can provide digital and new media arts a strong basis to develop artworks and experiences which go beyond the ludic and sensorial, forming a critic and detached spectator who becomes aware of the processes that media tends to hide. The best way to explore such tactic is to put it in action, test it and see if it can open new paths for reflection and representation.

4. Testing our Tactic

During Guimarães 2012 - European Capital of Culture, the LCD LAB from Porto (Laboratory for Digital Creation) invited me to organize with their team an artist residency, which applied an unusual experimental model of work. The residency took place during 6 days, from the 12th to the 17th March of 2012 at the CAAA (Center for Arts and Architecture) in Guimarães. In the first two days four theoretical sessions were presented and intertwined by discussion and brainstorming with the coordinators and the groups of residents. The rest of the days were dedicated to prototyping.

My contribution to the residency was a theoretical exploration and the conceptual framing of the tactic of *Media Displacement*, introduced in this article. This session analyzed the strategy of *Remediation* by Bolter and Grusin, the visions of media and technology by McLuhan and Heidegger and some works which fit in the trend of Media Displacement.

Ricardo Lobo, Pedro Ângelo and Sérgio Ferreira presented other theoretical sessions which discussed and analyzed the concept of hyperlink from a sociological, philosophical and mathematical perspective. At the end of three intense days of discussion and reflection, the four groups, constituted by 12 elements with backgrounds in fine arts, design, architecture and engineering, came up with four ideas which were then prototyped. At the end of the week, four prototypes were presented: “Join”, “I”, “AHA! – A Human Approach”, and “3.000.000 Views”.

4.1 Projects Developed

After the third day, the groups started to discuss and to materialize their concepts, exchanging their knowledge and collaborating in-between them. In the last day, the prototypes were presented in a public session at CAAA.

“Join” is a performance developed by Ana Palma, Diana Combo and Tiago Serra exploring the transposition of actions between online and offline social contexts. Each person that joins the Facebook event corresponding to the performance has someone waiting for them in the offline event (the performance itself), hanging a sign with that person’s name. This confrontation aims to introduce a critical distance to our use of the medium and to our notion of privacy, inclusion and exclusion in the transition from online to offline.

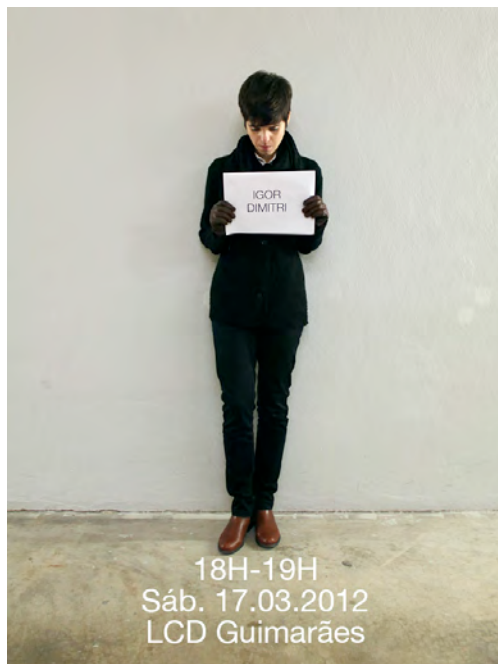


Figure 1 | Poster for performance “Join”

“I”, an installation by Pedro Ângelo, Rebecca Moradalizadeh and Sónia Ralha remind us that the physical space we inhabit is imperceptibly changed and fulfilled by thousands of invisible waves coming from all the technologies and media that surround us. By entering the installation space, the visitor becomes an involuntary participant in the soundscape composition, which emerges from the interferences triggered by the visitor’s mobile phones. When approaching one of the seven copper-cables vertically placed between the ceiling and the ground, the electromagnetic field of the participant is transformed into a noisy sound mass, which grows and becomes chaotic when more visitors enter the space.

“AHA! A Human Approach”, is an interactive installation by Gil Ferreira, Mónica Mendes and Victor Diaz, which explores the mechanisms of online research. A fake Google search page presents the results in the form of videos, instead of the habitual list of links. In these videos we see a group of three operator-researchers, searching in books, tasting, smelling, experimenting and going out in the nature or discussing in between them to find the best answer. AHA! turns the transparent process of online search into the content of the installation, breaking our expectations and showing how automatized we become by technology. In a moment marked by optical fibre speed and world Googlization, this project inverts the logic of transparency, objective and immediate, by slowing down the research process in an attempt to reflect on the impact of mediation and on the contemporary search-engine paradigm. “3.000.000 Views” is a public installation and performance developed by Raquel Carteiro, Sandra Araújo and Sérgio Ferreira that uses a popular strategy for online marketing. In different placards spread around the city one can read “3.000.000 Views” in black letters over a white background, with a QR code just under the text. By reading the QR code with the mobile phone the passer-by becomes an involuntary participant of this installation and performance. They see an image of someone looking through a wall somewhere and then a map indicating this location. If everything goes as planned, the participant will go up to the gallery where the hole is located and when looking through the hole, they will see a man seated in a desk, which stands up when he realizes he’s being watched. Then he draws a line on the wall with a piece of chalk, which means another “view.”

5. Conclusion

The *Media Displacement* tactic used works during the LCD Artist Residency presents a potential in the creation of digital media and interactive artworks, which needs further attention. Our hope is to see more digital and non-digital artworks that are able to create critical insight and render media visible rather than transparent. *Media Displacement* contradicts the movement of media *remediation*, for the sake of a critical look beneath the transparent layer of the interface, grasping the hidden underworld of code and algorithms. Such displacement breaks functionality and displays incompatibility, providing a moment of uncanny apperception. Finally the post digital art could be made of any kind of material or use any media – paper, plastic, biological tissues or electronics as long as it avoids their use for the sake of the new and the spectacular but rather face it critically.

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ON THE SEPARATION BETWEEN THE ESTHETIC AND THE FUNCTIONAL

And how the digital realm will steal form

Abstract

Looking at the impact of cyberspace over society and culture, we can observe that form tends to become the visual vessel of the virtual self. There is a foreseeable possibility for esthetics to dematerialize in the designed environment. This study aims at asserting this hypothesis and anticipates on a new approach to the formalization of esthetics.

Keywords: self-representation, esthetics, cyberspace.

Introduction

Today's society is admittedly characterized by the fast-growing importance of the digital realm. The ever-more-social web has brought radical changes to how we share culture and consequently, to our perception of self.

Design, essentially characterized as the productization of culture, has yet to transcend postmodernism. As carousels of new digital and visual memes emerge and propagate constantly, do new objects need to exist when solely conceived around storytelling? What will be the esthetic manifestation of our material culture if successfully brought into adequacy with the digital? Will new objects have to be made from scratch to accommodate new memes? Are objects updatable? And more importantly: is functionalism still screwed tight to esthetics or are we heading towards a complete separation of the semantic and useful?

After a brief look-back at the boom of communication and its latter economic, social and political implications, we will see how objects semantically – or rather, esthetically – adapt in turn to these observed phenomena. Finally,

we will attempt to establish a speculative vision of how digitalization, and thus the transformation of all things into information, will inhabit the very shape of objects and affect our understanding of esthetics.

The new technosocial paradigm

Only a quick glance at the cityscape and its people walking eye-on-palm through the streets is enough to tell our society has been shaken by progress in this freshly born 21st century. The frenzy for communication that appeared in the trail of two Industrial Revolutions and globalization led to the constitution of an immense pool of data. Data, initially considered as the only imprint left over by communications, now weaves a yet uncertain and vague territory we call *cyberspace*. From a simple document exchange system developed to fulfill post World War II dreams of hypertext [Vannevar Bush, 1945], Internet, last and most prodigal child of ultra-communication, has become the best candidate for navigating this space.

Now, this big data pool is an ever-growing one: *YouTube* recently announced an average of 72 hours of video uploaded every minute to their servers, while Google's index has reached 100 million gigabytes and four billion pictures are uploaded to Facebook every month. A study conducted by IDC foresees that we'll go from a global digital data footprint of 800 billion gigabytes in 2009 to 35 trillion gigabytes in 2020.

Cyberspace has become the new El Dorado. It is a new *territory to explore and conquer*, where *pioneers* from all over the world come to plant their flags. Companies have more or less successfully adapted their marketing techniques to the web, trying to pursue the capitalist dream in a highly unstable and virtual market. Traditional media are also here to claim a slice of the pie by attempting to save

their dying industries⁴. Comes then social networking, demolishing borders by turning cyberspace into a distributed network of individuals (most recent examples being Facebook in 2004 or Twitter in 2006). On the other hand, wikis and blogs proliferate and federate as *the first steps towards collective intelligence of future creative conversations* [Pierre Lévy]. Cyberspace has turned out to be so rich - too rich - in data that it now seems to require an *alphabetization to collective intelligence* [Pierre Lévy] or the development of a semantic web where *every single piece of data would have an http address* [Tim Berners-Lee, 2009].

Have we already shifted to a digital economy? How much have we converted atoms into bits⁶? How can we tell? Well, if we believe Bruce Sterling's interpretation, *we know there has been a revolution in technoculture when that technoculture cannot voluntarily return to the previous technocultural condition* [Sterling, 2004]. As the invention of writing has made us think ourselves as parts of a history instead of existing as phenomenal beings, and as telecommunication has made us think ourselves globally instead of locally, the creation of a cyberspace is making us think of ourselves as data-carrying agents in a distributed network abundant in data. We just can't go back, mainly because an ever-growing part of our society is now depending on quick data consumption and exchange.

⁴ *The impact of the information abundance means that those goods and services previously based upon information scarcity and its high costs of reproduction, such as journalism, films and music are severely challenged in finding viable methods of generating revenues*, writes Aaron Peters on his web-published article *The crisis of value in the network society*.

⁶ Expression borrowed from Nicholas Negroponte, who talks about the implication of this conversion of atoms (material goods) into bits (digital goods) in his book *Being Digital* (1995),

Such radical change is clearly the observable general characteristic of an abundant society. Despite it not being an abundance of goods, it is abundant in bits of information. And as information gains value, one could say our entire sense of value is being digitized. Past the digitalization process, social, political and economic patterns emerge. In order to address the web's foreseeable impact on form, let us first outline three of such relevant patterns.

The first pattern is that tomorrow's society seeks **transparency**, as it is necessary for information to be accessible and useable. The way we look at politics, for instance, changed with the birth of cyberspace; the *Arab spring*, Wikileaks, the emergence of *Anonymous* or the *Occupy movement* are strong occurrences of our craving for a quick and free access to facts. States that would fight hard for integrity believed to come with the opacity of a state-nation are now embracing transparency. Even the Obama administration is now glorifying transparency as a key principle for efficient governance, while opacity is becoming scarce and highly coveted - mostly because the governments' claim for transparency often disguises personal data gathering and sophisticated means of surveillance. Traditional media, newspapers, magazines, television, are all wiping their ways towards better transparency, for it is an epic win. Data gets to be produced, enhanced and filtered by users themselves. Moreover, users generate data without necessarily knowing it. Companies like to have a hand on society's pulse. So, transparency is actually a win-win. As such, not many people are left to oppose the process of making everything public.

Another remarkable pattern lies in **dynamism**. Everything happens in real-time. From live surveys on the web to geo-localization on connected mobile

devices, everything happening *here and now* must be leaving an imprint onto the cyberspace - Facebook's timeline is a result of bringing the semantic web into social networking - and user-tracking is a consequence of such a process. Only, it becomes less of an issue for as long as we adhere to the cult of transparency.

A dynamic society is capable of emitting signs constantly while ubiquitously projecting them at any end of the network. One is not only able to connect and correlate already available information, but also to communicate by *stigmergy*⁹ over the semantic web. *All signs emitted by humanity tend to join the universal visible sphere of the cyberspace* [Pierre Lévy, 2002]: everything we do, think, produce, is a stone thrown into the data pool. It has an impact, and it shakes the whole with varying intensities. Dynamism occurs when we can address such changes in real-time.

Our third relevant pattern here is **egocentrism**. It occurs as a consequence of the first two patterns in that the self wants to be discovered, observed and followed. One gladly turns into information too, and does it quickly, being both transparent and dynamic. Foursquare allows me to tell others where I am, Pinterest is for what I like... Transparency may be linked to a craving for honesty, as we saw, or a desire for openness following an even greater desire to optimize global communication. But next to a rising sense of individuality, isn't it just as much of a personal and existential need to be seen as unique?

⁹ Through his academic work, Prof. Pierre Lévy from the University of Ottawa uses *stigmergy*, as an example for the way people navigate and communicate through the cyberspace. *Stigmergy* is a principle, common for insects like ants or termites, which consists on altering the environment as a mean of communication, in order to increase the performance of the next action taken by the colony.

It appears often on the web that the frequent, loud and unconditional statement of our smallest action infuses us with uniqueness. "A burnt image of Ray Liotta has appeared on my tortilla" tweeted on the 23rd of May¹⁰.

Now, as geographic distance shrinks before faster communication, there is a nuance to how the *end-user* manifests him/herself in data. Society is the victim of an even more violent *intrinsic spectacular separation* [Guy Debord, 1967] due to the complete abolishment of distances, where the individual has become the *spectacle* and data, its currency¹¹. What matters is not what information you bring onto the cyberspace - for abundance makes it unnoticeable - but the way you organize it, catalogue it in a coherent, logical, rational and self-centered system that is a reflection of yourself: your *virtual identity*. That phenomenon is also a result of information abundance, for it creates an economy *in which the only available measure of competitive success is reputation among one's peers* [Eric S. Raymond, 1999]. One could say we've already acknowledged the *virtual self* as a prime and legitimate focus for marketing, in a spectacular wave of which *you are the star*.

Living in a material world

As we've now observed how intangible, information-related matters have submitted to transparency, dynamism and egocentrism, what about physical manifestations of information? What about objects and their role as cultural artifacts? What importance do we give to our daily tools and decorative knick-knacks? What do they mean? And more importantly, if they are emitting signs, will those signs also enter the

¹⁰ By @cedricbixler_zavala, permalink: https://twitter.com/cedricbixler_/status/205194163820572673

¹¹ The online service *Pay with a Tweet* is our best example for that phenomenon.

cyberspace? The very shape of everything has to be re-thought in order to match the newly established semantic territory.

As we move away from the modernists' "form follows function", beyond the undividable essence of an object's necessary form serving its purpose, there is a part of its shape that tends to vary with time, trends, political context, social position, status and self-representation - as it is not quite a *reflection* of yourself but an imaginary, spectacular representation of yourself in the social game. That extra essence, that little *je-ne-sais-quoi*, is an object's **semantic value**. *We seek to convey something about ourselves (or our products or places) not only through verbal declarations but through look and feel, creating, in the process, new connections between surface and substance, form and meaning. We want to show as well as tell, and the increasing variety of aesthetic options permits more complex or differentiated meanings, a more specific match between outward form and inward identity* [Virginia Postrel, 2003]. It is what we identify to, what shapes our cultures. Decorative objects, for instance, are products which existence is legitimized only by their semantic value. So do tools or instruments, though purely conceived around functionality.

Objects are *technosocial entities*, and their very shape is driven not only by the *Idea* of an object but also by the semantic value instilled by mankind, *for the producing man participates himself [...] to the way a product comes to being* [Heidegger, 1949], hence the cult of storytelling driving our contemporary society since the fulfilling of the postmodernist vision. As basic function-serving tools and objects have become abundant, it is their semantic value that has now become marketable, as a reflection of the social spectacle.

Looking closer, the industry has adopted the model of an *information economy*, where the semantic value of *things* serves representations of *cultural archetypes*. Objects are the scene of a golden age of branding and demographic targeting; a world full of *do-not-sit-chairs* exhibited in galleries and museums; a world full of *designer products*, getting further and further away from the original *Idea* of the object. Such objects are reduced to media for storytelling.

Contemporary objects are just not matching the new technosocial environment we were describing earlier. They are **de-standardized** and still mostly brand-identified **storytelling platforms** focusing on the author rather than the user. They are also **static**, for they are frozen in time and space by the material impossibility of dynamic manufacture.

Yet this is changing, and in order to understand what's going on we will take a look at two contemporary phenomena.

First is the death of postmodernism-driven economics and design. *Postmodernism, like modernism and romanticism before it, fetishized the author, even when the author chose to indict or pretended to abolish him or herself. But the culture we have now fetishizes the recipient [...] to the degree that they become a partial or whole author of it* [Alan Kirby, 2006]. This relates to the *egocentric* society described earlier; our culture is dying for means to *adapt to the customer*, and the *end-users* we were, are now slowly evolving into agents in complete charge of insuflating meaning to objects.

On an industrial level, there is only one attempt to grant users with limited esthetic choices while keeping mass-production intact, namely: cus-

tomization. However, it doesn't really allow for more than the customization of a few details, or rather, it doesn't customize enough to grant the users with full authorship. Products never truly come as a blank canvas for the user to brand. Customization has failed, as it 'feels fake'¹².

This brings us to a second point: smartphones, or, the epitome of user-enabling objects. If you take a look at our mobile phones from 10 years ago, you will see a large amount of colorful and differently shaped phones with, although limited, possibilities of customization. The phone now became a connected mobile device capable of emitting and receiving signs in real-time, to and from the cyberspace, and allowing infinite means of virtual customization ranging from wallpapers to organizing and selecting Apps. They provoked the new ritual of forming one's personal approach to navigating data. Since the smartphone era, a very particular shift can be observed in these objects' design: they tend to re-standardize. New means of customization and organization have gained relevance in user interfaces rather than in physical objects. As possibilities for furnishing smartphones multiply across the cyberspace, their shape has returned to a basic function-serving one. They have turned into thin black boxes and barely differ from a brand to another. As if they were intended to disappear or remain stand-alone screens, if only designers were able to get past the necessary battery, SIM card holder, microphone, webcam and speakers, binding the phone

¹² According to Joseph Pine, author of *Mass Customization* (1992), it seems that contemporary consumers only feel happy when spending their time and money satisfying their desire for authenticity. A desire that companies in charge of the manufacturing of goods are incapable to satisfy, being only able to render it with more and less efficiency. Manufactured products cannot be truly authentic - unless they allow the user to be in complete charge of the customization process.

to a material existence. So where did the crazy different shapes go? Well, they have just shifted into the cyberspace. The smartphone is a *non-object*: a semantic platform limited to its undividable and solely functional shape. On the other hand, Apps inherit the look of physical interfaces while the physical platform tends to disappear. Here lies the first step in the separation of the semantic value of an object and its function.

How can tomorrow's objects reflect any more the technosocial environment? How can an object become **dynamic, transparent** and **egocentric** enough for it to take place as the new cultural artifact? Our last part proposes prospective guidelines for shaping future objects.

Draft for contextual dynamic and semantic displays

Concerning **transparency**, the now popular adaptation method of products to this phenomenon seems to be permanent connectivity to the Internet. Connected objects would exist both physically and on the web, thus expressing semantic value in both realms. The recently overfunded *Pebble Watch*, or the autonomous GPS-based cars¹⁵ are other examples of this aim for *connectivity*. One by its being another platform for personal data to be manipulated, and the other for its being literally driven by data. Looking from afar, both are mere vehicles for personal data.

Tomorrow's object will have to become **egocentric**, which is probably the easiest thing to imagine, as everything in contemporary culture is already centered on one's personality, or rather one's *profile*. It bears no doubt that future objects will have to cele-

¹⁵ After Nevada in March 2012, a bill just passed California's State Senate authorizing the use of driverless cars on the roads, thus letting us believe that research in that area might intensify in the near future.

brate users even more. Designers should now be more preoccupied by *designing the designer*, as storytelling is being re-appropriated by end-users becoming authors of their own esthetic rules and therefore, of their own semantic expression. There is a necessity for future objects to become screen-objects that can display, modify and share data in a way where the author - the designer or the brand - would become completely transparent, and the end-user would be glorified.

Lastly, objects have to become **dynamic**. They must be able to react to the *stigmergic* shifts on the cyberspace, which happen in real-time, and formalize in an object's visual qualities. As treatment of information becomes crucial, and as the way one relates to data constitutes one's *reputation* in the economy of information, it seems extremely important that an object's shape adapts to contexts, situations and people in real time. One could draw inspiration from infographics which are digital but dynamic representations of data. Let's imagine objects as physical infographics, of which every esthetic characteristic is designed to be variable and reflecting of its data. The designer's role ends up being bound to the making of a platform, not unlike mobile tablets, allowing such changes on the user-side.

Looking at fashion items, or objects in general that are intrinsically connected with emitting personal signs in society, our speculative object could be a hat, for instance, whose shape is influenced by how we feel and what we want to reflect at a given moment. It would be like one's appearance is directly submitted to an online profile. And although freeform fabrication is at hand¹⁶, an object's physical form is

¹⁶ The Fablabs, the RepRap project, CandyFab, along with an ever-evolving research on printable food, organs and organic tissues lead us to

bound to material constraints and static means of production, which fatally lead to static objects.

But does shape need to be tangible in order to be visible? This would imply that what doesn't serve a physical function, meaning what is no longer bound to the material world, might just be destined to complete dematerialization - leading us to art. A lot of web-galleries and art blogs now exhibit artwork, which holds no other existence than a digital one. If art is no longer required to manifest physically, does it question its being a *piece*? What will the world look like once esthetics become an entirely digital layer?

Technologies like contextual augmented reality aim to become a solution for the display of ever-changing semantic shapes, contextually attached to the physical and undividable form of the object - the functional object¹⁷.

All it takes for augmented reality (AR) to popularize is an easy and quick interaction between the user and this new augmented layer of meaning via user-friendly interfaces, as well as appropriate methods of visualizing it. AR has been brought to life in the already popular smartphones, webcams, projectors, and soon to be goggles, while bionic lenses are on their way.

Conclusions

The object's physical shape won't disappear, for as long as we live physically and require instruments to feed,

believe that one day abundance of goods might become possible through a re-appropriation of the means of production by the consumers.

¹⁷ Augmented Reality has been seen by many artists, speculators or futurists as one of the most promising technologies, and now is the subject of research all over the world. We can, for the example, quote Microsoft's *Future Visions* video series or Google's proposal for Augmented Reality glasses. The latter very recently announced (May 31st 2012) these glasses to go on sale next year.

move and communicate. But its semantic value, encountered in its esthetics, is bound to join the cyberspace, which is already a treasured test-ground for new esthetic possibilities.

For that matter it appears clear that the correlation to the meta-data of objects will have to occur over a contextual display, a second layer of shape to be defined by the user, for the user; a dynamic display method that would support the necessary connectivity to our complex web of semantic value. This would get to express esthetics independently from their material, functional counterpart.

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From Paper to Portable Devices: How to script and read comics?

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Abstract

Nowadays, reading comics is a common activity. Due to the portable device advent and the wide spread of their high-performance, the market of rich content is enlarging. However, the adaptation of comics illustrations on such devices is not an easy task: graphic novels should stay readable and enjoyable. Moreover, producing thousands adapted comics is a long and fastidious work for designers. We propose a system dedicated to help designers who generate digital content from existing comics books for different portable devices. Our tool helps designers in three ways. First, by extracting panels using a binarization with propagation; second by detecting overlaps with a path planning method; third by scripting comics reading intuitively and quickly, providing a glyph-based interface. The first attempts show that extraction is 60 times faster with our tool than designer performances and that our glyph method is 40 times faster than hand-made transition. This tool provides a new and efficient way to read comics on any mobile device.

Keywords

Computer Graphics, Picture/Image Detection, Graphical User Interface, Media Art, Comics.

1 Introduction

Nowadays, numerical softwares and tools renew at an ever greater speed. With the advent of smartphones and the emergence of tablet personal computers, many art forms may be found on those new devices. They allow to transport a lot of content and people read more and more numeric books, newspapers or numeric comics. Incoming purposes, new objects or materials can be conceived from the wide concept and practice possibilities of art [Reyes-García and Zreik, 2008]. Each desire, invention or need creates a cycle leading us to new technologic level. These new technological devices and their use come from the panel of social practices. Thus, “a tool is the idea that art as information is inherently unlimited” [McCloud, 2000]. Our era

is the era where paper atoms become pure information: bits. To obtain a good numerical representation we have to study the way used to proceed on paper. In this paper, we focus on comics reading on portable devices.

Comics may have different forms varying from a single strip to a book collection. Image sequences in graphic novels are sometimes non-linear structured. Moreover, the different pictures have generally various sizes and it is a tricky task to adapt the way to watch them on embedded devices. Visualization becomes a crucial problem and content delivery device should be adapted. Even if the screen resolutions are small, the user should have a global view of an image or text, easily focusing on details through the tactile interface. However, reading a page containing sequences of images on a smartphone or a tablet device remains a problem, because its global view does not provide any suitable resolution. Furthermore, as comics reading is often non-linear, finding a way to predict panel transitions seems difficult. That is why the reader only should have to focus on the story and should not have to suffer from the research of the next image.

In the industry, existing graphics novels on mobile devices are created in two manually ways. The first one consists in creating images dedicated to mobile device screens. The second consists in scanning a comics page, then each image is extracted and sorted manually by a designer using manipulation tools (Adobe Photoshop¹ for example) that produce very limited results for a high cost process (i.e even if these tools permit to crop, resize. . . , they are not dedicated to script the reading). If an image size is not appropriate, the designer has to cut it, to resize it or to create an animation that permits to view the entire image. For both cases, de-

¹Adobe® Photoshop® is a graphics editing program published by Adobe Systems

signers have to create animations between the different images of the pages for a better reading experience.

This paper addresses the following questions: How should be transformed comics to be easily readable on an embedded device? Should the page be prepared entirely automatically? If some operations should be realized manually, what kind of interface should be used?

We propose a glyph-based tool to script comics reading for different devices with the respect of their own screen size and resolution constraints. We attempt to propose a “remediation” [Bolter and Grustin, 2000] that is a hypermediation where we are aware of the medium and an immediation allowing the medium to become transparent and confronting us to the content: the comics. To make it possible, it is important that the successive panels of the comics appears in an easy way, as we forget the page use of comics books, totally engrossed by the story. Our tool allows a global view of the page to extract its images, to sort them, to produce various transitions between them (fades, movements, accumulations. . .) and to display finally each image on the device screen with an animation. Glyph-based interface is particularly well-adapted to the scenarization of comics reading since we think that this task should be realized by a designer or one of the comics authors who often use graphic tablets. Moreover, for each target device, we provide a viewer able to read the produced script and to allow user interactions. Note that more than a comics reading scenarization, our solution can be used to script any non-linear structured media.

First, we describe how a comics is created and we give some definitions. Then, we present existing researches and tools regarding the different steps to export a comics on portable devices. Then, we propose our tool dedicated to the designers who will create the animated comics for portable devices. After that, we present some results and discuss them. Finally, we conclude and propose future works.

2 Sequential art and definitions

Graphic novels have been slow to be considered as 9th art². They are one of the most expressive media with a huge style diversity, allowing the expression of various ideas and emo-

²The 9th art expression exists since 1964 and comes from Maurice de Bévère and Pierre Vankeer, creators of *Lucky Luke*.

tions. In his book “*The Invisible Art*” [McCloud, 1993], Scott McCloud has defined comics as “juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer”. Rodolphe Töpffer is considered as the first theorist of this art and as the father of the modern graphic novels [Groensteen and Peeters, 1994]. Scott McCloud has said that Töpffer has created a way of expression coming from drawing and writing that cannot be reduced to one of them: an autonomous language [McCloud, 1993]. Thierry Groensteen has thought that “the verbo-iconic components of narration are inseparable” [Groensteen, 1990].

A comics is created in several steps [Duc, 1983]. The first step, named **synopsis**, consists in writing an abstract explaining the global scheme of the story. Then, the **scenario** details the story, the scene, the principal characters and provides the main developments. The next stage consists in **cutting** the **scenario** in different images that forms each **panel**. This is probably the most crucial step of the creation because if the **scenario** is well **cut**, with rhythm, it can save a bad drawing. At the opposite, good drawings would rarely save a poor **cutting**. The words in the **scenario** description are replaced by shots or frames, camera angle and centerings to compose the **strip** or the different comics **pages**. A camera angle is chosen to render an atmosphere like anger or defeat. For example, a high-angle shot put the character in a weak position. A vertigo sensation will be represented by a frame conveying this idea which probably will be vertical. The frame of each **panel** is dedicated to present the story and can be very brief (an action, a glance. . .) or take a while (a background description) and gives the **timing** of the reading. If there are enough varying shots, monotony will be avoided. They are never randomly chosen, their main interest is the psychological and expressive value permitting to highlight character’s action or sentiments. They modulate the dramatic or humorous intensity of each scene following the plot. Consequently, each **panel** has a size, a dynamism, function of the shot, and may have various forms: rectangular, circle, polygonal, undefined. **Panels** are often surrounded by black **borders**. In the following, the term of **open panel** is used when the **panel** is not clearly bounded by **borders**, on at least one edge. **Panels** can contain text often represented

in **speech balloons** or **onomatopoeia**.

Comics **pages** are sometimes non-linear structured and can be difficult to read. Thus, the **page layout** is very important and lets the reader focuses on the story. In comics books, the **panels** are generally separated by blank ribbons of paper named **gutters** [McCloud, 1993]. It guides the reader and can radically modify the perception of the story. Sometimes, a **panel** element **overlaps** another **panel** creating a highlighted transition between these two **panels**.



Figure 1: Top left: Page 6 of *Asterix and the Secret Weapon* [Uderzo, 1991]. Top right: Page 3 of *Star Wars: Legacy - War 1* [Ostrander et al., 2010]. Bottom: Page 2 of *Kromagnons* [Taloux and Chantoux, 2009].

Left of figure 1 presents a comics **page** where almost all images are surrounded by **borders**, in this page the text is in **speech balloons**. As one can see, the rectangular **panels** have different sizes and an **open panel** is present in the middle of the second **strip**. Due to the **overlap**, it is obvious that the third **strip** is read more continuously than the others.

Right of figure 1 presents a **splash page** (a

panel filling an entire **page**). In the main **panel** there are multiple images, with inclusions, overlaps. Here, the text is not used to depict dialog but to describe timing and intentions enhancing fear, anger and death filling. It is obvious that the **panel** size and **overlaps** that constitute the **page** layout were conscientiously chosen by the comics creators to highlight and emphasize some story elements or to depict the **timing**.

As another example, we present in bottom of figure 1 a **page** containing height **open panels**. The reader impression is the continuity of the action: **panel** sizes are approximately the same, so time for the action is the same in the entire **page**. Here, the text is mostly used for **onomatopoeia** which means that the text is used to describe the action (the speed of the chase).

Comics is not just a series of panels on a comics pages. We want to propose comics reading on portable devices. Nowadays, comics dedicated to portable devices are specifically created for this kind of device or they are exported from old comics books. Automatized solutions to extract panels should be provided when there are no ambiguities between panels. The scripting of comics reading should be helpful for the comics creators on mobile devices. Today, in the industry, designers have to cut manually the different panels of a comics book and then to animate them. This task take a long time and the existing tools to extract, sort and animate panels are not dedicated to comics page layout. In the following section, we present existing tools to extract or scenarize panels with animations.

3 Previous works

Due to the structure of a comics page (see section 2), and with a study of existing research projects, we have identified three main problems to scenarize comics reading:

- Panel extraction of a comics page;
- Identification and treatment of overlapped panels;
- Scenarization production by scripting the comics reading.

Hereafter, we present related work focusing on comics. Finally, we focus on sketch-based interfaces which are close to our scenarization problem.

3.1 Extraction

Ishii et al. [Ishii and Watanabe, 2010] have used density gradient and corner detection to extract panels from comics pages. Their method is limited to panel detection. Incomplete panels and open panels may not be detected. Moreover, overlaps are treated as a single image.

Arai et al. [Arai and Tolle, 2010] have proposed a binarization with a fixed threshold and then an extraction of single blobs. These blobs are considered as panels. They assume that a panel has a minimal size of a sixth part of the page width and an eighth part of its height. These conditions are used to guide the detection and are not suitable for all comics pages.

Ngo ho et al. [Ngo ho et al., 2011] also have binarized a comics page but they use a region-based image segmentation. They assume too, that a panel has a minimal size of a sixth part of the page width and a sixth part of its height. Here also, the minimal panel size is fixed to avoid the detection of small zones.

The panel extraction is commonly realized automatically. All these researches consider that panels have borders, so they use very simple solutions that do not take into account open panels. Unfortunately, some panels (see bottom of figure 1) cannot be detected without loss using these solutions and the minimal size chosen remains a problem.

3.2 Overlaps

Different solutions have been provided to detect and treat overlaps. Arai et al. [Arai and Tolle, 2010] have proposed a solution based on a simple straight line drawn by the designer. In practice, the detected blobs are displayed and the designer can specify which parts can be considered as overlaps. This approach is not sufficient since it is only based on a single straight line cutting the overlapped images. Consequently, overlap created by speech balloons for example are cut and the balloon is cut in both images.

Ngo ho et al. [Ngo ho et al., 2011] have used mathematical morphology to transform a block representing panels. These transformations enable to break overlaps with a dilatation and erosion to restore the size of the black area obtained by binarization after the previous step. One of the method restrictions concerns the overlap size. The method produces convincing results when the overlap size is small. Moreover, the approach neglects the semantic meaning of the overlaps when cutting images. Overlaps

have meaning, one cannot just cut them without thinking about the page layout. For example, in left of figure 1, the overlap shows the character irritation.

We consider that automatic cut of overlaps does not always provide a good solution. Overlaps contain significant information linking multiple panels (see top left of figure 1, third strip).

3.3 Scripting comics reading

In “Infinite Canvas” [McCloud, 2009], McCloud has explained that digital comics have many advantages. They have no restricted size, it can be an entire page or a single panel. So the flow of reading is not broken by the page, the break matches with the story break. Thus, the scenarization is needed due to the page format used in comics books.

Arai et al. [Arai and Tolle, 2010] have proposed to export panels and extract speech balloon texts. Nothing is done to script the reading, except a simple arrow to move to the next panel. This solution only consists in reading one panel, the panel transition is never considered.

Wandani et al. [Wandani et al., 2011] have proposed a different way from panel to panel to read comics. In this paper a way to display a comics or a page in a single screen is proposed using two prototypes:

1. All comics panels are arranged in a sequence on the border of the screen. In the center, a zoom is applied on the selected panel (left of figure 2);
2. Panels are arranged according to the story and displayed with a small size on the screen. The user can zoom on the selected panel to view it bigger and move to go to the next panel. They have two different interfaces for this prototype based on “Infinite Canvas” [McCloud, 2009] (right of figure 2):
 - A “Page view” where panels of the same page are reorganized from the original page layout;
 - An “Overview” where all the panels are reorganized and displayed in the same screen.

These two prototypes are interesting approaches but do not seem very usable with a mobile device. The first prototype lets a very few place to the current panel and the second forces the reader to manipulate panels every time.



Figure 2: Prototype proposed by Wandani [Wandani et al., 2011], respectively prototype 1 and 2.

As one can see, proposed solutions are automatic and basic. None of them considers the timing as an important element and the size of the panels is never adapted to the device. Also, this effect is disturbing because the page layout is completely removed. This should be preserved and described by a designer through a convenient graphical user interface (GUI).

3.4 Sketches

Making sketch-based interfaces is a powerful way to express something and seems to be the most suitable solution to provide any scenarizations of the comics reading. We think that scenarization must be realized by an artist or a designer who often use graphic tablets and who, consequently, use sketch very naturally.

Apitz et al. [Apitz and Guimbretière, 2005] have proposed a GUI named *CrossY* that enables to replace a button-based interface with a menu by a sketch-based interface. For Apitz, “crossing is as expressive as the more traditional point-and-click interface”. As Apitz, we want to provide a system as simple as possible in which sketches are used to select, organize, resize, cut and script.

As shown by Gross [Gross, 2009], two classification systems can be used to depict a sketch-based interface: kinds of drawings and kinds of systems.

- On the three axes of the “Kinds of drawings” diagram (see blue mark in figure 3) we can be located:
 - In the geometric part on the **domain** axis describing the domain as geometric or not;
 - In the project part on the **purpose** axis representing the different purposes that a drawing can serve;
 - In the diagram part on the **denotation** axis which represents the degree to which a drawing is directly denotational.

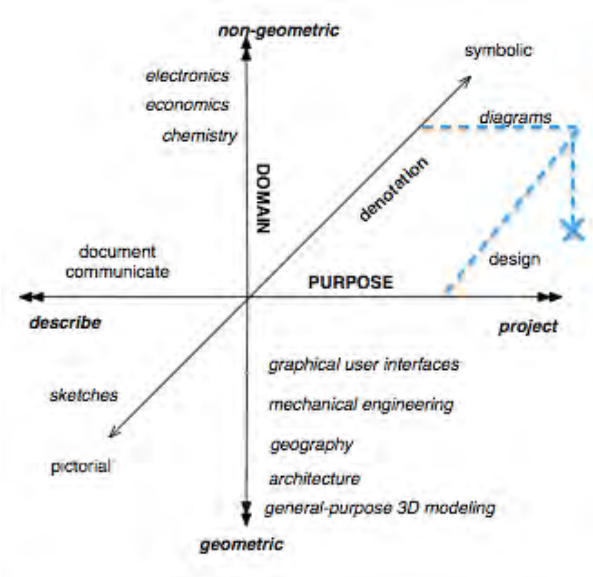


Figure 3: Kinds of drawings [Gross, 2009].

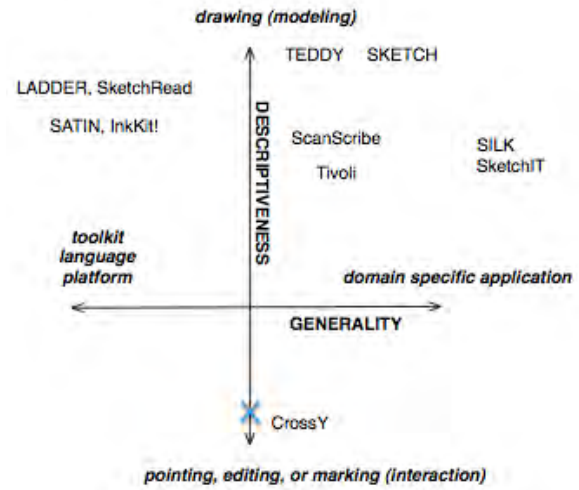


Figure 4: Kinds of systems [Gross, 2009].

- On the two axes of the “Kinds of systems” diagram (see blue mark in figure 4) we can be located:
 - In the interaction part (like *CrossY* [Apitz and Guimbretière, 2005]) on the **descriptiveness** axis representing the tasks for which pen based interaction is used;
 - In the middle of the **generality** axis indicating the degree to which a system is intended or designed to support a specific domain.

As described in the following, we use simple geometric glyphs to script comics reading.

4 Searching for an ergonomic interface dedicated to designers

In the following, we present our glyph-based tool dedicated for designers and inspired by page layout considering three main problems (from top to bottom approach):

1. Allow the designer to extract the successive panels of the comics, hereafter called **page decomposition**;
2. Allow and help the designer to specify the properties of each displayed panel (when and how it appears and disappears, reading direction), hereafter called **panel properties**;
3. Allow the designer to export it for several portable devices, hereafter called **exported files** and **device viewer**.

Concerning the page decomposition, we assume that panels can have various sizes. Thus, we do not fix a minimal one, but we use a threshold of 1% of the page (in number of pixels) to remove noise or page numbers for example.

As previously described in section 3.3, there is no convenient solution to create a comics reading scenarization. Actually, in the industry, this process, is entirely achieved manually by a designer. We consider that scenarization should be comics friendly designed.

Starting with comics pages, our glyph-based tool is designed to produce a description file and a set of panels that can be read on any portable devices with our viewer.

Therefore, comics reading is composed by many **screens**. Each screen is composed by one or more panels. In case of multiple panels on a screen, we use hereafter the term of **accumulation**. The timing depends largely on the screen composition, the panel size and the presence of speech balloons. Moreover, it may be reinforced by the **transitions** between screens.

4.1 Page decomposition and overlap detection

Helping the designer to create the different screens, as a preliminary step, we automatically extract panels by detecting the background color used in the page. Our approach is based on a binarization process that creates a map of the background. The background color is detected at the page corner. For a corner, if only one panel is detected, we test another corner until we find more than one panel

(or test all corners), considering that it can be noised due to digitization or that is potentially a panel positioned at the border of the page (without blank ribbon). Considering that the background is almost uniformly filled we propagate the binarization on the map while the pixels have the background color. A threshold is used to avoid noise due to the digitization. During the decomposition, we create at the same time polygonal bounding boxes. When two close neighbors bounding boxes have been created, we automatically merge them. In practice we maintain a rectangular bounding box for each detected panel and we merge them when they have at least 30% of intersection. Finally, we export as panels all areas which are not binarized in the map.

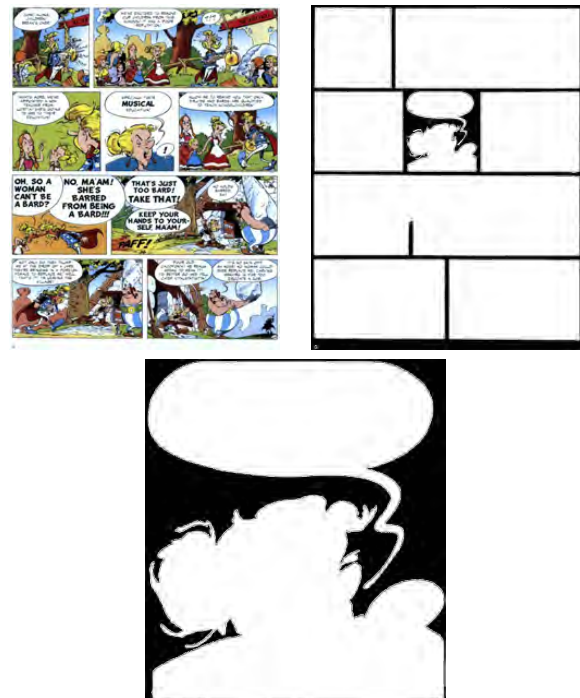


Figure 5: Top left: page 6 of *Asterix and the Secret Weapon*. Top right: its binarization. Bottom: zoom on the open panel of the second strip.

Figure 5 illustrates this binarization. We provide the original comics page on the top left and the result of the binarization on the top right. Remark that for the second panel of the second strip (zoom on bottom of figure 5), the open panel is considered as one single panel by our system because of the two elements vicinity.

We consider that an automatic cut of overlaps is not a suitable solution. If an artist has drawn an overlap, it is obvious that it is one element

of the comics page layout. Thus, we provide a solution to detect overlaps to prevent the designer. Considering its semantic meaning, the designer will decide which treatment should be applied during the scenarization.

The overlap detection is based on the detection of incomplete panel frontiers on the binarized map. We use a path planning algorithm to detect dead-end possibilities which are considered as an overlap consequence (i.e. two panels are not clearly separated). Small dead-ends (less than one third of the panel size) are neglected since we consider that noise can be present in the image due to the digitizing. Figure 5 presents an overlap on the third strip. It is detected by the bottom frontier of the panels with a high level of confidence.

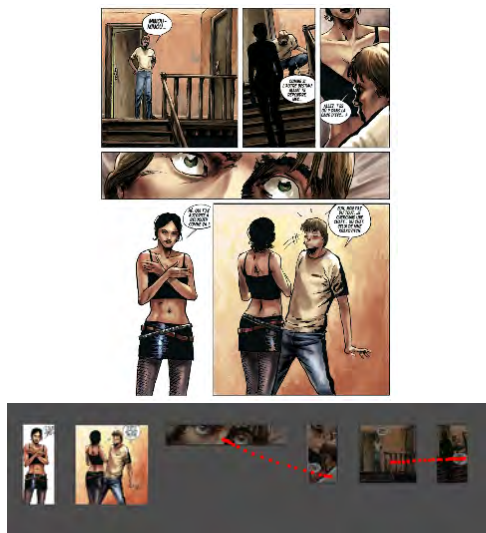


Figure 6: Top: page 38 of *Fate Spinner*. Bottom: sorting the detected panels.

Figure 6 is a resulting example of a page decomposition. Remark that the girl alone and the speech balloon close to her have been extracted automatically as a single panel.

After this step, the designer can cut panels. If he desires he can cut an overlap by tracing a line where the cut should be. Then, he can sort and script the comics.

4.2 Defining panel properties

This part of our tool (figure 7) is based on a low level recognition of simple glyphs. It allows the designer to create a scenarization for comics reading on different portable devices.

First, the designer can modify the panel order following his desires. This step cannot be automatized due to the comics style variety

(for example, left to right for a Franco-Belgian comics and right to left for manga pages). The designer can reorganize panels sorting them by a click and release action on each one or by drawing a line passing through the different panels in the order he wants them to appear (see bottom of figure 6). If the original proposed order is the good one, the designer can just validate it.

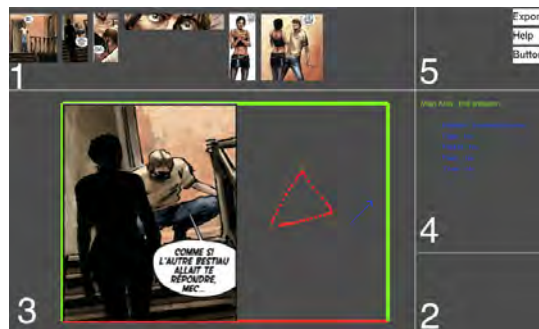


Figure 7: Global view of our glyph-based interface dedicated to script comics reading. Here, the triangle indicates that the panel disappears with a fade.

After sorting, the designer sets panels properties like transitions or size. This is made through a glyph-based interface (see figure 7) where a glyph matches to an action (change mode, add an effect...). First, we check if the glyph is closed to know if it is a closed form like a circle, or an opened form like a line or a combination of lines where the designer has to put up his hand to draw the next one. If the glyph is closed, we search lines in it and we count them to know what is this glyph. For example, a closed glyph with 3 adjacent lines is a triangle. The way of these lines might be important: 2 horizontal lines and 2 vertical lines represent a box when 4 diagonal lines represent a diamond-shaped box.

The screen interface is divided in 5 parts (see in figure 7):

- ① At the top left, we provide the panel order described above. This is used to select a panel to treat. It is also used to combine two or more panels to be displayed with an accumulation;
- ② The bottom right area is used to select the main area mode (see ③ hereafter). For each mode, we give its associated glyph:
 - In-coming (\rightarrow): panel animation applied when the panel appears;

- Out-coming (\leftarrow): panel animation applied when the panel disappears;
 - In-screen (\cdot): if the panel oversized the screen device, then the designer can choose the panel movement;
 - Position (Δ): panel position on the device screen;
 - Size (\square or \diamond): used to resize automatically or manually the panel if necessary.
- ③ At the bottom left, we find the main area. Here, a panel can be displayed and we use glyphs to describe one or several actions depending on the selected mode (area ②):
- **Panel animations** (in-coming, out-coming): we provide a collection of various possible animations defined by a glyph for each of them: fade (Δ); flash ($+$); zoom-in (\square); zoom-out (\diamond); rotation, clockwise and counter clockwise (\circ); flicker ($- - -$); 8 directions ($\leftarrow, \dots, \nwarrow$);
 - **Panel size and position** (in-screen movements, position, size): based on comics structure analysis, we provide 8 reading directions ($\leftarrow, \dots, \nwarrow$) and any zigzags with only two parallel lines (N, Z...);
 - **Panel combination** (depicting accumulation of multiple panels and deciding when they disappear): the designer can encircle consecutive panels to provide panel accumulation on the screen. It is achieved in ①. Therefore, panel transitions defined for exit are performed when the first panel which is not in the accumulation appears.

Multiple effects can be combined for a transition. For example, a panel can appear from bottom right to top left with a rotation and a zoom. In this case, the panel, which is out of the screen at the beginning, moves from the bottom right to the position defined by the designer. The panel may also grow in continuous and linear proportions until the desired size. Concurrently, the panel rotates around its own center.

If we create an accumulation in ①, when we display a new panel, the previous panels are displayed too, with a low transparency. A

virtual device screen in landscape format is displayed through lines:

- A green line indicates that the panel can be displayed entirely on a device;
 - A red line mentions that the panel is cropped due to its size, position or both. The designer may specify in this case an in-screen movement;
- ④ In the middle area on the right, we produce information summarizing the scripted actions. For example, we can view, if a panel appears with a fade, a rotation or both;
- ⑤ In the top right area, we provide three buttons. The “Export” button is used to produce the xml file (see section 4.3), the “Help” button summarizes the glyphs and the last button is used to switch to a classical “Button” interface or to our glyph. When the designer has finished his work, he uses the “Export” button that produces the description file. This file permits to read the comics on any portable device which has a viewer.

4.3 Exported files and device viewer

We provide a description file per comics which contains the properties of each extracted panel. As a consequence, one can easily imagine to upload his comics scenarization on different devices without any modifications. For each device on which we desire to read a comics, we need a viewer (see figure 8 for an example). This viewer differs from an architecture to another.



Figure 8: A panel in iPhone viewer. See additional material for a video. (<http://youtu.be/sGYOuIGGveg>)

The viewer permits to compute and to generate transitions, accumulations and to adapt sizes and positions of each panel. It must also display automatically panels and allow the user to zoom or to move manually forward or backward. We also allow the user to disable panel

transitions to respect the original immobility of the comics.

5 Results

This work is a collaboration between a computer graphics laboratory and a producer of entertaining applications. For each page, we calculate the time taken by our system and the time needed by a designer to realize the same tasks. Table 1 present results of extraction and scenarization computed on 273 pages (from comics, manga and Franco-Belgian comics). These pages have different configurations: from one to thirteen panels, with or without borders, including overlap or not. Digitizing the pages, noise can appear on some of them.

who time	Designer	Our tool
extraction	2 minutes	≈ 2 seconds
scenarization	2 hours	3 minutes

Table 1: Time comparison between our tool and a designer: average time per comics page.

5.1 Extraction

Our extraction process detects correctly 96% of the images if we consider overlapped images as a single one and 80% in the other case. Remark that compared to a process realized by a designer on an image manipulation tool, where 90 minutes are necessary (2 minutes per page), we provide a solution to extract panels on 44 pages (classical format for a Franco-Belgian comics as in [Uderzo, 1991] for example) in 90 seconds at worst. It is crucial to recognize and preserve the meaning of open panels. Bottom of figure 5 gives an open panel example. For 73% of open panels, we produce only one panel and do not cut it.

Binarization is easy but it is the essential part of the extraction and it enables to separate panels more efficiently. However, the binarization is not a “complete solution”. For example, the third strip of figure 5 has a gutter half binarized because of an overlap. The rest of this page was correctly cut.

5.2 Scenarization

In our tool (see figure 7), glyphs are used to script comics. Today, in the industry, a comics page is scripted in two hours (adding sound effects and music). Our solution enables to achieved this process (currently with-

out sound) in three minutes (depending on the speed of drawing and the complexity of the desired script).

A video is given as additional material (<http://youtu.be/sGYOuIGGveg>) and presents our tool and the glyph based interface in details. In this video, we do the scenarization of a page of the manga One Piece [Oda, 2012].

Our tool is dedicated to the industry. Because of the the right of the firm, only the designers tested our system. After fifteen minutes everybody find it easily to use and very intuitive. They found a real interest in this tool and in particular the saving time for extraction and scenarization. However, they emit a small criticism on the scripting part: they would like to define glyphs themselves. For example, one of them would like the flash effect to be a lightning bolt glyph (⚡). More generally, they would like more possible effects: checkerboard, scanning, strip...

6 Conclusion

We have proposed a glyph-based tool to script intuitively comics reading for different devices with their own screen size and resolution. To ensure that comics are still readable on portable devices and with respect for sequential art nature, we extract panels from comics pages. We provide an automatic page decomposition system detecting panels and overlaps. Indeed we have shown that an entire automatic solution is not desirable due to comics diversity and the semantic meaning of each element. In regards of previous work, we provide a glyph-based interface which is very well adapted to the graphic tablets often used by designers and artists. Our interface allows them to sketch easily all panel properties. We also provide a button-based solution to reach a wider public and we propose in future work the scripting of various media. Our tool provides a complete solution to extract and script comics reading in few minutes per pages while other solutions take at least several hours.

More than a comics reading scenarization, our tool is designed to script any non-linear structured media and for example one can easily imagine to create efficient slideshows. It is also conceivable to use our tool to transform the pages of newspapers and script article reading for tablet personal computers. To do this, we only need to change the page decomposition proposing a choice between comics and newspapers at the launch of the tool. Newspaper

decomposition could be done encircling articles with a sketch-based interface using our glyph recognition.

In future work, we plan to manage text positions and speech balloons to improve the comics reading. Finally, we desire to detect panel characteristics (size, form...) to automatically propose reading directions and transition effects to the designer.

7 Acknowledgements

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Designing Natural User Interfaces with Depth Sensing Technologies like the Kinect Sensor - A Tracking Framework for Artists and Designers

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Abstract

This paper presents KinectA, a tracking application for media artists. The potential of natural user interfaces (NUI's) via depth sensing technologies is discussed. Recent literature on the definition of NUI's is summarized. The Kinect Sensor is identified as a successful example for the technology behind NUI's, the operating mode is explained and the major coding frameworks are introduced.

Keywords

Natural User Interfaces, Kinect Sensor, Depth-Sensing Camera, 3D Tracking, Designing Natural Interaction.

1 Introduction

We believe that the qualification of natural user interfaces (NUI's) plays an important role in the field of virtual reality, augmented reality and ubiquitous computing when the difference between reality and fiction disappears for the interacting users. Thereby a user interface becomes more and more natural if it enables its users to operate with computer systems in the way they interact with their everyday environment [4]. During our research we noticed that in the early 2000's efforts in the field of prior natural interaction research focus mainly on gestural interfaces which are clearly dominant in the field of natural interaction until today [1, 5, 8, 9, 10].

The technology behind a NUI is currently often connected to depth sensing technologies. The *Kinect Sensor* (abbreviated *Kinect*) is probably the most popular one. It was primarily thought to be a controller-free gaming tool but nowadays it is also being used for the purposes of medicine, education, science, business, fine arts and other cultural issues.

It is important for media artists as well as for computer scientists to understand how such depth

sensors work in order to create user-friendly interfaces and projects that make use of this technology for new paths in human computer interaction. Therefore this paper gives an insight into Kinect's operation mode and the possibilities to get access to the Kinect via existing frameworks.

Finally, we present a prototype of a tracking application via depth sensors that is especially created for media artists and designers who want to focus on their creative work. This software enables them to track persons, hands or objects and to use and process the tracking results in their individual projects.

2 About Natural User Interfaces

2.1 A Literature Review

The definition of *natural user interface* is mainly described and promoted by Microsoft researchers [3]. In their sense the term natural is associated with an easy and effective path to interact with technology. They say it implies a quick and enjoyable learning process for novices as well as for non-experts, because NUI's do not necessarily require a special instruction nor artificial input devices (e.g. mouse or keyboard) [8, 12]. They tend to result in an intuitive experience and "enable users to interact with computers in the way we interact with the world"¹. But it is not an effort to copy the real world, as Wigdor and Wixon point out, *natural* refers rather to a feeling and behavior users have during the interaction [12].

Further definitions of NUI's are discussing the seamless natural behavior towards the interaction with technology [3, 4, 10]. In this sense the technology behind becomes almost invisible for the user. Some authors even state that the NUI itself is not visible. Saffer describes it as "interfaces without faces"². But this point of view

¹ Jain et al, p. 211.

² Saffer, p. 147.

appears not to be fully accepted because other authors do not agree. They rather believe that “the idea of the NUI as a fully tool-less interface is overstated”³ and invisibility associates that no interface representation is needed as it is in comparison to traditional *graphical user interfaces* (*GUI's*) [12]. Concurrently it is also not excluded that NUI's could be visually represented [2].

The differentiating characteristic is the novel interaction mode of NUI's which is related to a more intuitive behavior and easier experience for the user, which today is mostly based on gestures, but which becomes more and more natural if it supports a combination of all human expression modes (e.g. seeing, gestures and facial expression, hearing and speech, tactile sensing, senses of taste and smell) [4, 12]. Nielsen et al highlight this, too [5]. They have developed and tested a procedure with a selected set of gestures. Their experiments revealed that “gesturing concerns more than just a hand posture or movement. It affects a greater part of the body, biomechanically speaking”⁴.

If a NUI is just based on gestural interaction it is anyhow not natural [4, 5, 7]. Donald A. Norman argues that most “gestures are ephemeral”⁵ and not “easy to learn or remember”⁶. In addition just a few “are innate and readily predisposed”⁷. Norman and Nielsen later insinuate that the different companies in the industry of gestural devices “use different rules, which end up confusing people”⁸ and show, on the basis of several fundamental principles (e.g. visibility, feedback, consistency, scalability and reliability) of interaction design that currently no standards for gestural conventions are existing [6].

The phenomenon of missing standardization could be caused by the fact that the analysis of gestures was and particular still is not standardized [9]. That point of view is connatural to the argumentation of Brockmann and Müller. They state that gestures are often redundant or spontaneous [1]. We assume that cultural differences have to be considered additionally because nodding the head does not mean yes in every country, for instance. Therefore intended gestures are hard to understand for a technical system or tricky to reconstruct with scientific methods [1]. That applies even in a more complex way in multi-modal situations when gestures, facial expression and speech are combined.

³ Goth, p. 14.

⁴ Nielsen et al, p. 418.

⁵ Norman, p. 6.

⁶ Ibid.

⁷ Ibid.

⁸ Norman and Nielsen, p. 49.

Concluding this literature review, the subsequent characteristics can be summarized:

- At first a NUI is the contact point between man and machine that does not require artificial input devices like physical controllers.
- Second it enables users to interact with technology through body movements, speech and sound or other biophysically given capabilities that are ideally combined to a multi-modal interface.
- Third the technology behind a NUI is almost invisible.

2.2 The Potential of NUI's

We will now shortly discuss how natural user interfaces assert themselves in the near future in different cultural and non-cultural areas. NUI's are “another potential evolution in computing”⁹ although gestural interaction is currently their predominant mode. But they will not replace traditional interface paradigms like GUI's because this type of interface is widespread and sophisticated [11, 12]. Nielsen et al emphasize for instance that a “gesture interface is not universally the best interface for any application”¹⁰. NUI's will probably fill computational niches and they “will bring unprecedented interaction experiences and capabilities to computing”¹¹, similar to how graphical user interfaces brought new interaction modes to the age of the command-line interfaces.

Although Donald A. Norman is on the one hand skeptical caused by the missing standardizations, he sees gestural systems on the other hand as “a valuable addition to our repertoire of interaction techniques”¹². Gestural behavior holds some advantages for the interaction with technology. Gestures can for instance be tracked over distance or in noisy environments when voice input or input with artificial control devices is not possible [1].

At least in the gaming industry, Kinect mediated NUI's seem to revolutionize the market. The annual report of *Microsoft Corporation (MS)* proves that they have sold 8 million sensors and 6.3 million *Xbox* consoles in the second quarter of fiscal year 2011 [13]. But they have only sold 5.2 million consoles a year earlier when Kinect was not yet launched. This supports our opinion that games with a natural interaction mode are successful.

⁹ Wigdor and Wixon, p. 5.

¹⁰ Nielsen et al, p.409.

¹¹ Seow et al, p. 4768.

¹² Norman, p. 10.

3 Depth Sensors as Media for NUI's

3.1 The successful Story of the Kinect Sensor

A huge hype around Kinect Sensor takes its course since it has been released in November, 2010, by MS. It was meant to be a controller-free medium for the gaming console named Xbox. Just a few days after its market launch in the United States of America, the first open source driver was published. This was the birth of the OpenKinect community and the beginning of lots of experimental projects that made use of the Kinect Sensor for innovative human computer interaction in a way, that was probably not originally planned by MS.

The employment of Kinect is so versatile that the creative projects that already exist only give a small insight in the multiple possibilities of different application fields. But the question why this audiovisual depth sensor has become so popular still remains unanswered. In the previous chapter we have collected the attributes of a natural user interface. Applications that make use of Kinect's technology are mainly formed by all these qualification criteria: most of them use gestures and speech, require no additional input devices and the technology behind is almost hidden despite the depth sensor and a processing unit in the background. Inferential this medium comes along with an innovative concept for NUI applications.

One can ask if the hype is truly justifiable and if other technologies are not able to deliver similar results for diverse project ideas. Indeed there exist other depth sensing video systems but these technologies are usually very expensive. In contrast the Kinect Sensor and similar devices like the *X-tion Pro* by ASUS are absolutely affordable for most of the interests.

The further comparison with other depth sensing tracking systems reveals that most of the other systems need an elaborated and complex installation that might even require specially trained experts. These systems are not as flexible as the Kinect Sensor which can be easily plugged in and out, which enables mobility through its relatively small size, and which does not need an especially equipped or shielded room.

We have tested the Kinect Sensor in different situations, inside and outside, under the conditions of natural light and artificial light as well as in the dark. It always worked excellent in our settings as long as there was no irritating infrared source like it could be caused through additional infrared spots or during the sunset when the infrared radiation of the light spectrum is very high. The Kinect is also

reliable if the tracking stage is clear set up with a homogenous environment and with few interacting people who can appear and disappear in the tracking field without large difficulties. But up to now we have not tested tracking sceneries with lots of people, with a huge fluctuation rate, or under the conditions of other human specified circumstances (e.g. with children or physically handicapped people).

3.2 The Operating Mode of Depth Sensors

So, how does Kinect finally work? The infrared spot and the infrared camera at the front side of the device build the starting point of the common workflow. The diode transmits a pointed interference pattern that changes dynamically. This pattern is reflected through humans and objects inside the active space. The infrared sensor perceives that reflection systematically and sends the given data to the integrated chip. Afterwards the system on the chip calculates the information to a depth view. The processed information is again sent to a connected PC or gaming-console. This method is called *Light Coding*. So far the core concept of the system on the integrated chip is not published. For us it remains just a speculation how the depth information is finally computed.

It is supposed that the depth information can be calculated exactly for every illuminated centimeter. Persons or objects can be tracked up to 400 centimeters away from the device. If they are further away the tracking results show inaccuracy. All these details are based upon environmental conditions as already explained in the previous sub-chapter.

3.3 Three major Coding Frameworks

In order to connect the Kinect Sensor to a computer three major frameworks exist. These are

- the *Microsoft Kinect for Windows SDK*,
- the *libfreenect* wrapper of the OpenKinect Community and
- the *OpenNI* framework

The Microsoft programming framework has been released in February, 2012, and is only available for solutions on Windows based operating systems. This *SDK (Software Development Kit)* is commercial software and offers different features for skeleton tracking, face and speech recognition, object and gesture detection, as well as for hardware control (e.g. change the LED's color or tilt the motor). It supports the programming languages C++ and C#.

OpenKinect is an open source community that works on a non-commercial basis and disposes open source libraries since Kinect's market launch

in the end of 2010. This solution is focused on the hardware access to Mac OSX, Linux and Windows. It supports a lot of programming languages such as C++, C#, Python, Action Script 3, JavaScript, Processing and some others. This framework provides features of hardware control, access to the cameras and microphones, depth visualization and detection, and it allows the use of multiple Kinect devices simultaneously. But currently it does not contain higher-level solutions like skeleton tracking.

The framework of OpenNI (*Open Natural Interaction*) is an industry-led organization that publishes its framework for free. *PrimeSense* from whom MS has purchased Kinect's technology is developing this SDK together with other companies who work on modern hardware and software solutions for new ways of human computer interaction. It is currently available for the languages C and C++, and can be used under the operating systems of Mac, Linux and Windows. It offers hand and skeleton tracking, a set for gesture detection, speech recognition, limited hardware control, as well as the combination of multiple devices.

4 KinectA – A Tracking Application for Media Arts

4.1 The Motivation for this Project

When we started our research in the beginning of 2011, there was no tracking software available that met the requirements of media artist and designers who wanted to realize projects with the Kinect technology. Most of the existing projects that use depth sensors like the Kinect have their own tracking concept. The tracking methods are integrated and not available separately. That means, they do not use an external tracking software for the access of the depth data. Although some of these projects have published their source code it is difficult to use the individual tracking methods for other project ideas. This is especially relevant for media artists and designers who often do not have sufficient programming skills for advanced and individual technical problems. They normally also prefer to concentrate on their creative work.

In contrast the main idea of KinectA is to provide a tracking application that is just ready to run. Figure 1 shows how KinectA is integrated in the workflow of media artists and designers. This software is especially meant to meet the requirements of media artists and designers, and assists them in their creative projects. For this user

group it is important that they can choose between different tracking options (e.g. skeletons, hands or objects) depending on their individual project ideas. Furthermore, it is necessary for them to control the tracked data and to decide which information are involved in their creative processes.

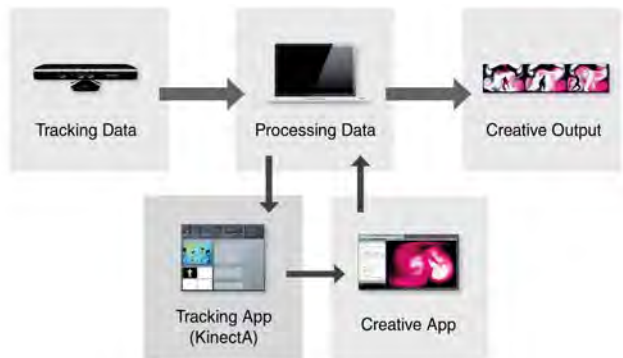


Figure 1: KinectA in the workflow of media artists and designers.

4.2 The Main Features

KinectA is built on the framework of OpenNI and supports both skeleton tracking (see figure 2) and three-dimensional object tracking (see figure 3). Additionally KinectA provides a simple hand-tracking feature (see figure 4). It is possible to run all tracking modes simultaneously. But the number of simultaneously tracked items is limited for reasons of computer performance: KinectA can track in sum eight hands, four skeletons and 20 objects at the same time. The basic settings contain options such as activating the camera and changing between depth, infrared and no view. By default the depth view is on.

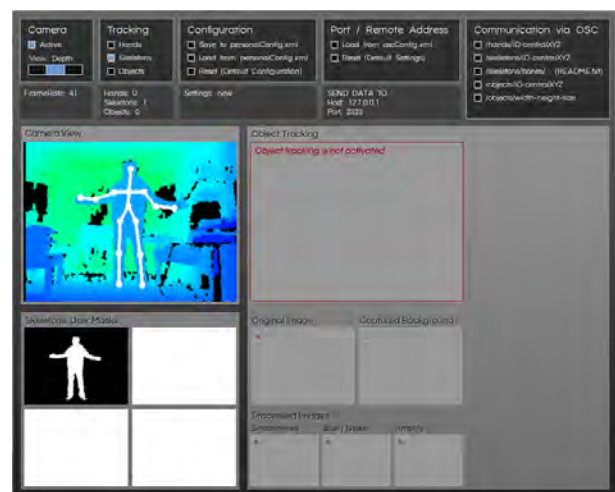


Figure 2: Skeleton-tracking with KinectA.

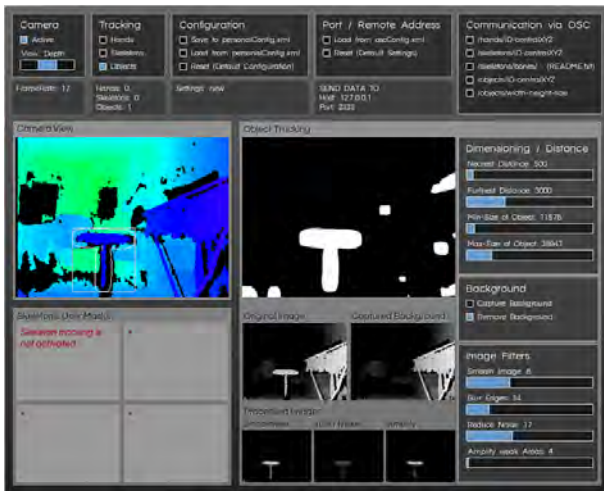


Figure 3: Object-tracking with KinectA.

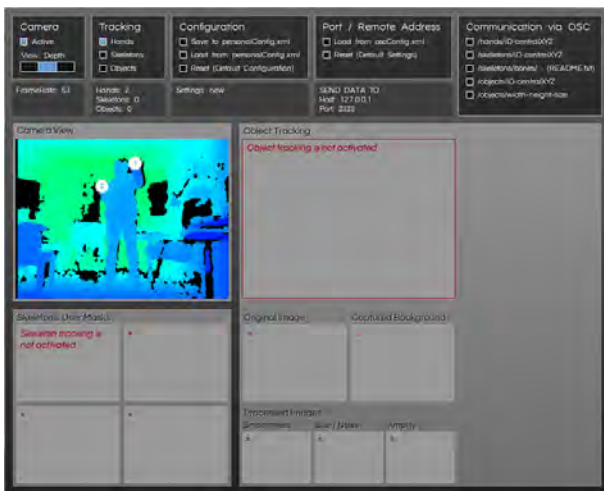


Figure 4: Hand-tracking with KinectA.

Object tracking is implemented with considerable functionalities and allows additional settings for processing the received image. It is possible to define the optimal distances and sizes of objects for a specific scenario, then capture a static background image and remove it from the final tracking images. Afterwards only new objects are considered for object tracking. In addition this tracking mode provides some image filters for smoothing, blurring, noise-reduction and intensifying of areas with weak signals. Object tracking is mainly based on the framework of *KinectCoreVision* but additionally allows the calculation of three-dimensional data of tracked objects. This helps to exactly define an object's position inside a three-dimensional space.

If users need the configuration of a scene several times our Kinect tracking application is able to save specific settings and configurations. The setup is thereby referenced in a simple XML file.

KinectA knows four different states for the personal configuration (save, load, reset and new).

In order to optimize resources the tracked information is not forwarded by default. KinectA offers an easy way to send a set of data. So users can choose manually which information they want to send via *OSC (Open Sound Control)* to the network connection if the corresponding tracking function is activated. The network configuration can as well be changed individually.

5 Closing Remarks

This paper has shown that depth sensors are innovative media for natural user interfaces and that the Kinect Sensor is currently the most popular one. It has drawn huge public attention from the beginning of its introduction. The interest of the open source communities has become as high as the interest of commercial institutions. It has been adapted for different issues and applications that experiment with new methods of human computer interaction. The examples for project ideas range from arts and culture over business applications to areas of science and medicine. The source code of lots of these project examples is published. But the availability of real tracking applications that are just ready to run is limited. Especially media artists have often not the hard coding skills to build an own tracking module for their projects and rely on the existence of support.

Additionally we have explained the operating mode of this depth sensing technology. The coding frameworks that exist to access and process Kinect's depth sensing data are in general highly developed. Some frameworks are commercial others are free available. But not all of them support high-level solutions such as skeleton tracking as it is implemented for instance in KinectA.

This software has been developed especially for the needs of media artists who want to create projects for natural interaction modes. It is a tracking application based on the Kinect Sensor that offers simultaneously skeleton, object and hand tracking. The individual configuration of this program can be saved for a later usage and the tracked data can be forwarded to other hard- and software via OSC.

KinectA is currently a stable software release that can be downloaded for different operating systems [14]. Its core concept is complete from our perspective but will be optimized through practical tests and through the detailed feedback of its users in the future. The underlying coding framework is also in a prototype state. We will continue to

optimize KinectA in the sense that it becomes more comfortable for artists and designers to create prototypes and artworks for natural interaction.

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New technology and non technical students: making contact with creative digital writing

Digital art can be viewed as the age when artists questioned the legitimacy of, and the proximity between, art and new technology. They had to learn the use of new tools, programs and methods, and acquaint themselves with technical expertise (programmers and engineers) collaborations...

With post-digital art, I make the hypothesis that the legitimacy of art's relationship with new technology (which has been validated) is no longer the crucial issue, and shift the focus onto the interrogation of this hybrid's specific characteristics. Many artists now use new technologies for their works; it is an unexceptional situation.

In this work, my intention is not to describe an occurrence of this hybridity but to reflect on how this breed of production can be profitable; how the factor of art can be used to interest people who are apathetic towards new technologies. In other words what could be the social position of digital art?

This text proposes a unique way of using creative tools to open up a post digital methodology – how we can invite non-technical students to enter the domain of new technology and impart the skills necessary to use interesting tools in the future.

1 Teaching digital writing:

In the second semester, I had the opportunity to teach a class on digital writing to approximately twenty Master students. Most of my students came from the Literary Translation department and some others from a department about Digital Issues. With few exceptions, the overwhelming majority of these students had no background in computer science.

The class curriculum was constructed on three principal axes:

- Provision of a cultural capital to understand the nature of digital literature through the presentation of a corpus of works. Some examples of works showcased can be found on the Youtube channel “Signes, forms et Figures”.¹
- A theoretical discourse base to aid the students in observing, evaluating and criticizing the works, and a global perspective of digital writing enabling them to move towards a more macro vision in their observations.
- Creative workshops which allowed the students to experiment with different aspects of digital creative writing while encouraging the expansion of their imagination

The class comprised of 13 lessons, each lasting 3 hours. The last lesson was dedicated to the presentation of every student's final piece of work (each student had to create an original text to validate the class).

The other 12 lessons were divided into 3 cycles. Each cycle was composed of 3 sessions and ended with a creative workshop. A workshop begins with the presentation of the exercise to do, then the students work on it. At the end, some voluntaries presents their work.

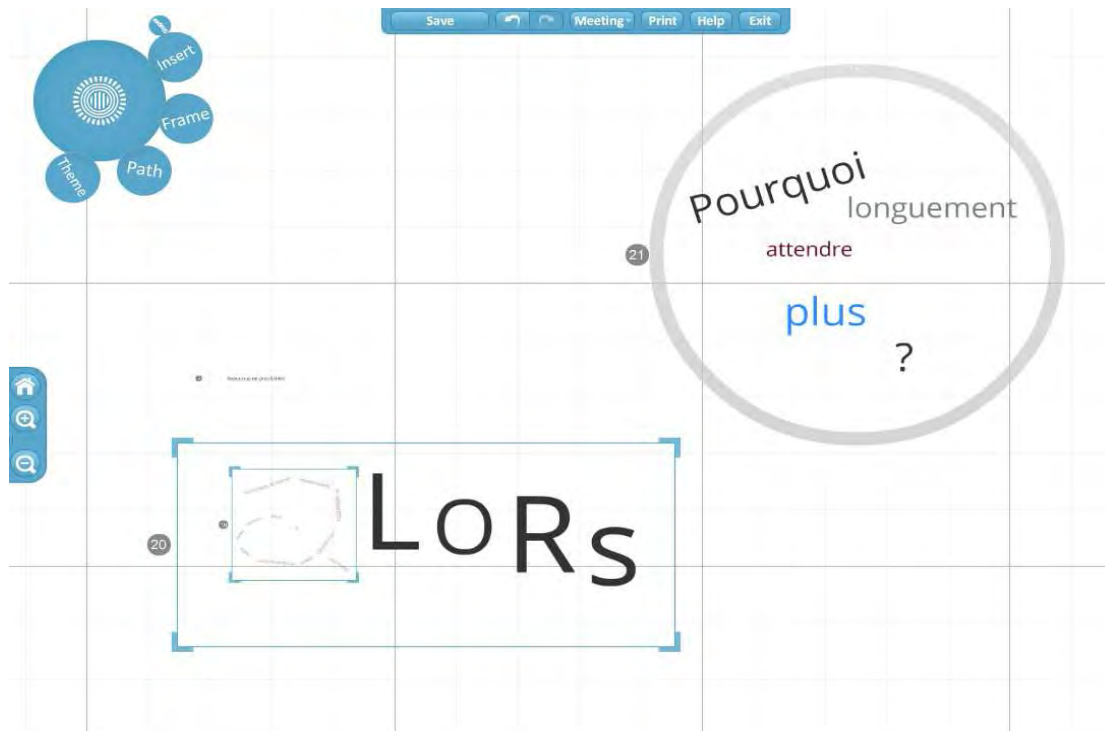
The first cycle was consecrated to the theme “Le texte juste le texte?” (*Just the text?*). In the beginning lessons, purely text-focused digital writing produced without images was explored, with a perspective of the

¹ http://www.youtube.com/user/signesformesfigures?feature=results_main

links that could be created in this minimalist setting. Among other examples, works from Heavy industry such as *Dakota*² were looked at.

At the end of the cycle, the students had to create an animated text with Prezi.

1.1 Prezi:



Prezi³ is a cloud-based web service/software that is usually used to create presentations like Power Point or Keynote. It was not originally intended for the writing of digital poetry or the creation of literary works but has a great potential and lends itself well to these purposes.

Prezi can be used for free but the presentations created on the website are accessible by anyone. It is possible to buy this software (Prezi Desktop) which enables one to control the privacy settings on the publications.

Prezi provides many possibilities for the non-technical to play with a text's presentation as it is used very intuitively and the creation of animations is hassle-free.

The text can be placed anywhere on a "desktop"?, in a multitude of positions and sizes.

Some e-writing playing with animated text like the Young Hae Chang Heavy Industrie ⁴ works can act as an inspiration in the play of a text's presentation (even if the works of YHCHI are made in Flash and there is extensive work on music and its synchronisation/de-synchronisation with the text which is not possible with Prezi). The research on textual? superposition by Jim Rosenberg with his diagram poems⁵ is another potential stimulus for creative work that could be done on Prezi.

² <http://www.yhchang.com/DAKOTA.html>

³ <http://prezi.com/>

⁴ <http://www.yhchang.com/>

⁵ <http://www.well.com/user/jer/whatsnew.html>

For the students' first workshop⁶, after showing some simple examples of how a text's presentation can be played with, I suggested that the students continue a Haiku which was an extract from Lutz Bassmann's (alias Antoine Volodine) book *Haikus de prison*⁷, using Prezi to present the text in an original fashion. It was an interesting experiment even if most of the students chose to use their time to work on visual design rather than writing.

Besides being user-friendly, Prezi also has another strength which is intrinsic to its cloud-based nature of existence. This enables different users to work on a common Prezi canvas simultaneously, and also the real-time presentation of a text in its creation. This collaborative aspect can be very profitable during a writing workshop: an entire class can contribute to and interact with the works of the others at the same time.

The problem is that there are still some (strange) bugs when the number of people on a text exceeds five people. Also, the visualization system is not very strong, but it can be an interesting tool for experimentation.

The second cycle "Parcours libre" (Free Run) was very general and open. It was a presentation of some digital poetry, Interactive Fiction and Hypertexts works and theories.

1.2 Interactive Fictions:

The workshop consisted of creating an Interactive Fiction with a specific program called Inform⁸ (Version 7).

"Inform is a design system for interactive fiction based on natural language. It is a radical reinvention of the way interactive fiction is designed, guided by contemporary work in semantics and by the practical experience of some of the world's best-known writers of IF."⁹

Interactive fictions are text where the reader can make choices and follow different paths accordingly. In the informs-like Interactive fictions (that are often called IF or just Interactive Fictions because they are more popular), the reader has to type out his desired actions on the interface, to advance in the story. For example, if in the story he wakes up in a room, he can ask to "look", to "open the door", to "go north", etc.

The first version of Inform was developed in 1993 by Graham Nelson.

⁶ <http://prezi.com/mh2lgzcrhcwc/formes-figures-4-contrainte-decriture/>

⁷ Lutz Bassman, *Les haïkus de prison*, Verdier

⁸ <http://inform7.com/>

⁹ Ibid

Home
Sunday 9:13 pm

Your pager tickles you awake.

Upstairs in the house of your childhood, in your room, and it must be time for school because – no, it's the weekend, you remember, but your alarm is going off anyway. You should have been awake already. You're going to miss the bus. Your mother climbs in the window. You're dreaming.

You're a grown-up: It opens to you again, a sluggish window summoned by a mouse click. Waking up now in your own apartment, your new apartment. Your pager is buzzing and vibrating both, serious. It is in fact the weekend, but you're not in elementary school. No one is crawling in through the window. You're a system administrator for nWare. Waking up urgently, here in nTopia.

Home
The constellations on the ceiling are as you left them: Pisces, Cetus, Aquarius, and the ones without celestial referent, left by some crazed astronomer in residence here before you. What could you call them? The Cradle, The Way, The Burning Book...

They're still glowing, too. Must not have napped for long.

> **wake up**
You're awake enough, and can get off the couch if you like.

The pager buzzes and jars you, its motor driven to disrupt and demand attention. This is no Harry Potter broomstick.

> **look**

Home
The glow-in-the-dark stars are about all you can see. Despite the disorientation, you do at least recall where the light switch is.

The pager vibrates like it's repeatedly tapping you to get your attention, and it buzzes gratingly.

> **stop the pager**
If it were only so easy. You have to listen to whatever messages are on there to get the thing to stop.

The buzzing of the pager continues. You are tooth to the dental drill of the device.

> **push the button**

An example of Interactive Fiction: *Book and Volume* by Nick Montfort¹⁰ on Splatterlight

An interpreter is needed to read an Interactive Fiction. The two most famous IF readers are:

- Splatterlight¹¹ for Mac.
- Gargoyle¹² for PC.

To create an Inform file, simply download the Inform 7 suit¹³; the software is available for all operating systems (Linux, Mac and Windows). Although the Inform editor uses a specific code to create IF which has to be learnt before the creation of a text, this language is very easily acquired because it is close to natural language (high level) and can be a good introduction to programming.

To begin a text, a room has to be created with the sentence “The [name of the room] is a room”. A description of the room can be added and it can be filled with different objects (containers, furniture, people...). Other rooms can be created and connected to the original, certain conditions or a timer can be imposed ...There are endless possibilities allowing a complete customization, and one can even add extensions¹⁴ providing new options (for example, an English-French translation plugin for the interactions vocabulary).

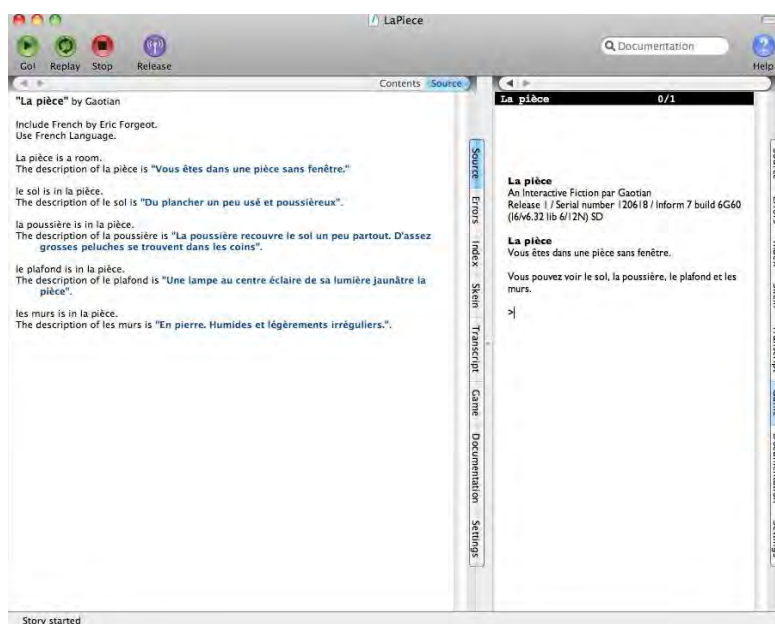
¹⁰ http://nickm.com/if/book_and_volume.html

¹¹ <http://ccxvii.net/spatterlight/>

¹² <http://ccxvii.net/gargoyle/>

¹³ <http://inform7.com/download/>

¹⁴ <http://inform7.com/write/extensions/>



Above, the Inform 7 interface. On the left, the window where you write the code, on the right, the window where you can run what has been written, read the documentation or see the structure of your text.

A lot of Interactive Fictions have already been written with Inform and there is a cornucopia of excellent references for students, such as the texts *Book and Volume* from Nick Montfort¹⁵ or *Bad Machine*¹⁶ by Dan Shiovitz.

During the workshop, the students were offered the choice between three subjects¹⁷:

- Open a chest: tell a brief story about a container. This path is a good opportunity to learn Inform as the technical exigence is limited and synchronised with the development of the storyline: create a container, close this container and made it openable with another specific object, use the “instead” system...
- Digital Poetry: create an Interactive abstraction where rooms are not really places and where north is not the opposite of south... In this theme, the student can exploit, as opposed to being disadvantaged by, possible bugs - they can play with the code and explore the boundaries of the program.
- No limits: the students can use Inform in the manner they want, to create an IF.

After all the lessons in the semester had ended, I was surprised to discover that the workshop with Inform had been the most popular (every student who had answered the evaluative questionnaire at the end of the semester voted for Inform as their favourite workshop). Inform is not the most user-friendly software compared to those practised in other workshops, but it is distinctive from the other programs which were familiar to the students through their experience with blogs/social networks.

There are other¹⁸ programs that largely resemble Inform, but have their own specialites. An example is the Hugo¹⁹ freeware (with its interpreter Hugor available for Mac and Windows) which permit the use of multimedia (pictures and sound). Not limiting the fiction to a purely textual dimension can be tempting, but in practice, the textual focus of software like Inform is a way to keep the attention focused on the creation. It is difficult for newcomers to divide their effort between the options offered by modern technology and a literary inspiration when using new digital tools.

¹⁵ http://nickm.com/if/book_and_volume.html

¹⁶ http://collection.eliterature.org/1/works/shiovitz_bad_machine.html

¹⁷ <http://prezi.com/pkcpzmw4fpvx/formes-figures-8-atelier-decriture-2/>

¹⁸ An other famous tools more often used before is TADS http://ifwiki.org/index.php/TADS_2

¹⁹ http://www.generalcoffee.com/index_noflash.php?content=hugo&accessible=true

To publish their works, the students can use an interesting program that interprets and converts Inform 7 code, making it directly usable on the web. The writer of an Inform text just has to copy-paste his code on the Playfic²⁰ platform to make it readable online by everybody. The last version of Playfic integrates the Inform 7 extensions. This was the second workshop.

The third cycle was focused on works on the periphery of text (the video games for example) and the workshop introduced data visualisation tools and how they could be used for creative writing.

1.3 Many Eyes and Data Visualisation

Nowadays it is common to hear about data and a lot of new studies interrogate how we can create tools to produce new types of information. For example, the phenomenon of big data pushes us to think of how new qualitative study interpretations can be made.

Using a lot of data leads to the question of how to read them. The field of data visualisation has to answer this question and since last year, it occupies a growing place in the sciences, and even in our private life.

Well-designed visualisations (graphs, tables, etc.) have a position of authority, they give the impression that the information generated is true. Keeping in mind that the aesthetics can help to validate what is being presented, visualisation can be an interesting way of lying. With this perspective in mind, the workshop was conducted around the play with certain data visualisations tools to generate false graphs, maps or diagrams... and to write.

Many Eyes²¹ is a web platform where the user can send their own data and produce visualisations (with their data but also with every dataset available on the website). The program is deceptively simple, which can result in problems with obtaining ideal visualisations, making it a good compromise to work only with the pre-defined datasets.

After the visualisation has been produced, the user can export it with an embed code on every website or blog. I recommended that the students create a blog on Tumblr²² for their writing, due to its facility of use and to subsequently import the visualisations.



²⁰ <http://playfic.com/>

²¹ <http://www-958.ibm.com/software/data/cognos/manyeyes/>

²² <https://www.tumblr.com/>

During the workshop²³, I proposed the students three ideas for visualisation-combined writing:

- to describe a feeling and to show how it evolves or to compare different intensities of feeling and to comment on these states
- to create a false “official page” for a small town relating a fictional incident
- to write a poetic incomprehensible text where the visualisation complicates the information instead of clarifying it.

1.4 Using tools to be more creative, be creative and liking to learn how to use tools

With the progression of the lessons, I was surprised to observe the students’ growing fascination and attraction for the technical tools, and their willingness to learn how to use them for creative purposes.

In using these tools for their own projects, the students created their own way of controlling the tools and by trying to use the tools in a 'subversive' manner, had to first learn how they conventionally functioned.

It was an enriching experience, for me and I hope for the student too. But this experiment has pushed me to ask how it could be possible to go further and which tools I had to use in this case.

A short presentation and commentary of some tools that could be very useful to bridge the gap between the non-technical and new technology as well as observations and suggestions for using them according to their particular characteristics.

2 News tools and perspectives:

2.1 Create hypertext and IF:

The distinction we make between Interactive Fiction and hypertext is that the reader has to write to describe the action he wants to accomplish in IF and he has to click on a link in hypertext to go further in the text.

But sometimes it can be more complicated to see the differences (with some IF decoders for example). The two categories belong to the interactive text.

Recently a lot of new tools for reading and creating hypertext has been developed and the tools for IF continue to be improved.

2.1.1 StorySpace:

StorySpace²⁴ is probably one of the most famous writing programs historically (available for Mac and Windows). It is with this software that certain renown hypertexts have been produced, such as *Afternoon, a story*²⁵ by Michael Joyce.

The software is presented as « a hypertext writing environment that is especially well suited to large, complex, and challenging hypertexts. Storyspace focuses on the process of writing, making it easy and pleasant to link, revise, and reorganize. »²⁶

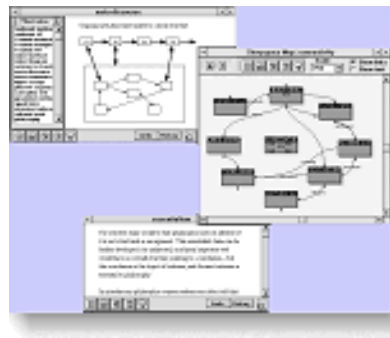
²³ <http://prezi.com/iphxyw2hmbmv/formes-figures-seance-12/>

²⁴ <http://www.eastgate.com/storyspace/>

²⁵ <http://www.wwnorton.com/college/english/pmaf/hypertext/aft/index.html>

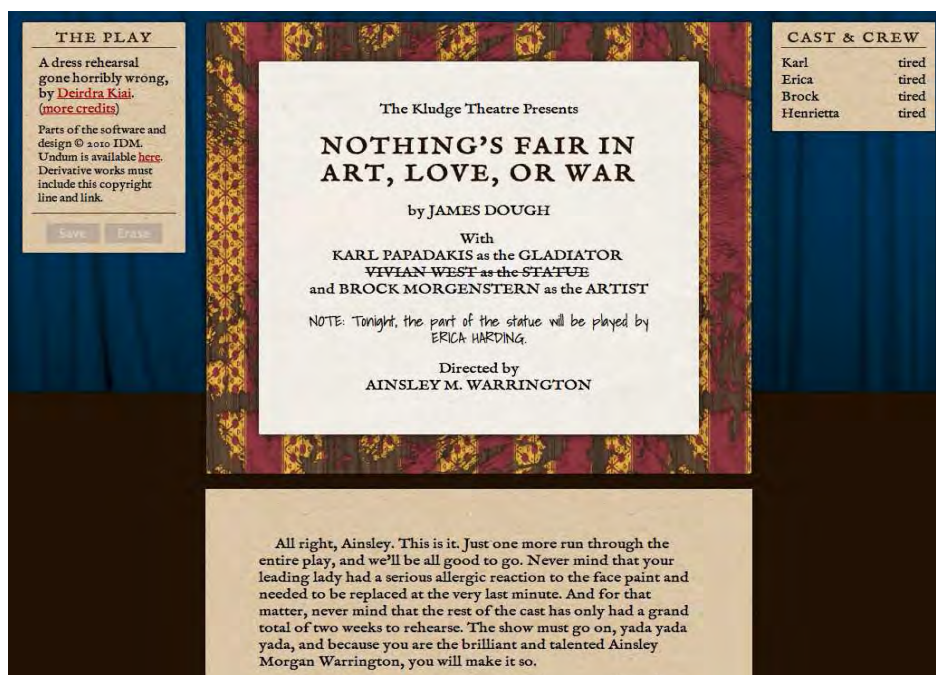
²⁶ <http://www.eastgate.com/storyspace/>

It is not free, in fact it's quite expensive (it costs 295 dollars) and it can be a problem for using it in a class, but there is a free demo version which allows the test of its functionalities and gives the students a preview of what could a professional tool for writing hypertext could be.



2.2 Undum:

Recently, there are some new programs that have been developed and which are free. Ian D. Millington has developed some code for the easy generation of hypertext on the web with HTML5. The solution is called Undum²⁷. The code is downloadable and user-fr but it's preferable to have some basics in HTML programming.



<http://www.deidrakai.com/theplay/>

There is an excellent tutorial created by I.D Millington that shows the possibilities which explain how the program works with the program itself.²⁸

The particularity of the hypertexts created are the following:

²⁷ <http://undum.com/>

²⁸ <http://undum.com/games/tutorial.en.html>

- There is a status box where the state of mind, situation, skill level, moral level... of characters can be described and the elements of this status can be changed by the actions of the readers.
- The hypertext is composed of different sections of smaller texts, the reader can go further in the story by clicking on the hypertexts, the text doesn't always disappear after a decision, only the decision vanishes. This allows the reader to read all his text at the end like a "normal" text if he wants.
- There are two kinds of links: the action links and the links that makes you advance in the story. The actions links can change the status of the characters or change some of the text section where the reader is. The others links change the text section.

The main problem for Undum is that there doesn't really exist an editor for one to write directly without knowing code.

To resolve this problem, its creator has developed a new solution, a webservice called VaryTale, although Undum can be a good introduction to learn HTML.

The strength of Undum is that it is easy to export a creation: it is simply composed of some html pages.

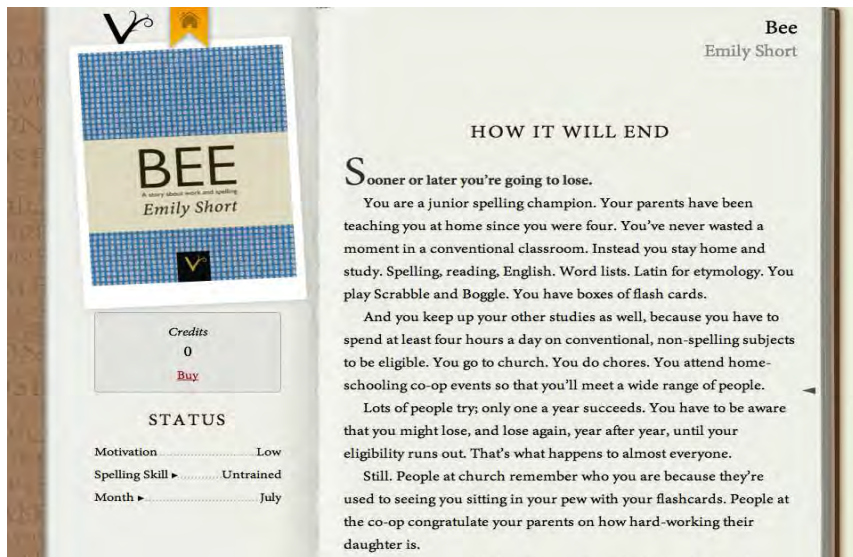
At the same time, there are no pre-established publication tools: you have to publish yourself on a ftp server the files if you want to share the hypertext.

2.3 VaryTale

VaryTale is a platform where you can read and write hypertexts. The structure of the hypertext is not the same as that of Undum. Each hypertext is called a "book" and each book is composed of many sub-texts called "storylets". You can choose the storylet you read. The storylets that you choose influence the story's narration.

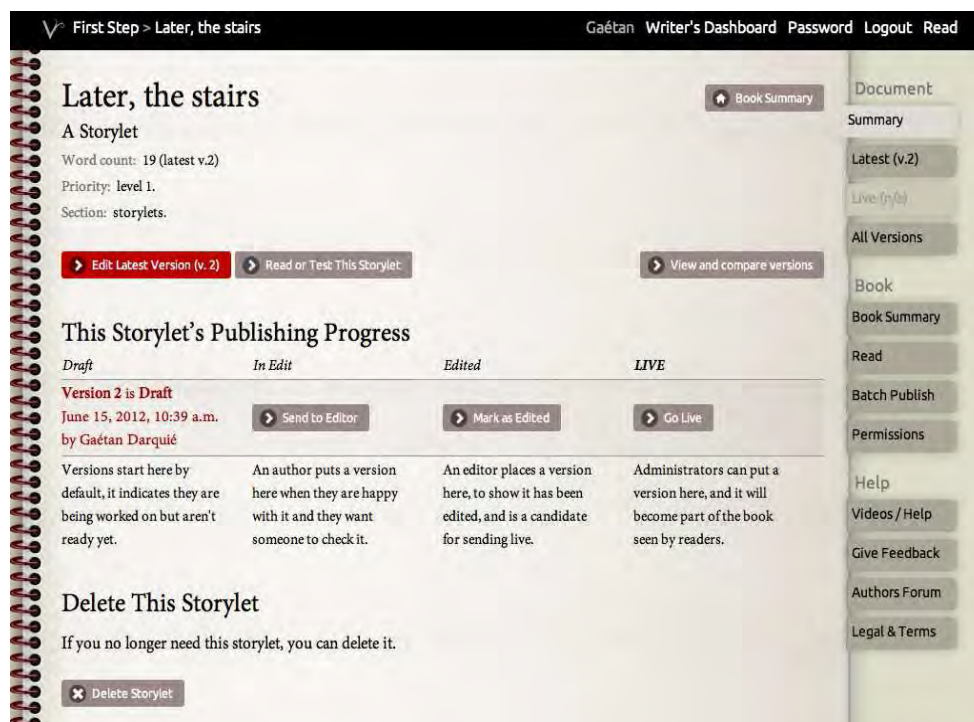


A part of *Bee* from Emily Short where you can select a storylet.



After selecting the storylet, you can read it and sometimes make actions or a final choice. <http://varytale.com/read/>

Inside the storylets, you can make a choice. The choice of a storylet is already an action and can have consequences. When you have commit some action. You discover new storylets.



VaryTale can be a valuable hypertext-writing tool because it's free, user-friendly and doesn't require a programming background.

However, it can pose two problems:

A text can be published automatically if the writer makes a request, but has to be validated by the editor. But if a student wants to share his text, he can download his version and send his files to his teacher.

The main problem is that, for security reasons, the system to create a writer account is not automatic, so you have to ask for permission to subscribe to the platform, which could take some time (although this time has proven to be very short in my personal experience, about a day) but this is not a consideration to be neglected if you want to program a lesson with this tool.

Some others tools can be used in class.

2.4 Visual Novel

Ren'Py²⁹ for example (Py for the Python code with whom it is developed) is a freeware for creating visual novels. Its graphic vocabulary is tainted by manga and Japanese design (visual novels are well-known in Japan). However, despite some childish pictures, the program can be used to create complex hypertexts with a focalisation on text and pictures. Music can be added.



A creation of a student, *Clashing All* by Damien Rembert

3 Other propositions

The hypertexts occupy a very specific and important place in digital creative writing and learning, but it can be combined with other elements and programs. For example, numerous possibilities of new kinds of interaction with Kinect³⁰ are feasible: the body of the user can directly interact with the text. But this combination of different technological tools requires a certain level of computer science skills. I will now present some other tools that can be used for non technical students, along with brief descriptions, that can supplement this list of suggestions.

3.1 3D and augmented reality

The Cave writing editor³¹ is a tool developed by Brown University to simplify the development of applications for its CAVE system³². The CAVE is a 3D environment where you can project videos and text onto four different screens. With goggles and pointers, you are able to interact with and immerse yourself in the projection.

²⁹ <http://www.renpy.org/>

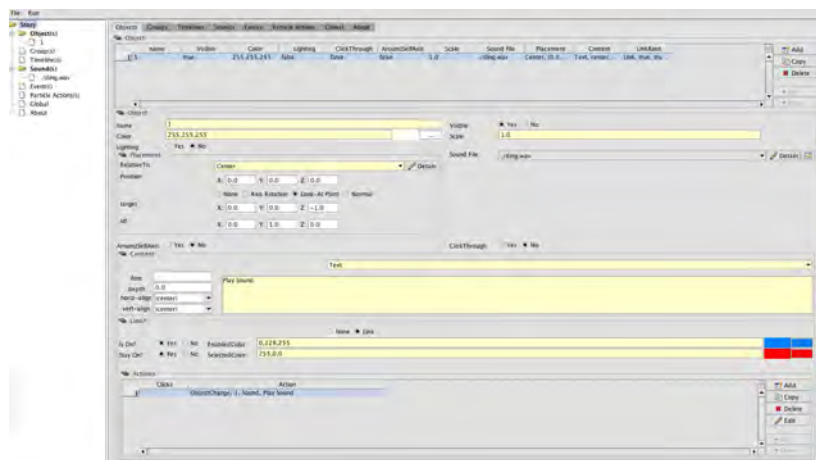
³⁰ <http://www.xbox.com/fr-FR/Kinect> Different API permit to use Kinect and to import embodiment interactions in personal projects.

³¹ Downloadable at <https://wiki.brown.edu/confluence/display/wdm/Cave+Writing+Software+Installation>

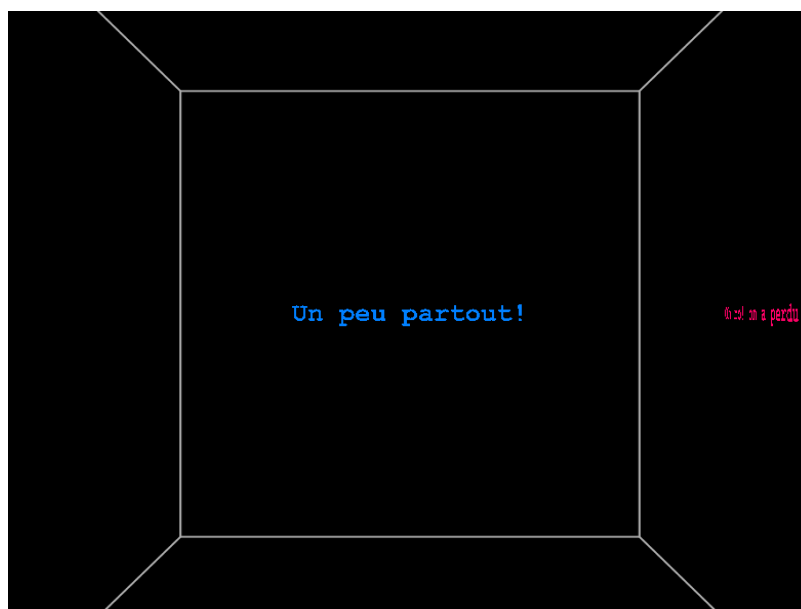
³² An article from wired: <http://www.wired.com/culture/lifestyle/news/2003/02/57334>, documentation is available on the Brown University website: <https://wiki.brown.edu/confluence/display/wdm/Cave+Writing+Resources>

With the Cave writing editor, you can create a text which will be playable in the CAVE but if it is not possible to have access, you can simulate the result with a preview system.

It can be a good way to introduce the element of 3D to students and to make them reflect on how they can use space and movements.



A screenshot of the editor



The preview of a sample

3.2 Digital Poetry, playing social, annotating... one million other ways to write with new technology

Writing with new technology can be very useful for students and fortunately there exist myriad possibilities to explore it differently. To complete my propositions, a list of some others tools to open up new perspectives.

It was in 2005 that Tim O'Reilly explains the Web 2³³ and there is the incessant daily repetition of the sociability of the web³⁴, in this context how could we forget the social networks (Facebook, Twitter, Google + just to cite three) and not think about working with them and imagining a new way of writing?

³³ O'Reilly, 2005

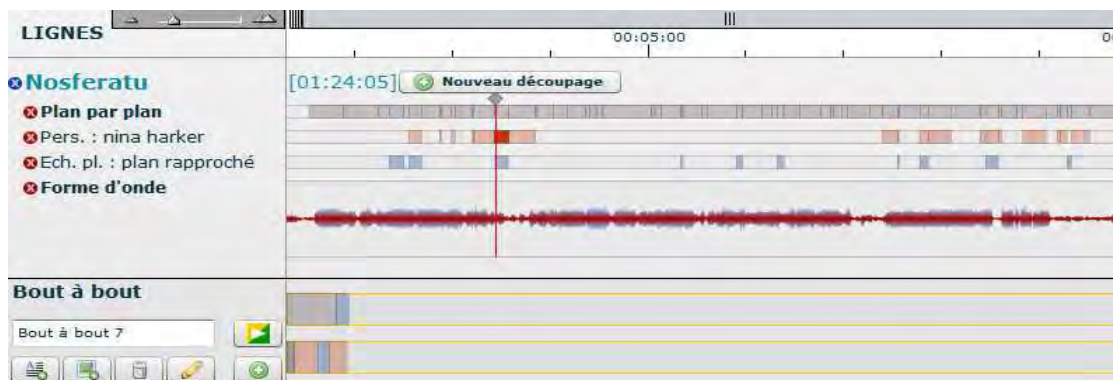
³⁴ Just some random works between so many: Chesbrough, Von Hippel...

Can the students use their social networks to create a fiction? Do they need to create a pseudonym account to produce something new? What is the point between social writing and collaborative writing (what difference when they write on a wiki and on a social network?).

This field can be very profitable to explore, especially because this could sensitize the students to the privacy rules and to better understand what and how they can show what they want to.

It is possible to “subvert” tools to produce narration or poetry, mind map softwares³⁵ can be a good help for the creation of a hypertext with another software, but it could be directly used to write in a very arborescent way.

*Flash*³⁶ is a well-known software for digital writing with which it is easy to create animated text. Annotations system like *Ligne de temps*³⁷ could be a good source of inspiration.



Students want to learn to use tools that can help them in their future professional life. Not all of them have the ambition to become technical experts, they just want to be able to accomplish their tasks without suffering too much. By giving them the desire to play with technological tools, the benefits are multiple:

- They learn how to use software
- They are initiated into the issues of new technology and can evaluate some technical artefacts
- They are sensitized towards digital writing and more globally speaking, towards the (post)digital art production

Teachers and artists need to be creative to invent new ways to use tools and to propose some new perspectives for innovation. With the digital opportunities, a new playground exists where everybody can have enough sand to build new castles.

³⁵ http://freemind.sourceforge.net/wiki/index.php/Main_Page : FreeMind is a free mind mapping software

³⁶ <http://www.adobe.com/fr/products/flashplayer.html>

³⁷ <http://www.iri.centrepompidou.fr/outils/lignes-de-temps/>

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Disrupting 3D models

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Abstract

Media art is constantly looking for innovative ways to produce objects and processes and to communicate with/through them. In this work we introduce an experimental way to view and interact with digital 3D models. We have developed a simple application that allows users to manipulate, decompose, and recompose models. We show examples of three type of models: realistic, generative, and what we call “motion structures”. We discuss our results from the standpoint of computational aesthetics, visual semiotics and software studies.

Keywords

media art, aesthetic computing, visual semiotics, software studies.

1 Introduction

3D models are generally considered as digital objects made of geometry that simulate width, height, and depth inside a computational environment. Although their origins can be traced to computer graphics during the 60s, when pioneers created computer simulations, virtual reality, virtual worlds, and visual effects in film, nowadays we encounter them in graphic design, video games, architecture, art, advertising, Web, industrial design, scientific visualizations, and digital humanities.

In this contribution we introduce an experimental way to view and interact with 3D models. We also present ongoing work to produce 3D models, based on images sequences. Our aim is to contribute to aesthetic viewpoints and explorations. The results obtained are then studied from the angle of visual semiotics and software studies.

2 Disrupting models

We have developed a simple application that allows users to interact with 3D models. Technically speaking, we used Processing with ModelBuilder and ControlP5 libraries. The application basically takes a STL model and

renders it. For us, the importing process implies to read its the STL original geometry and to present it as an ordered path of points or triangles. Processing supports lines and quads as well, but we did not retain them because of an aesthetic choice. Figure 1 shows an imported model by Bernard Dejardin from the open repository scifi3d.com.

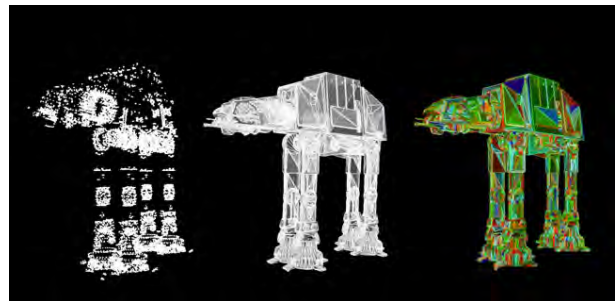


Figure 1

Once a file has been loaded, the user is able to interact inside the 3D view environment. A series of GUI sliders indicate modifications upon three factors: factX, factY, and factZ. Additional buttons apply transformations, change mode view (points or triangles), and reset the model to its original state.

The idea of the system is to invite users to perform transformations on the models. The resulting images from transformations are basically abstract. Some would be appealing but disrupting at the same time. They show how the same quantity of triangles in a model may be recomposed. Of course because STL relies heavily on tessellation, triangles are never separated. That means, geometry is not spread they rather create new solid forms. If a transformation is made on the view mode of POINTS, then the result looks like a particle explosion. Figure 2 shows two transformations from the colored triangles mode, obtained with different factor values.

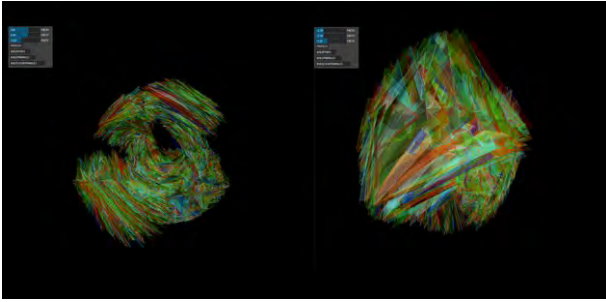


Figure 2

But what can we say about these new forms? Are they a kind of computational aesthetics? Can they teach us something from the visual semiotics standpoint? Or what about software studies?

3 Aesthetic provocations

These images can be approached from the computational aesthetic standpoint. As it has been recalled by Zhang, Harrell, and Ji, computational aesthetics aims at answering “How can the computer automatically generate various forms of visually aesthetic expressions?” The generation of forms requires to consider computational complexity, i.e. how much of the artistic decision is delegated to the machine power.

Our intention is to provoke aesthetic experiences by viewing differently a 3D model. Our strategy is to decompose an iconic image and to convert it into indexical and unrecognizable forms. We go from realism to abstractionism; from order to random disorder.

For a user to obtain results with our system, she must negotiate with the graphical interface. The user experience model is cyclic: decomposing an object and then recomposing it to be decomposed again. She must deal with parameters in order to generate a compelling shape. An outcome involves then to focus both on the input model and the artistic decisions of the system.

To discuss another example, allow us to remember the Anonymous mask which is now heavily associated with political and cultural movements. A STL model has been distributed in P2P sites for users to download it and 3D printing it. With the growing introduction of rapid prototyping in art fields and the relatively easy access to 3D printers, we may ask: are generative and abstract forms inviting to produce a physical object as well?

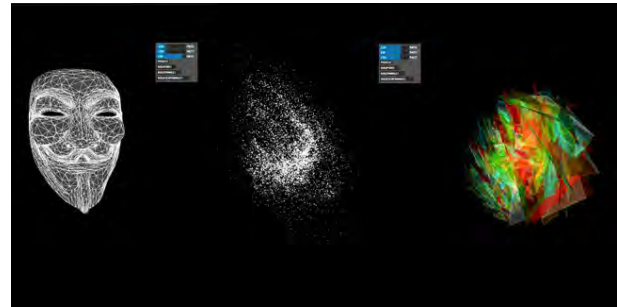


Figure 3: Three views of Anonymous mask

4 Visuality

From the perspective of visual studies there are some points that can be observed. One of the main contributions of visual semiotics is to study visual phenomena by taking into account both figurative and plastic elements. That means that the interest is not only on recognizable figures and symbolic iconography but also on the material properties of images. In 1992, the Groupe Mu identified three main plastic elements: colors, forms, and textures. The work of American philosopher Charles Sanders Peirce is also valuable. He distinguished categories of signs according to three relationships: the sign itself, the object, and the interpretant. In the present article we will concentrate on the Groupe Mu perspective.

We believe the importance of focusing on material visual properties is to develop a more rigorous visual literacy. This endeavor requires the eye to look sharper at visual material stimuli but at the same time requires the brain to create and connect abstract relationships of meaning. To further develop our point, allow us to discuss briefly some theoretical references.

Danish researcher Louis Hjelmselv elaborated his theory of glosemiotics based on the distinction of two planes in front of a signifying sign: expression and content. Both concepts could be associated to what Swiss linguist Ferdinand de Saussure called signifier and signified, respectively. But for each plane there are two more levels: the form of expression and the substance of expression, and accordingly form of content and substance of content. On one hand, the form is related to a constructed and abstract meaning, a sign, or what structuralists called “a structure”. On the other hand, the substance is the material part, it is articulated by the form in order to signify. Hjelmselv postulates that a form can have various substances (eg. graphical, gestural, phonetical), but not the opposite.

As it can be seen, the glosemiotic model provides a more detailed way to approach signifying processes than Saussure's. There are always two levels to consider, whether we concentrate on the material or on the content. If we apply the model to plastic signs, we can talk about plastic signifiers and plastic forms. French semiotician Algirdas Greimas has already made an effort on understanding abstract and culturally provoking visual productions. One of the main questions is of course: what and how these productions mean?

The structural analysis offers a logic and ordered methodology for a first approach. Given a visual production inside a 2D space –a painting, a poster, a computer screen- we can observe topologic categories that allow its segmentation into smaller parts: top/bottom, left/right, periphery/center, etc. Inside the topologic scheme we can articulate signifier units according to two categories: chromatic and eidetic. The first is related to hue, saturation, and brightness. The second is related to forms and its role is to establish the discretion of different signifier units. The combination of both categories gives “plastic formants”: particular arrangements of signifiers that constitute a sign.

Once we have plastic formants we can perform plastic readings. In linguistics, the syntactical organization of forms allows to treat them as semiotic processes. The reading is done on two axes. The paradigmatic axis defines relationships according to the couple “this or that”. It allows to recognize the presence in opposition to absence: e.g. this painter's palette of colors and not other. The syntagmatic axis is constructed from relationships “this and that”. It informs us on the mode of co-presence of plastic formants. For example, plastic contrast operates by the co-presence of opposite formants from the same plastic category.

Greimas postulates the principle of homologation between plastic categories and content categories. For example ,the opposition top/bottom with euphoria/dysphoria. For him, it is not important to know if such homologations represent cultural conventions or universals, it is the principle itself of modus operandi that matters. Of course, the homological categories come from the form and not from the substance.

As we said, in our work we are interested on provoking different readings. The fact of loading an iconic 3D model makes it easier to understand

the disruptions when it is decomposed. A common paradigm of industrial 3D modeling goes from simple to complex. In our system, we do the opposite. We apply the basic transformations of move-rotate-scale in stochastic and chaotic fashion. Hence, every transformation, even with similar parameters, is likely to generate different structures. Abstract as they are, they may foster readings and meaning effects of: roundness/harshness, flat/jagged, union/dispersion, small/tall, stretched/squashed. For a user, the only reference to a figurative reading is through the original model.

But is it possible to say that these meaning effects are homological? Is there a universal or an ideal shape of harshness? Is it useful to categorize plastic formants? What happens if there is no figurative background as reference? Although the scope of this paper is not to answer these questions, we clearly identify the need to continue experimenting with abstract digital objects. Moreover, we find it relevant to explore them within a simulated 3D space. The fact of zooming and orbiting is required for the visual experience.

Figure 4 shows an imported object generated with Structure Synth and a transformation. Generative art has reputation of producing complex and non-iconic images and structures. This is just an exercise to think about abstract models as input and abstract structures as output.

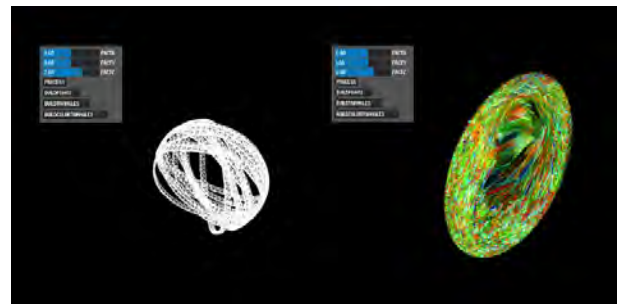


Figure 4: Transformation of an object generated with Structure Synth

5 Motion structures

“Motion structures” is a work in progress that aims at creating and studying 3D models from image sequences. Our first explorations have been made on film sequences. From the perspective of film studies, our contribution is an effort to start thinking about moving pictures as objects and to analyze them through techniques and processes from other disciplines. Figure 5 shows the motion structure of a shot from the bending-Paris sequence

in the film *Inception* (Christopher Nolan, 2010). The process to obtain this object involved the use of Quicktime Pro, Automator, ImageJ, Blender, and MeshLab.



Figure 5: Right: Motion structure in Fiji. Left: the structure imported in our system

Basically, our visual productions put in evidence the shape of movements. Instead of analyzing camera movements or character performances, we trace the transformations within the image itself. This allows us to explore the form of indexical signs of moving pictures, to construct shapes, and to explore them in 3D fashion.

We believe that motion structures are also a kind of abstract and disrupting models. Our initiative toward film may be considered as iconoclast, in terms of Boris Groys, but it is also a kind of transcoding. An animated sequence is transformed into an image sequence, that is a series of image files. Then, these files are digitally processed to get stacked and removed background. Finally, they are exported as a 3D object, which we require to remesh to obtain a low-res version that can be loaded in our system. The final outcome may not resemble the high-res and neat image of film, but it does preserve fundamental plastic signs.

When a motion structure is the input for transformations in our system, the output renders a highly complex disordered geometry. This is due to the fact that a motion structure has an average of 32,000 faces, which is almost the threshold supported by our system. While an optimized model would have 2,000 faces, we should also note that the original OBJ obtained from Fiji has more than 500,000 vertices and more than 1 million faces.

6 Thoughts on software

As we mentioned earlier, we used Processing to develop our viewing/transformation system. Regarding the acquisition of 3D models, we used several different software applications depending

on the input kind of model.

Before developing our application, we asked ourselves if it was possible to produce our generative transformations with existing software. Although Maya and Blender, among others, allow to enhance their functionalities with scripting code, we decided to create our own system mainly because we wanted to deploy a simple user interface to interact with objects. Indeed, Maya and Blender are complex environments that cover topics from modeling to animation and rendering. Furthermore, they handle their own file formats. It is possible to export/import to other formats but the main workspace relies on their own. For us, we use STL format, which is widely adopted for 3D printing and would satisfy our previous question on printing a complex and disordered model. But perhaps the main reason behind the production of a system is the cultural practices that it supports. A complex and integrated environment is suited for many tasks required by cultural industries but not precisely for a particular artistic approach and research need.

Currently, we observe an increasing communication between 3D software to support and exchange file formats. For example, Collada DAE is supported in Maya and Blender. In another example, a structure generated in Structure Synth may be exported as OBJ, which in turn can be exported as Collada DAE or STL in Blender. But there are still some missing pieces if we want to experiment with remixability of media species. Imagine that you could record a video right from a Web browser. This would be useful for recording navigation sessions, videoconferences, or for studying in detail navigation patterns. Consider now that you could export as OBJ a visualization made with the plug-in Tilt in Firefox. It seems a large quantity of media productions are adapted for Web but not the contrary. Consider the exportation of PSD or AI to PNG or JPG, AE to MOV or AVI. Yet, today we encounter new objects that in most cases are reduced to image or video for Web distribution: media and network visualizations, maps, tags, augmented reality, etc.

Innovative uses of software foster at the same time a culture of transcoding. We believe it is important to document traces of media in order to theorize in the long tail.

7 Conclusion

In this article we have introduced a novel and

experimental way to view and interact with 3D models. The main idea is to provoke aesthetic experiences with digital objects. We developed a simple application using Processing that allows to load, view, explore, decompose, and recompose a 3D model. To perform a transformation on an object means to parameterize a GUI, that behind the scenes moves, rotates, and scales stochastically and chaotically the fundamental geometry. The new structures would be appealing and disrupting at the same time. From the standpoint of visual semiotics these processes may foster different kinds of lecture, ranging from iconic to indexical, from figurative to plastic elements. From the point of view of software studies, we argue that more efforts are needed to explore the transcoding of digital media species. To adopt media art as experimental and artistic practice means also to challenge current paradigms and supported tasks of our current tools.

8 Acknowledgements

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Digital Preservation of Ju Ming Stone Sculpture in Taiwan

- the documentation and regeneration of arts

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Abstract

3D digital preservation of arts was conducted on the sculptures created by famous Taiwanese sculptor, Ju Ming, which is a one year project to scan 9 copper and 55 sand stone sculptures. Since the stone sculptures are currently deteriorated, the intended pace of one per season for 3D digitization becomes very urgent; as both the shape and appearance must be retrieved before further weathering damages occur. A hand-held device, the Artec 3D color scanner HM-T, was used as the main capture tool for stone sculptures, while the Cyrax 3000 long-range laser scanner was used for the larger copper sculptures.

1 Introduction

Digital preservation efforts were made on stone sculptures made by a famous Taiwanese sculptor, Ju Ming. The one year project is to scan 55 sand stone sculptures in 3D (Fig. 1), which are currently deteriorated, at a pace of one per season. The 3D digitization becomes very urgent and seeks to salvage both shape and appearance before further weathering damages occur.

Preservation is an integral task of the planning, designing, and resources, and involves many roles from data acquisition to web page creation (Haval, 2000), and all maintenance efforts should be planned ahead (Guarnieri et al., 2010). Information should be in the simplest possible digital format to minimize the requirements for specific or possibly obsolete software (Hedstrom, 1998).

Beyond the three-dimensional data, a large amount of heterogeneous data is collected during the analysis of buildings. Integrating heterogeneous data requires the management of the collected information regarding measurements, analysis, and interpretation of building shapes, and structural inspections (Andres et al., 2012; De

Luca et al., 2011; Duran and Aydar, 2012; Remondino, 2011). The results must also be presentable for large audiences for pedagogy purposes in the virtual world (Trapp et al., 2012).

The public needs to access cultural heritage subjects over the Web in real time interaction (Hernandez, 2008; Manferdini and Remondino, 2012). In contrast to the appearance of some models generated in a lab with lighting controls (Sitnik et al., 2012), this project was conducted outdoors, where daylight changes were a great concern.

2 Map of collaboration

The sand stones were collected from local areas, and due to their relatively low strength, layers of skins were separated from the surface or deteriorated into pieces. The Museum commissioned the Botany Department, Taiwan Natural Museum of Natural Science, to conduct relevant tests in 2008, which determined that micro organic hyphae can indeed grow along the cracks and pores of the lithic material, thereby causing damage to the artworks. From the perspective of preventive conservation, considerations must be given in future conservation works to how mosses, lichens, etc. are causing biological deterioration to stone sculptures, as well as how to avoid physical damage that may arise from frequent surface cleaning. The study focuses on how to strike a balance between sufficient surface cleaning and the reduction of biological growths on stone sculptures. The collaborative efforts are listed in chronological order.

- In 2008: Professor Lin C.K., Botany Department, Taiwan Natural Museum of Natural Science: Tests on mosses and lichens. Helen Jacobsen (stone conservator from Germany): Condition survey of the artworks and tests for restoration.
- Between 2009-2010: Tests and studies by

stone conservator Helen Jacobsen for the restoration work of the stone sculpture display area. Analyses conducted on the sandstone's salt content, sorption isotherms, and hygric dilatation.

- In 2011: The Department of Transmission and Learning, Headquarters Administration of Cultural Heritage, the Council for Cultural Affairs, Executive Yuan: Documentation for digital preservation, field surveys of artwork deterioration, and restoration proposals. A team led by Professor Shih N.J., Department of Architecture, National Taiwan University of Science and Technology: 3D digital collection, preservation, and value-added applications project for Ju Ming's Sculptures.

Deterioration of stone sculptures mainly arises from natural weathering and human damage. Works placed in the outdoors are susceptible to expansions /contractions (due to temperature differences), erosion by rain and wind, organism-induced effects, and the deposition of various materials from the atmosphere, all of which can increase weathering effects. At the same time, human damage to the stone can easily occur from people touching, climbing, or leaning on the sculptures.

Weathering has a huge impact on sculptural works. It is the gradual fragmentation and decomposition of stone due to exposure to air, water, and organic action. The three types of weathering - i.e., mechanical (Fig. 2), chemical, and biological weathering, often occur concurrently and affect each another.

3 Issues and tools

This challenge is twofold, namely, texture and details. Sculpture appearances constantly change during the day from dawn to dusk, or between clear sky, overcast, and rainy days. If a single sculpture is not completely scanned, the subject must be re-scanned for minor differences that may exist in terms of brightness, saturation, contrast, or gamma. Modifications may have to be made to separate scans. Since there were always regions or orientations missed in the first scan, following-up scans were usually conducted in 3-4 additional trips. The number of scans varies from 20 to over one hundred, depending on the size and complexity of a sculpture.

Photogrammetry bears limits in modeling multilayer, overlaid, and concaved crack conditions, thus, a hand-held 3D short range scanner is more feasible. A hand-held device, the Artec 3D color scanner HM-T, is used as the main capture tool. The scans contribute to the inspection procedures of the museum conservators by helping

to identify the configuration of a sculpture (Fig. 3). While the as-built digital models represent textures and the actual perception of size and proportion, the scan data enable the monitoring of detailed configurations changes of colors, shapes, and biological deteriorations. The conservators now can refer structure features to 3D models for future conservation references.

4 Web 3D environment

Sculptures data also serves public education and promotional purposes. Interactions between data and users are conducted through the Internet (Fig. 4) with 3D graphic plug-ins, such as Otaga, Cortona, or Octree, for easy access and minimum maintenance efforts. Instead of a specific viewing format or virtual environment, 3D models are presented in the Flash format. As the models are distributed, the copy right of sculpture-related data can be maintained without compromising visual quality or demanding higher computer graphic standards.

Color-textured rapid models (Fig. 5) are printed by a rapid prototyping (RP) machine in a smaller scale as an alternative to presenting the objects to the public. Digital and scaled physical models are used as reference in order to avoid any possible future weathering damages.

5 Data integration and interaction design

This project attempts to integrate resources, data design, and planning with existing working processes in preservation. Scanned data was formerly designed using the web as the only interface with the public or conservators, while this project divides the user interface into two parts: interactive web pages for the public and specific 3D applications for the conservators. A typical example is the measurement function, which conservators use to inspect the model in detail. Other functions are also applicable, such as viewing the model in mesh mode for geometric inspections. Most important of all, the working models are for interior uses with the resolution of polygons reaching 100000 or higher.

In order to make the best of all scans, the data are designed to be smoothly transferred from the project to the museum conservators by actually allowing them use the data in all possible ways. The scan data were delivered to the owner in advance, with the introduction of 3D software to bridge the process between traditional work flow and that with digital data. As hands-on digital experiences are encouraged, the conservators can perform simple data maintenance and simplify future life cycle updates.

- Hands-on for all: The experience for all those involved especially original conservators. The purpose is to encourage them to conduct everyday works based on the digital models, such as converting formats, measuring distance, changing resolution, or comparing historical scan data to actual physical objects.
- Maintained by all: By properly planning digital modeling and related data, anyone can update the data or trail contents, as follows.
 - Contents of pop-up windows: simply editing, replacing images, adding text, or promotions to images inside the pop-up window;
 - Links: to the gift shop or any designated site for promotions;
 - 3D models manipulation: by introducing a non-commercial software environment (like Meshlab) for 3D model-related manipulation;
 - Browsing is conducted in a non-plug-in environment: Other than Flash, no 3D plug-in is required to be installed or run in the background, thus, it is a simple way to maintain the system for maintenance and assure the maximum compatibility.
 - Uses off-shelf software: The fundamental graphic elements exist up to administrator management (for example, Web pages). Web page editing software is used, and no programming is required. Anyone can learn and implement the data with ease.
 - Data originality: In addition to original point cloud data, it uses the format down to the basic level, such as the XYZ file format, which only stores x-coordinate, y-coordinate, z-coordinate, red value, green value, and blue value of each point. Each obj file is prepared in two resolutions for each object: 100000 polygons and 10000 polygons. The conservators can convert to different formats or resolutions as needed. The simplicity facilitates migration between old and new systems, as well as related conversion and management.

6 Conclusion

Digital preservation efforts conducted on stone sculptures is translated into different forms, which serve the purposes of conservation, promotion, and public education. The 3D scan-related data and transformed formats enable a virtual environment with greater interaction and improved photo-realistic experiences for the public and

conservators. Future research includes the life-cycle monitoring of weathering data based on comparisons of the virtual models and the sculptures.

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Figure 1. Stone Conservation Lab, Juming Museum

<p>Granular Disintegration</p> <p>Granular disintegration arises from the rates of expansion and contraction differences of temperature changes, which is in turn due to the minerals on the stone surface having different coefficients of swelling. This phenomenon is often seen in sandstone, the loosened mineral granules of which would usually drop off and accumulate beneath the stone.</p>	
<p>Block Disintegration</p> <p>Block disintegration occurs when stone repeatedly expands and contracts along existing joints or cracks, during the day and at night. The joints or cracks would widen and multiply, eventually culminating in lithic disintegration.</p>	
<p>Exfoliation</p> <p>This occurs when the stone is made up of finer mineral granules, and the rates of thermal expansion and contraction differ between its exterior and interior parts.</p>	

Figure 2. Three types of mechanical weathering (Juming Museum, 2011)



Figure 3. 3D scanned data with/without image mapping and the photos of the original sculptures



Figure 4. Illustrating interactive digital data in a 3D web virtual environment by panorama and models



Figure 5. Illustrating digital data by scaled physical models 3D-printed by a rapid prototyping machine

U-rss *in the dark side of the moon*



1 - U-rss team, *generic logo*, ©2012.

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Abstract

There is no other reality than that secreted by the simulation models.

Jean Baudrillard, *De la séduction*,
Éditions Galilée, collection Folio / Essais,
Paris, 1979, p.23.

We are currently developing a project called **U-rss** (<http://www.u-rss.eu/>) that allows to set up what we may call a layer of *social portraits*, superimposed *in fine* to Google Earth. This layer contains several 3D modules (the social portraits) which are created with the help of analysis tools built on top of *APIs* that Web platforms provide in order to interact with their services. These tools give us the understanding of someone or the group he relies to, how he is described, qualified and linked by the Web itself. The project is framed by the idea that the platform speak more than the actor himself ; our main purpose being to detach every automated processes that appeared glued together on our screen, especially with Facebook. This *joint program*, always focused around a specific territory, was applied in Mexico City and Toluca with a group of students and teachers of the TEC of Monterrey (<http://micampus.tol.itesm.mx/>) who have created, during a whole week, a language of signs and shapes understandable by all, regardless their nationalities or language barriers.

Keywords:

Google Earth, Facebook, data visualization, data mining, digital art, cartography, social network, API, code, semantic Web.

Introduction

This creation goes throughout two stages. Firstly, several signs - we could define as "i+D/signs"(1) - are extracted and reassembled according different levels of introspection going from a basic keyword agglomeration (*i-deal*) to a personal Facebook's wall analysis (*u-rss+scanner*): Where *i-deal* gives us a quick snapshot of semantic relationships between queries and search engines (whether they're used for texts or images), *u-rss+scanner* is a simple gate we have built in order to record a Facebook activity on a external database. Thus, we can get rid of Facebook point of view and restrictions, write new algorithms on large scale of data and extend the Facebook *API* with more polemical methods(2). During this first step, we are able to retrieve meaningful descriptors that speak for cultures practices, and sensitivities of anyone; a set of signs, allowed by *mutual agreement* of participants in this project. Then, in a second step, these signs are organized, processed to give rise to what we may call *modular architectures (information + signs = in/signs)*. In other words, we gather signs given by our tools into a 2D graphic we lastly interpolate in 3D. These *architectures* - real *social portraits* of *in/signs* that are resulting from cross content, collected information, themselves summarized (compressed?) using *i+D/signs* - are finally visible on Google Earth and instantly legible from RSS feeds.

With the computer, the visible has always a blurred side projected in the shadow, this is the program. However, a precision of vocabulary is needed: we tend to approach the relation in a dichotomous way (the light against the darkness, the visible against the invisible, either in the case of the computer: the information vs. programs, codes and algorithms) while we should understand both sides in the gray of the relationship, in the *penumbra*, in an interface that is capable of retaining traces of the two poles at once. The *penumbra* is therefore that gray area (the unspoken subject) where the light illuminating the body (information) is partially intercepted by the program. In this original context, the filtering parameters made from Facebook to build *i+D/signs* on **U-rss** will allow us to update and gather particularly rich and interesting criteria, which will overlap this field of study by producing new forms built *upon, in between* existing forms. This work in progress is associated with the fundamental idea that, while seeking to transform the way we design, publish and share

content on the Internet, we inevitably offer new forms of identity, defined by social logics directly associated with web users and the ability of machines to produce quantifiable and interconnected data. In this idea of "semantic web"(3), it is therefore here we're able to review our personality from the intersection of two points of view that seem both contradictory and complementary: Facebook and Google Earth.

While the first proposes a formatted structure where we have to slip into in order to build a tribe - in which we may lose ourselves at any time - the second gives us the illusion of zooming from the collective to the singular, from global to local levels. Thus providing a focus on a progressive *fold* ("repli" in french) to the peculiar, a deep whirlpool diving into private space, a bit like a snail retracting itself to the center of its shell. Three other parameters in this art and research project still need to be emphasized: first, how to redefine the concept of reality through the device of *re-presentation* where the image (the *social portrait* on Google Earth) of the image (the set of *i+D/signs*) of the image (the Facebook tribe) does only illustrate this successive overlapping of *simulation models*? A second line of approach will inevitably asked the role of "i-negotiation"(4) we have to implement in this work since it is a constant confrontation (conversation?) between our own desire to interact with a community and algorithms - that already carry ideas and opinions - behind the interfaces we use to exchange, maybe just like a visual anthropology exercise applied to digital networks. Indeed if an initial scan of the Facebook wall is done automatically by a program, the raw result is then *modulated* (corrected?) by the play of *i+D/signs*, so the interest of certain elements - for us or the owner of the wall - can be *overstated* depending the automatically generated links... Finally it is important to notice the rhythm of in/signs - leading to the construction (the invasion?) and conservation of the 3D modules on Google Earth - which is associated with information gradually - but also temporarily - left on Facebook.

The work is constantly evolving, so... a bit like a melody of "Free Jazz"(5) , in which a musician would (re)interpret a known score and adapt it during a temporary immersion in a social body, **U-rss** develops several recurrent issues raised by the sometimes ambiguous relationship relying arts, science and technology since the advent of the Internet.

1- CONVERSATION: *the spring principle*

It is interesting to note that *Spiral Jetty* imagined by the artist Robert Smithson (1970) "which creates the experience of a constant shift"(6) perfectly sums up this idea of a double point of view emphasized in our proposed **U-rss** project. With the work of Robert Smithson, paradoxically, when a person runs on the pier to the center of the spiral, he moves away from the shore (which might delimit, to him, the *boundary of the land*). But the more he approaches the center (thus theoretically: the idea of having traveled the farthest on the water), the more the concentric rings of the pier separates him from the lake... Similarly, in **U-rss**, if the recovery of a constant mass of data on Facebook inevitably produces a social portrait from a set of important *inter-community* connections (the tribe of the verb *be*?) - and somehow determines the avowed desire of a view opened on the outside - this transformation of *raw data into corrected data* seems a priori attached to a result inversely proportional to the programmed investment: a continuing interest to assert his limits.

The experience is similar to that described above with *Spiral Jetty*. What happens when you leave yourself? The hypothesis is to consider the duality between two points of view apparently contradictory but necessary. This hypothesis can be summarized by one simple concept: the *spring principle*. On this idea, *relational design* sets to work in **U-rss** requires us to suggest that the development of a dialogue with the *Other* invariably seeks to build a *private space*, only visible within its permeable boundaries... Thus, this *conversation* between the Facebook *wall* and Google Earth - we could be inclined to initially think as the *necessary appropriation of a new living space* (Internet) - would be able to build both the eyes of others and the policy of an *ego identity*. It would gradually composed the bricks of an autonomous subject, a *self sentinel* posted *secretly under all*, who would define his *elastic limit*. And the *i+D/signs* would be witnesses of this essential balance between tension and elasticity. These limits make - and perhaps *anticipate* - the indeterminacy of language as they mark intersections; signal nodes built on networks that involved a social, *outward ego*... The *social portrait* marks a temporary elasticity limit.

As a *focal point* (superimposed to the Google Earth texture), this *social portrait* is located on the optical axis of a lens: a metaphorical meeting with the Other.

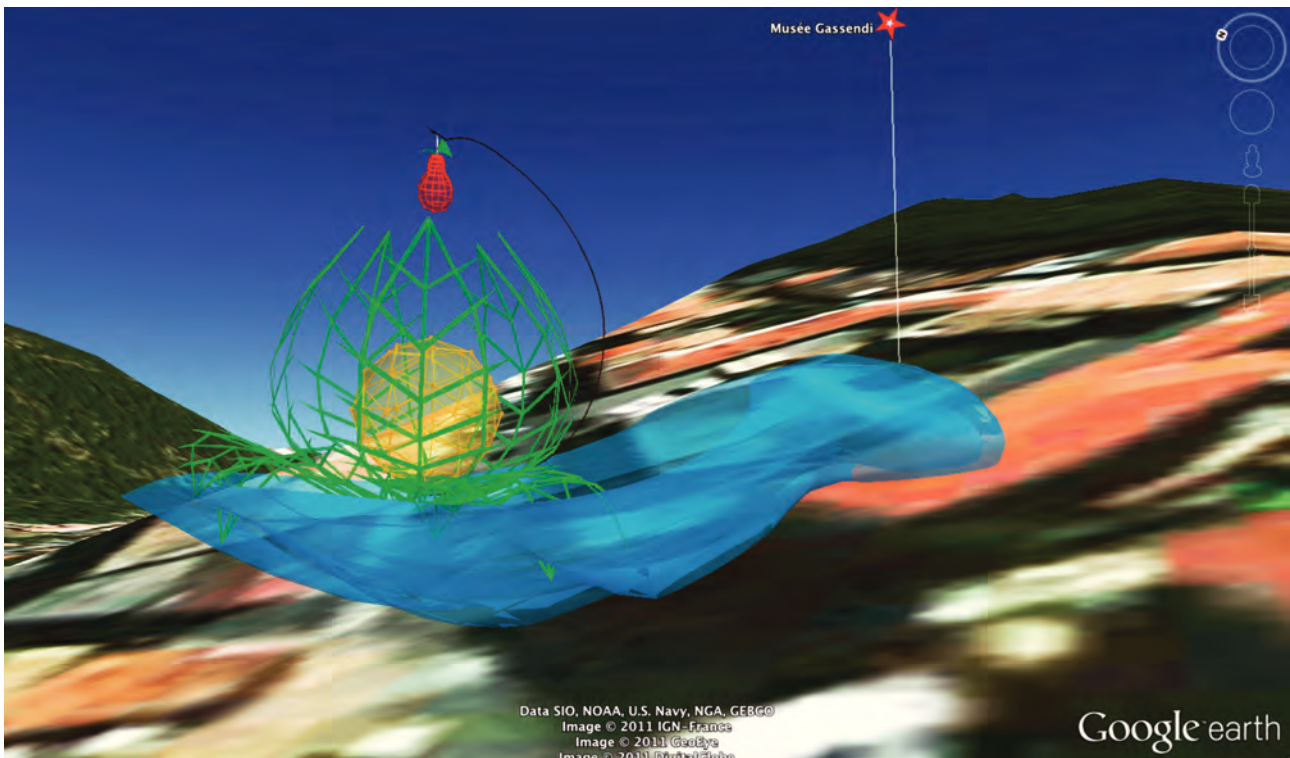
But if like him it focuses light rays, it is only possible during this process of constant back and forth between the opening and closing of this lens.

Jean-Louis Boissier writes about the work "Five Into One"(7) of Matt Mullican: "The virtual here is neither a representation nor a simulation, it is the projection of a mental universe topology. In this sense it has the consistency, the concrete presence of a raw object, strictly artificial, shaped as a map project, without a map of any territory"(8). The correlation generally drawn between public and private spaces, experienced here through **U-rss**, has to be interpreted in the sense of a *Weltanschauung* (worldview). It is first and foremost a matter of speech: a reversible conversation. This one - theoretically here because always linked to language - produces the opening to the Other, organizes, arranges *his own mental territory of identification* by the use of essential filtering devices. These devices cause many levels of interpretation needed for this speech to solidify, to sediment, to close itself gradually until it looks like a shack. Because "virtual worlds, as generally devices of digital interactivity, remains within the partition, an art of interpretation"(9).

2 - **U-rss** team, *social portrait*:

Musée Gassendi, Digne-les-Bains, ©2011.

In **U-rss**, the transition from the surface of *i+D/signs* to the simulation of a 3D volume takes place in three acts. As we said, everything starts with the information originally reported on Facebook, which are then analyzed and transformed into *i+D/signs*, and last modeled in 3D... before being placed on Google Earth. In our daily use of these tools, we could think that they represent something important to us, they interface things that seem to be linked to reality whereas they just emphasize the presence of something absolutely artificial, just because they rely on codes which could be re-interpreted, re-framed and re-exposed. In order to get a wider perspective on our daily digital life, we believe that we have to penetrate the algorithms beneath the interface so we could project the proper mental universe (*an utopy?*) that stays within and that we could only achieve it by melting the territories of what those tools aim to map. In other words, **U-rss** becomes a bit like the *Rosetta stone*, a collection of words and images where three languages (of the same text) coexist within an *i-negotiable phenomenon* so we can attach, in some way, the *Google Earth territory* to Facebook walls with *language springs*. We are here far from a simple "informational acupuncture"(10) set by Maurice Benayoun: the tattoo operation *designed* by successive implants - springs of language - on the Google Earth platform *virtualizes* it.



2- CONSTRUCTION: *i-Negotiation*

The *i-negotiable* (tradable information) is a generic term we use to describe the conversational process, the exchanges of contents. This term points the process that engage actors in *discursive relations* they maintain towards a resource or any production of the mind, and that needs a construction of its own legitimacy in order to exist, whether it is an intellectual, strategic or simply social one. This fundamental principle can be stated as: "The information always comes with a price and delivery entities have always been able to exercise the right to influence its rate"(11). *Information has this inherent quality*, an easily corruptible, playable rate that allows media spheres to exist; cost of information seems to have even formatted logical media technology, from their hierarchies to their routines.

The analysis of this business obliges us to describe the whole set of players who can take a part regarding their influences on the information rate. In the pre Internet era, when dealing with traditional media, we can consider that the technology actors, the transient channels, exert a relatively little influence considering our problem, the *price of information* seems to be mostly modeled, constructed by organized human agents. In these systems, regulation means a lot, and *the act of piloting information*, their switches from one to another is governed by an organization (an institution in most cases) that is highly hierarchical thought. In this case, if a current (stock) of information sees its stock price raising, it is relatively easy to trace the chain of transactions that have granted its final value because the players who cause this are easily identifiable. This principle is also sufficient to explain the archaic systems of knowledge transmission, especially when it comes to societies based upon spoken words.

In a science fiction book as *Grande Junction* by Maurice G. Dantec(12), the archaic regression of information's delivery systems is based on deregulation of these latter. We are in 2060; in an information society which has seen its distribution organisms gradually technicized until every human is connected through bionic implants to a central machine. The plot of the book lies in the intrusion of a computer virus, bugging the central machine and making every little digital object perfectly mute. This gigantic *bug*, called the *fall* in the novel, leads each human to a *non sustainable* use of language, oral transmis-

sion so. Dantec then describes very well this society of informants, organized as a network of dealers whose main product is information itself. Thus there are small dealers, traffickers and barons finally, the last link in a chain where each branch contains actors who try to take profit (trading) of information they provide the transmission for. It is interesting to note that the life of all human kind depends on the goodwill of these barons, in the information they allow to be traced. Otherwise said, the value of each human life is estimated upon the width of the pipe of information they are.

However, if we want to talk about the *i-negotiation* over the Internet and more especially in the use **U-rss** proposes to do with Facebook, we have to say a few words about this web social service. The high-tech platform requires us to include algorithms and programs as influential participants, acting in the negotiation process. *Decision-making* entities that are decentralized - fragmented into a network which overlaps an increasing amount of trading places, so that each user can shape an informational sphere of its own, according to his will, where he can access all resources the world knows - does not alter the fact that computer architectures operate with varying degrees of aggressiveness, influence and change to the access to information they solely provide. Quite the contrary, it's the very existence of these programs that made possible the emergence of this new paradigm the Web media is. If hierarchies are no longer visible in such systems, or, to quote Castells, if we went - now - from a "space of places" to a "space of flows"(13), it's not so much because the Internet is profoundly ubiquitous (trading eras moving at the speed of light until they become a stream), but because technologies and programs build maps to drive the streams, thus forcing us to reconsider both the territory and the map logic.

It is necessary to identify these programs, their influences and their possible corruptibility. Coming back to Facebook, the geometries of the platform are so complex that we are actually unable to emulate our model, without talking about the inside mechanisms of features such as *I like it*, suggestions, groups or fans and what they involved. Information that is negotiated with the algorithmic logic of Facebook on one hand, with members of our network and the other, and corresponding to the digital identity of the user, presents such permeability towards actors (whether they're technological or not) with

which it passes, that its rough edges make it elusive. The malleability of the web forces us then to find any material picture [Gaston Bachelard, 1947] capable to stimulate our thinking. Very influenced by the thought of Peter Sloterdijk and his trilogy *Sphären* (14), Bernhard Rieder proposes the metaphor of *digital foam* to designate the *social web* and its impact on the interactions between web users. Most interesting in this article is the concept of *membrane* both *filters* and *interfaces* of a *bubble* containing the original identity equipment, constantly subject to intrusion. "The bubble must stay away from others but its extension inland (identity or *home of meaning*) depends on the production of such other space of their own. Our identity must occur by both relationship and isolation, or - to speak in Bourdieu's terms - the game of distinction demands that everyone plays it."(15)

Under the **U-rss** project, we retain the concept of *membrane* as the (none) place of our experiment, space exchange (of flows) which build relationships between members of a shared network. The importance attached to walls (*membranes*) of web users is not to be looked in the exchanged contents but through the pulse of it, somewhere in between the relationship of its owner with its network of friends and programmed tools of Facebook. This is not so much upon a qualitative interest that the project was born, but from time measurement, from an activity that include rates, pulses and echoing vibrations. We consider that a wall is no less a musical score on which could be written the digital identity of his owner. Research by Bernhard Rieder and more generally *marine ontology* or the *aqueous lexicon* developed by Peter Sloterdijk is an interesting basis for considering the report that information and algorithms maintain in such interfaces. On this membrane, we do not dwell on content, or even on *hypertextual* qualities within them, but on its origin first, its liquid state then.

Thus, activity of the wall can be segmented according to the origin of the interface trail it leaves:

- 1 – Algorithm activity: all jobs generated by the system itself, traces of an activity outside the wall: *I* and one *Other* are now friends, *I* is a fan of ..., *I* joined the group ..., *I* commented link ...).
- 2 – Author activity: posts on the wall by the owner (role of images and hypertext links).
- 3 – Network activity: post by others, comments, spontaneous interventions.

These scraps of identity can then be classified according to their liquid state. Except for what we could consider as a *fossil record* – corresponding to the *administrative profile* of a user, an indelible mark consisting of a name (an index) and all the profile information linked to a tangible existence (address), or to any other physical communication tools (telephone, mail) - if we keep only information on the wall, we can measure the *liquefaction of information*, its degree of permissiveness. It remains ice if it does not cause reactions, it tends to ice if the reactions are removed, it tends toward liquid if it causes reactions (quantitative approach), it tends to gas if the reactions present some form of wealth (qualitative, social approach: rich network, information is reviewed by a lot of different friends, themselves posting personal resources or other hypertext). This kind of report to the membrane is selected for **U-rss**, report that can be envisaged in terms of *interface* by extending what this net (*work*) retains or misses, deletes or rewrites.

3- CONSERVATION: *i-Documentation*

U-rss provides several computer programs developed in AS3 and PHP that perform certain tasks with respect by obligation to the Facebook API. Applications are available on the Facebook platform itself and it is therefore possible to operate them. But they are mostly associated with the development of two important protocols:

- A documentation playing the same role as a *cartel* of a physical artwork, explaining the ontological conditions and uses of this program and aesthetics.
- A book of rules defining the limits of acceptable uses for a particular program and any contributions to the **U-rss** project in general.

The programs offer shortcuts to perform tasks such as scanning posts of a wall, retrieving images from an album, searching by keywords, etc. The source code for these programs are documented and made available for everyone. The progressive development of this toolkit may be, as usual with most open source projects, augmented by contributions from other artists, either by modifying the source code of existing applications or by providing new applications. The purpose of this part of the project is to involve various artistic actors who do not necessarily possess the technical knowledge about the use of open source projects. Documentation for a program,

although it may be offered in a traditional "Javadoc"(16) format, will have to be associated with a plastic, aesthetic and theoretical discourse, supporting the creation of the latter as it was developed with an artistic process in mind.

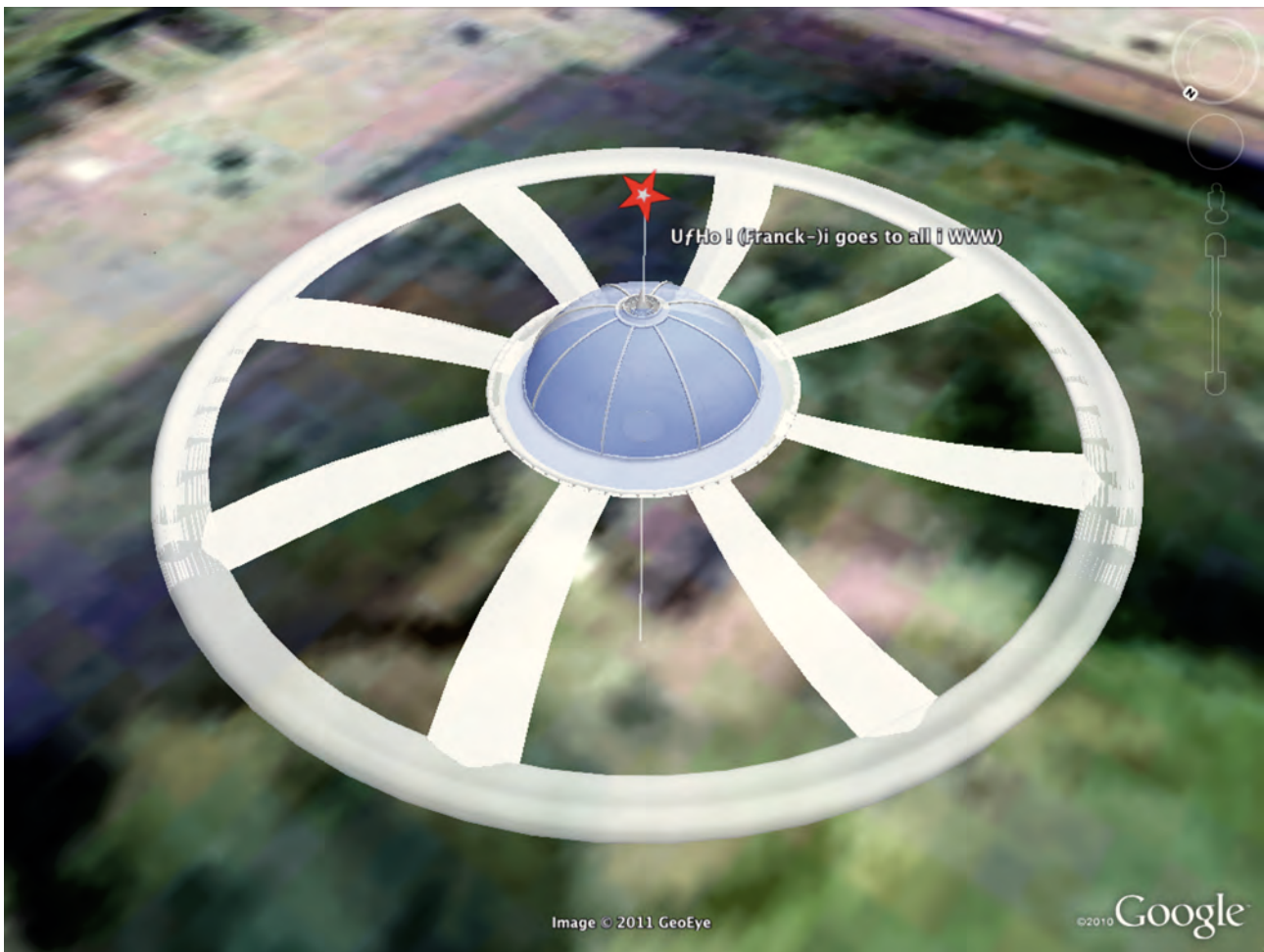
Documentation for these programs is then proposed as an alternative reference to the official API (http://en.wikipedia.org/wiki/Application_programming_interface) of Facebook. It means that there will be no question of relationship between functionality and algorithmic vocabulary(17) anymore, but between *possibility* and *artistic problematic*. From the Facebook's API, some terms will be extracted, referring to very specific methods to achieve what may be called a paradigm of the *existing digital*, tracks that can combine several possible methods but must make sense as artistic approach inside **U-rss**. We are then facing a distinct material of the Facebook API, an interactive *language-specific* project. The goal is not to develop an efficient and functional API, but to offer entry points for uses or developments of applications that need a clear data model to truly work

as computer art. Thus, two main branches are created in this documentation:

- The institution branch, designating methods and pointing applications that could be of interest for an institution on Facebook.
- The artist branch designating other methods and applications of interest in an artist's personal approach.

In addition, to allow insertion of projects brought by other contributors, creators of the project will offer a book of rules that one must comply. This book depends on the game levels to which the contributor wishes to submit (*transparency of inclusion*) and a classification of the action/shape dialectic (*reminiscent of the universal form*): action on Facebook and shape in Google Earth. Two rules are however necessary to thin the transition between the selected actions reserved for the development of the social portrait and its translation into a visible shape (*in/signs*) on Google Earth.

3 - **U-rss** team, *social portrait: UfHo! (Franck-)i goes to all i WWW*, ©2012.



Transparency

The concept of transparency is selected here to explain the report that levels of implications (gray, pink, red) will maintain with the interface. In a transparent relationship with the production of *social portrait*, there are no other interfaces than the Facebook platform. An application is developed through the contributor's (the artist or the institution) wishes; he then installs it on its own wall. As mentioned before, the scanner merely exists to extract information that the contributor deems necessary, depending on his goal and how he thinks himself on networks. But it remains invisible to his network, so no "friends" are aware that their interactions with that wall are used elsewhere. It is the gray level, the spy in the belly of *Neo* who tracks, records, agglomerates and translates the information to us. The pink level corresponds to the setup of an application by other users, which provides additional information, more sensitive, sometimes more accurate; the spy eventually ends up to present some kind of *ubiquity*. The interface remains unique, it is still represented by the Facebook platform and the essential operation of translating the data into shapes (*in/signs*) can work without the use of an *interactive interface*. It is the contributor who programs his algorithms, thus developing a hidden relationship in his *action/shape* dialectic. So far, there are no other interactions on the social portrait that those provided or authorized by Facebook. The red level involves the outsourcing of selected resources on Facebook in an intermediary layer such as a database. The artist then proposes an interactive artwork so that the raw data extracted from the API are replayed, open to corruption. The red level deepens the relationship with the digital identity and would, through the creation of an intermediate interface, give a hand on data so that an entire private segment slips into public space. This level designs a major "advocacy" of **U-rss** : the right for anyone of us to retrieve, copy, share any data we added to Facebook outside of it.(18)

Shape

In the same way as we faced given solid and / or liquid data, we are facing fossil or sandy *in/signs*. There are specific actions on Facebook, for example *I like it* could be considered as fossils, binary *in/signs*, episodic wave of lean interest, planted around a *social portrait* and or we may face sandy *in/signs* evolving such as reviews or measurable information we can extract, hypertext linking to a web page opening the post. We could scale these infor-

mations using semantic technology that will translate word into magnitude of the *in/sign*, altitude or opacity, its value against the **U-rss** 3D module, its value short... The *Fine Arts classification* of Etienne Souriau [Souriau 1920], *colors / stamps / emotions* chart of Kandinsky can then present a great utility. The whole being is to identify the relationship we have with our digital twin and network. Some play on the concepts of private / public space, thus moving a cursor throughout a veiled / hidden rule, others measure the value of information (useful / useless), so the more an information they share raises reviews, the more their ego inflate, the more the spiral that draws a module extends. It may also play on a different axial relation. The inclusion of a third dimension provided by the use of Google Earth also allows a glimpse of a different relationship in terms of *inclusion*. The *in/signs* may develop on a horizontal plane (x / y) so they create a kind of forest, or on the z axis according to the depth with which the contributor appears on Facebook.

Conclusion

If, as Jean Baudrillard pointed out in the 70s, *meaning* takes precedence over the *signified*, then the *verbal* or *visual* symbols that represents things and real objects are detached from their referents: they are referents (because they are digital). Not only the images replace the real but also they *define* this real. Thus, we do consume neither objects nor situations, but the meaning of these objects reported in situation: we consume information. In any presentation space (or exposure space), if the context changes the perception of the image, it is especially the *recognition* of it that has already changed the perception of this image stored in its context. With information, the boundaries of territories *settled* by successive codes or signs articulate our progress. We are both *eyes on the dish of real*.

As for the moon, what we see is only what is looking at us. The reality becomes reported reality in an area that is perceived as an area only because it is appointed. And this space should allow us to collect all the layers of construction, *i material distance* (the distance made by the information material) between material signifiers, structures and meanings of these joints. But with **U-rss in the dark side of the moon** other issues also seem to point through the intersection of these two platforms: Facebook and Google

Earth. The coefficient of *proposed reality* suggests immediately a doubt about the *visually observable*, what our cognition understands through technology.

With Facebook & Google Earth - even if the latter has implications with observable reality: for example the real presence of the ©box and the IAE Savoie Mont-Blanc leads to a kind of confrontation between two nested observation, a process that can be called a “*réellité*” (actually a temporary and partial reality).

Any integration of digital 3D elements (*ingredients?*) on a programmed system which thinks itself as a projected photography (Google Earth) also disrupts the readability of the system. Finally, does this project can then be regarded as a *prism*, a (*no*) *place*, or simply the *place of language*? To see through; all the richness of this (*false?*) crystal, while relying only upon the choice of ingredients, work plan and statement of the recipe... In **U-rss**, if the physical location to the project is fundamental, it gradually dissolves in its digital identity. We do not choose a place for what it says about the reality it represent, which means: city names, roads, neighborhoods, but because we need a visual boundary, a proper portion of the globe where our investigations are echoing the map. The same logic is applied to existing buildings that needs to be created and implemented on Google Earth because they become a part of **U-rss**. For example, during the *invasion* of a geographical space - in this case Annecy-le-Vieux - with any module (the above IAE Savoie Mont-Blanc that is already invaded by players), we do not include the architecture of the real building with care in order to simulate his presence on Google Earth (the 3D model is blue, transparent and has no textures), but to identify the institution we, as searchers, depend. So any individual who is living around or who discovered the project is able to produce (digital) *i-real*. This digital report seems to present two interesting points: the content is intended to position the institution or individual with respect to the norm. This means that a difference can be measured depending the hosts of the place and if all these productions are linked to the *existence* of a *physical territory* (a building, a place...), these productions of information (i.e. communication) probably correspond to *operations of deterritorialization* (Deleuze). In other words, this digital format forces us to reconsider the existence of the territory as an *open source program*. What does that mean? Perhaps that an idea, a thought or an event that produces any *i-real* is never a collabo-

ration around a shared real. In summary, if **U-rss in the dark side of the moon** is mostly based upon the share of a real: **U** is **M-i @lf-real friend**, with the source of this event, our voluntary presence on the landscape of the *Other* is only a crystallization of elements that become meaningless when shared by a form of universal language, somehow a joint program...

Marc Veyrat / Franck Soudan, 2012.

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- Marc Veyrat, ©box - *interMade : l'interstice comme facteur de lien social*, in *Rencontres entre artistes et ingénieurs autour du numérique (mobilité et glocalité)*, collective work under the direction of Yannick Fronda & Grégoire Courtois, Éditions L'Harmattan, Paris, 2011.

(1) These common signs, which we call *i+D/signs* are not simple translations of words. These are cuts of information using recurrent signs (e.g. the *i* of information that any person intends as a signal), resulting from clues left by the use of certain words, their circumstances, their positions in a message on the wall of Facebook (the *D* that stands for “definition”)... These *i+D/signs* are used to intentionally cause interactions between words, colors and objects. “*In a world actually overthrown, the true is a moment of the false*” says Guy Debord in his famous best seller *La Société du Spectacle* (Éditions Gallimard, Paris, 1992, p.19). However, as pointed out by Jean Baudrillard to the question of the sign / simulacra, now, in this really reversed world, it is the false that has become a moment of the true. Thus, on our computer, we’re looking through the window / screen that is not really a window on the world, something that exists, which is not true, but which refers to something real or at least to what we know about it, our certitudes. For example, in the *i* material society, the image of green grass will be chosen because we all believe, we all know intuitively that the grass is green. Consciously, the false then gives the illusion of the true and when the image becomes true, then the *société i matériel* really starts... Jean Baudrillard writes in his book *De la Seduction* (Editions Galilee, Paris, 1979, p.78): “*any talk of sense wants to end up appearances, that is its lure and deception. But also an impossible undertaking: the speech is inexorably linked to his own appearance, and thus the stakes of seduction, and thus its own failure as a discourse*”. The speech would be a network of identifiable signs potentially related to ideas - what we call *i+D/signs*, whose meaning is still subject to the shape, appearance and charm of these signs...

(2) On social networks, we always face multiple active speeches all meted together on a single interface. Our message is written to be shared on a network of contacts but when it becomes visible to them, our content is augmented by the code and the discourse of the development team behind the platform. This inclusion produces more damages to our words than a simple and necessary interoperability process: it changes the design of meaning. Facebook does not only provides a tool with which we share our identity, it tells us how we should interact on the Web. That is precisely what Zadie Smith points out: the fact that Facebook is merely a Mark Zuckerberg production. “Shouldn’t we struggle against Facebook? Everything in it is reduced to the size of its founder. Blue, because it turns out Zuckerberg is red-green color-blind. “*Blue is the richest color for me - I can see all of blue.*” Poking, because that’s what shy boys do to girls they are scared to talk to. Preoccupied with personal trivia, because Mark Zuckerberg thinks the exchange of personal trivia is what “*friendship*” is. A Mark Zuckerberg Production indeed! We were going to live online. It was going to be extraordinary. Yet what kind of living is this? Step back from your Facebook Wall for a moment: Doesn’t it, suddenly,

look a little ridiculous? Your life in this format?” Zadie Smith (2010), *Generation Why?* Retrieved February 4, 2011 from the web : <http://www.nybooks.com/articles/archives/2010/nov/25/generation-why/>

(3) “How such systems will they live, and when they will begin providing meaningful answers, begins to be the topic of many researchers and experts.” says John Markoff for the New York Times. For Markoff, this Web 3.0 is based on the excavation of human knowledge, as Google has operated within its Page Rank (who plays the links of a web page to another as a vote). And to give a sum of examples to his thesis: “*We’re going to a Web of connected documents to a Web of connected data*” said Nova Spivack, from Radar Networks, a start-up company that operates the content of social network websites, and who reported recently on his blog, how fed up of web 2.0 he was (“*Destroy the myth of Web 2.0*”). KnowItAll, from a research group at the University of Washington, extracts and aggregates information from products testing websites to provide understandable information to the user. So today, for information about travel, you need to review long lists of comments gleaned from the web. With web 3.0, the system will classify all the comments and will find, by cognitive deduction, the right hotel for your particular need. “*In its current state, the web is often described as being in the Lego phase, with many different parts able to connect to each other. Those who bear the vision of a next phase, web 3.0, see it as an era when machines will start to do seemingly intelligent things. [...] It is clear that human knowledge is more exposed to machines than it has ever been.*” says Danny Hillis of Metaweb. From artificial intelligence systems, such as Metaweb or Cyc, which combine basic and conventional rules for of web content analysis, could afford to operate always better this incredible database that is the current web, to provide answers to complete questions. Unless, thinks the Research Manager of Yahoo!, salvation come from the aggregated user intervention: “*With Flickr you can find images that a computer could not find. Problems that we are challenged for 50 years, suddenly became trivial.*” Guillaud Hubert (2006). *Vers le Web 3.0*. Retrieved January 30, 2011, from <http://www.internetactu.net/2006/11/21/vers-le-web-30/>, (translation: Franck Soudan).

(4) Franck Soudan, *Collectifs intelligents et algorithmes, l'i-négociation sur Internet*, in *H2PTM'09, actes du colloque*, Editions Hermès, Paris, 2009.

(5) Free jazz normally retains a basic rhythm, but without regular meter, with sudden accelerations and declines, as the sea swell. Often the musicians of the same orchestra are playing on different tempos. Wikipédia, Retrieved August 8, 2009, from http://fr.wikipedia.org/wiki/Free_jazz. We can read about this relation between *Jazz* and *U-rss* : Marc Veyrat & Franck Soudan, *Le Jazz fabrique t’il encore des images ?* in *Les Territoires du Jazz*, collective

work under the direction of Jean-Claude Taddei, Éditions Presses de l'Université d'Angers, 2011.

(6) Centre Pompidou : *Traces du Sacré* (2008). Retrieved January 30, 2011, from http://traces-du-sacre.centrepompidou.fr/exposition/oeuvres_exposees.php?id=31

(7) Matt Mullican (1991), *Five into one*, in *Artifices 2*. Retrieved January 30, 2011, from http://www.ciren.org/artifice/artifices_2/mullican.html

(8) / (9) Jean-Louis Boissier, *La relation comme forme, l'interactivité en art*, Switzerland, Geneva: MAMCO, 2004, p.64.

(10) Maurice Benayoun, Colloque H2PTM'09, *Session Art des Nouveaux Médias*, table ronde, laboratoire CiTu, Université Paris 8, Paris, 2009.

(11) op. 3.

(12) Maurice G. Dantec, *Grande Jonction*, Albin Michel, Paris, 2006.

(13) Manuel Castells, *The Information Age : Economy, Society, and Culture: Volume I, The Rise of the Network Society*, United States: Blackwell, 1996.

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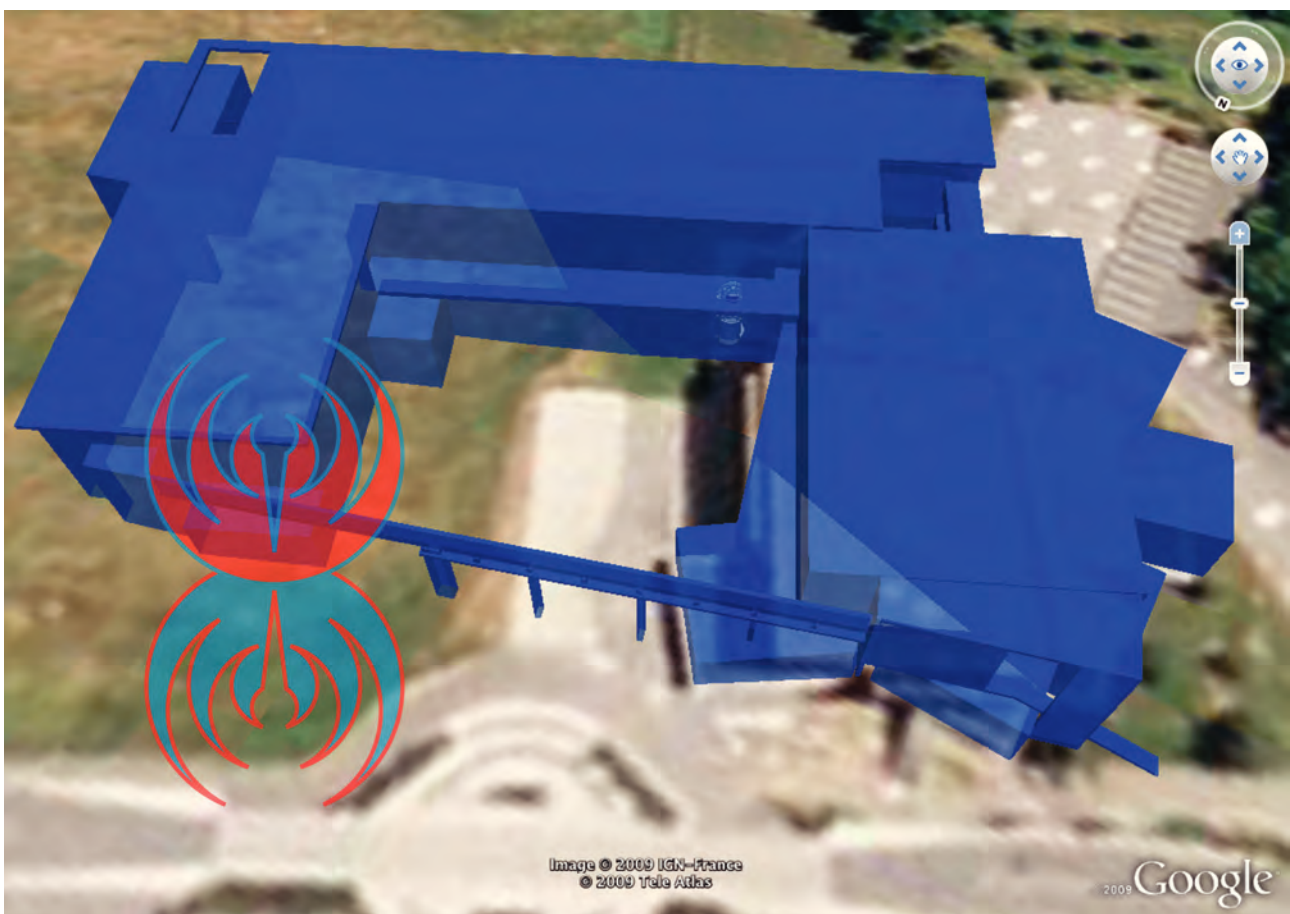
(15) Bernhard Rieder, *Membranes numériques : des réseaux aux écumes*. Paper presented at the *PHITECO seminary*, UTC de Compiègne, 2008.

(16) Javadoc is a tool for generating API documentation in HTML format from doc comments in source code.

(17) For example, one of the most widely used methods of the Facebook API method is the one called Users.getInfo. It can recover some information about the user. But does this raw method make sense for the **U-rss** project?

(18) This right is actually not provided by the Facebook Platform Policies (<http://developers.facebook.com/policy/>) thus making our scanner application legible for shut down.

4 - **U-rss** team, *social portrait*: IAE Savoie Mont-Blanc + ©**box**, ©2012.



Connected Creation: The Art of Sharing

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Abstract

Launched in 2006 by the CiTu-Paragraphe under the artistic direction of Maurice Benayoun, the In/Out network (aka The Art Collider) is an open platform that uses peer-to-peer technology to enable real-time data exchange between art installations. It has been featured in several exhibitions over the recent years. This paper proposes to analyze its artistic potential: First, by describing and characterizing the type of connections that the network allows to establish between peers. Second, by analyzing how data is shared and transformed by artists according to a poetics of data. Finally, also by analyzing how the network presents itself and how the exchange of data has been made perceptible to visitors both locally and globally through art installations and a monitoring system.

Keywords

Peer-to-peer network, shared creation, poetics of data.

1. Introduction

Art does not evolve in a separate sphere, preserved from reality. Art is transitive and interacts with social space. It establishes relations, and configures spaces. In this regard, over time, artists have used several techniques such as perspective to structure spaces of representation. For example, during the Renaissance, painters used perspective to organize “the prose of the world” (Foucault, 1966) by placing human figures inside a unified space. At its origins (1430-1460), perspective had a political dimension and was used as a tool to build the scene of history and civic freedom (Arasse, 2006, p. 133). Perspective represents a system that differs significantly from the system of places and images that was widely

used in the late Middle Ages to confer order to memory. Coined as “art of memory”, this system was used from its introduction by Simonides de Ceos around 477 BC up until the 17th century to structure memory impressions, improve recall, and contribute to the combination of ideas (Yates, 1975). However, we might ask what type of system do artists use to structure and arrange elements today?

They use database systems within which they configure spaces and establish connections between different data sets. Online databases make it possible to retrieve data using advanced search criteria, in order to use their content to create dynamic compositions. Gregory Chatonsky, for example, has created over the last ten years several web applications such as *The revolution took place in New York* (2002) that use Flickr to dynamically retrieve vernacular pictures - taken by multiple individuals all over the world - in order to associate them with other images and textual statements (in a slideshow format). Database systems are also used to configure virtual worlds such as the one in which the art installation called *The tunnel under the Atlantic* (Maurice Benayoun, 1995) allows to dig. A database system is used to manage the visibility of a collection of pictures in a virtual world based on the time that each user spends to contemplate them: The more time a user spends in front of a picture, the more chances he/she will have of finding pictures belonging to a same category. However, database systems do not only make it possible to build dynamic compositions and virtual worlds. They also help to organize social networks: both centralized and decentralized.

In centralized networks, databases tend to be used to collect large amounts of data and to secure their access. Thereby, they allow organizations to control and monetize access to their content. Yet, databases can also serve to collect metadata in order to facilitate the exchange of data hosted by

peers. Databases are often used in this manner to collect metadata associated with files that are available in peer-to-peer networks: in terms of connection and communication between peers, peer-to-peer networks offer different possibilities from centralized networks. In a peer-to-peer network, users interact directly with each other to exchange streams of data without having to first obtain permission (from a central entity). Many researchers working in different fields have used this technology over the last thirty years to communicate and collect data. For example, in 1997, the Space Sciences Laboratory at the University of California used peer-to-peer technology to launch a distributed computing system aimed at analyzing radio signals, searching for signs of extra terrestrial intelligence with the help of a large Internet-based community. This project, called SETI@home, “captured, as stated, the public’s imagination and achieved tremendous popularity” (SETI@home Classic: In Memoriam, 2005). However, artists have also used peer-to-peer systems to collect and exchange data. They may even have used this technology to create original networks: networks of “shared creation” that allow new types of interactions between themselves and their audience.

Launched in 2006 by the CiTu-Paragraphe, the In/Out project is one of these attempts to create a network dedicated to artistic creation using peer-to-peer technology and a database. The In/Out network aims indeed to create an ecosystem of artworks by making the exchange of data between artists possible in real-time. The artistic potential of this type of network is addressed hereafter. First, the types of connections that the network allows to establish between artists are defined. Second, several artworks that have been designed especially for the In/Out network - today called Art Collider - are described. Finally, the relations that exist between a connected artwork and the network itself - considered as whole entity - are examined in order to better understand how they work together.

2. Establishing a connection

The In/Out network is the result of a collaborative work between different artists and programmers. Several teams were set up which were responsible for creating art installations that shared data streams in real-time using a same system of communication. However, the different installations do not share the same type of

streams. The terms of the exchanges are based on the individual artists’ personal interests. Each installation effectively reflects a different artistic position and proposes a unique experience of the network thanks to different types of data streams. In this regard, the In/Out network allows not only to share video streams, but also to share audio and raw data streams. In addition, artists can use these streams of data in many ways.

In order to establish meaningful connections between the different installations, over the last years the CiTu has organized several meetings between artists and programmers. For example, ahead of the second exhibition of the network that took place in 2008, the CiTu organized a one-week workshop to discuss the projects and their associated streams. The workshop enabled each artist to adapt their project to the needs of the others participants. The workshop also made clear that the network needed to be organized. It was therefore decided to use a server to keep track of each stream generated in order to make these accessible to everyone as soon as they would be available.

Being a peer-to-peer network, the In/Out network allows direct connection between peers, but in order to provide access to all the streams generated, the network also keeps track of all the individual streams. Each data stream of data is indeed indexed in an online database. When queried, the database releases information about all data streams currently available. None of these are actually stored. They are only indexed by the database that collects and shares metadata such as their name and their URL, that is to say metadata that can be used to identify them. However, the database is also used to store metadata other than name and URL so as to make it possible for users to search for streams matching specific criteria. Thus, for each stream, the database records a description, a screen capture, and a list of tags. The database also provides the name of the person at the origin of each stream, allowing, for example, to retrieve dynamically only the data streams produced by a specific person or tagged as “bright”.

It is not necessary to query the database in order to establish a connection with another artist. Anyone can directly ask for the data stream produced by another art installation provided they know its URL. However, the database plays a key role by enabling artists to search in real-time for streams of data that match advanced search criteria, so that they do not have to rely on chance

to obtain a stream that corresponds to their needs. In this respect, the database offers the possibility to create connections that are both dynamic and meaningful. Moreover, the qualities of the connections that can be established also depend on the number of streams available at the time that a request is initiated. Indeed, the network needs to reach a critical mass, that is to say a sufficient number of peers who generate their own stream of data. To reach this stage, the CiTu has launched a wiki platform that provides several software programs such as the Floximer: The Flomixer enables anyone to join the network by providing a video stream that can be the result of a compositing process (Getting Started, 2011).

The In/Out network uses the database in a manner similar to the way that Internet services such as Napster have utilized their own database. Developed by Shawn Fanning in 1999 to offer the possibility for all to share their MP3 collections online, the Napster platform also used a database to keep track of each file available on the hard drives of its users in order to facilitate their access. By making copyrighted materials available for free, Napster defied - until its closure in 2001 - the rules of the market economy. In the same time, the Napster platform contributed to the creation of online communities based on peers' interests, allowing a new relational sensibility to develop among young people. The In/Out network shares these aspects with the Napster platform. However, unlike Napster, the In/Out network is not used to share copyrighted materials. It serves to coordinate the circulation of data streams generated in-real time by artistic installations.

3. Connected artworks

To further examine potential relations between different art installations belonging to the In/Out network during an exhibition, two specific examples are presented. The first one is an installation called *Driving* that we created ourselves in 2008. *Driving* is a video installation that shows a pony car driving through the night. The car (a 1970 Dodge Challenger R/T) was modellized and rendered using 3D software. The frames displayed by the installation are completely computer generated and are projected onto one of the four walls of a small and dark projection room. Yet, unlike frames projected in a classical movie theatre, the frames projected by *Driving* respond to an external signal. This signal is a data stream generated by another art

installation (currently connected to the In/Out network). Indeed, the *Driving* installation uses an external audio stream to control the speed of the car displayed on the screen: This higher the sound level, the faster the car moves and conversely the lower the sound level, the slower the speed of the car will be. The car may even come to a stop if the stream connection is lost and no other audio stream is available. The installation does not show a movie with a beginning and an end. Instead, it plays the same dozen of video sequences in a loop, showing a car travelling on an endless road. The audio stream retrieved by the installation is also used to produce car engine sounds. Created mainly by altering the pitch of the audio stream, the sound of the car engine confers to the Dodge Challenger a real presence inside the projection room.

The *Driving* installation only shows outside views of the pony car. Visitors can not see the inside: they are invited to sit on a bench in front of the screen to watch the car drive by closely at different speeds. Moreover, in order to establish a more direct contact between the visitor and the network, the audio stream retrieved by the installation is also used to flash the car lights. By doing so, the installation aims to reveal the presence of the network behind the image, enabling visitors to imagine all the streams of data that are being generated and retrieved simultaneously by the different installations that are part of the network.

In addition, in order to retrieve an audio stream, the installation generates its own stream of data. The installation releases the video frames that are being projected inside the projection room in real-time, thereby offering others artists the possibility to use them as raw material. As an example, the video frames made available by *Driving* could be used by the computer program *Crystallizer*. Born from the collaboration between Robin Gareus and Joseph Nechvatal in 2009, *Crystallizer* is a program that attacks video frames by using colonies of viruses. The program is inspired by the work of mathematician John Horton Conway on artificial life (particularly Conway's Game of Life). It uses video frames generated by installations within the network as a host environment for viruses that feed on their colors, and multiply until they have completely altered their code and original appearance. *Crystallizer* is one of the programs that Joseph Nechvatal has used throughout his entire career to influence the

outcome of an image thanks to autonomous agents (Sikora & Nechvatal, 2011). Yet, unlike other computer virus programs that Joseph Nechvatal has used previously in his viral works, the *Crystallizer* infects an entire network. The attacks are not limited to a collection of pictures previously selected by the artist. They contaminate an entire living network by producing and proposing to the other peers, transformed and degraded streams of their own data.

The In/Out network is characterized by a continuous displacement of data from one peer to another, allowing artworks to invest a space without barriers. Thanks to the network artworks are not confined to an enclosed space, they can be distributed. This changes most of the rules that apply when organizing an exhibition. As Geert Lovink has stated, new media are increasingly distributed and require a new aesthetics that moves beyond the concepts of form and medium. They require namely “a distributed aesthetics” that takes into account simultaneously “the dispersed and the situated, the asynchronous production and multi-user access to artefacts on the one hand, and the highly individuated and dispensed allotment of information, on the other” (Munster & Lovink, 2005).

4. Distributed creation

In recent years, the In/Out network has been presented on multiples occasions. In 2008 and 2010 at La Bellevilloise in Paris for example. Yet, the exhibition of the network does not generally occur at one place. The exhibition typically takes place simultaneously at several locations in order to reflect the distributed architecture of the network. For instance, the artworks selected for the In/Out x.0 exhibition (that took place in 2008) were distributed between several exhibition venues located in Paris (like La Bellevilloise) but also in Montreuil at the premises of PétaHertz studio and at the Maison Populaire. An interactive installation connected to the network and created by Yves-Marie L’Hour and Benoit Meudic was even exhibited at the Cube (Issy-lès-Moulineaux).

The distance that separates each exhibition space from the others, confers a physical dimension to the network. Each exhibition space helps to define the presence of the network in the city by covering different territories. The exhibition spaces represent points of connection. They enable visitors to enter the network, to follow the path taken by data to travel from one place to

another. Yet, inside each exhibition space, how are the connections that are being made between the different installations that belong to the network made visible?

In order to make the network visible to each visitor, the CiTu has developed a monitoring system. This system uses the information collected by the database described previously, to show in real-time all the connections that are being established or closed between peers. The monitoring system has a structuring effect on how visitors understand the structure and dynamics of the network. It shows what kinds of streams of data are being shared and where each installation is located, enabling viewers to choose between the different exhibition spaces. Presented in all exhibition spaces, the monitoring system proposes several views of the network called “Connections”, “Physical and Metaphysical Locations”, “Sociability and Nervousness”, “Treeview and Influences”, “Affinity Groups” and “Flux and Reflux”. Each view offers a different representation of the network making it possible for the visitors to observe many of its characteristics. The “Physical and Metaphysical Locations” view for example places all the selected installations inside circles that represent all the exhibition spaces. This view thus allows visitors to observe the data exchanges that are being made between the different exhibition spaces. On the contrary, the “Connections” view does not take into account the location of the installations. By representing all the streams of data that are being exchanged between the different art installations it draws the viewers’ attention to the connections established directly between artists. The view even specifies the type of streams of data that are being transmitted (raw data, audio or video) by using different colors to display them: Each stream is represented by a colored line that connects two installations (themselves represented as cells).

The monitoring system helps to map the network by drawing a landscape of connections. However, the map is not the network. A network is indeed opaque, ubiquitous, and non-formal. It cannot be reduced to its representation. It must be apprehended within the complex ecology in which it is developing, that is to say not merely with the monitoring system that only makes certain types of connections visible. The smooth and seamless lines that the monitoring system displays cannot account for the human efforts required to create links between each physical installation or to

maintain them. The views of the monitoring system work only in relation to the installations that are being presented in each exhibition space: The monitoring system is in charge of the global representation of the network, whereas the individual installations allow to interact directly with them, to observe how data is being moved and transformed. The poetics of data that the network carries is not fully displayed by the monitoring system. It has to be experienced by entering the network, that is to say by interacting with the exhibited installations, and visiting several exhibition spaces. Unlike the monitoring system, the installations do not offer access to a global representation of the network. They allow to capture what is not yet described, what is not yet visualized, as illustrated with the flashing lights in the *Driving* installation. The installations also enable viewers to observe how the data streams are progressively transformed as they move from one installation to the next, in an endless relay.

5. Conclusion

The In/Out network is not only a tool. At a time where artistic presence over the Internet tends to be standardized, it is a collective experiment that proposes an original way of being present as a connected artist on Internet but also in an exhibition space. The In/Out network makes it possible to imagine new types of collaborations and external participations in favor of a poetics of collaboration. The In/Out network is an open space with no barriers that invites one to be part of its making, part of its development and change. The network does more than simply manage and map data. Potentially it enables anyone to play a role in its organization (structure) by proposing a stream of data or by developing a computer program that uses and transforms data streams shared by other peers. However, like any network, In/Out does not constantly grow. The life of the In/Out network is organized around exhibition projects that bring together groups of collaborating artists. The In/out network is a continuous emergent project characterized by a distributed aesthetics that invites one to embrace the surrounding flow of data. For all these reasons, the In/Out network can be considered as an artistic proposition in itself, a collective artwork. Indeed, the In/Out network does not only connect artworks, it also embodies an artwork that

has to be entered and experienced through multiple views, as a visitor or as a participant.

6. Acknowledgements

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Cinema Beings

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Abstract

The Cinema Beings are a complex ecosystem of artificial beings whose goal is to create artificial films. This system is on one hand primitive and chaotic, and on the other hand evolved and self-organized. Not only does it produce films independently, it also implements theories of aesthetics and the rules of cinema...

Cinema Beings are based on a huge Genetic Algorithm, and use some Cellular Automata for producing rules of Live, and rules of Art pieces.

Keywords

Artificial Life Art, Cinema, Generative Art.

1 Introduction

Artificial Life is a science studied by computer scientists, and sometimes picked up by artists to create new art forms. However, most of the time, artistic works are based on visualizations of artificial worlds, as in the work of Karl Sims [1], Laurent Mignonneau and Christa Sommerer [2], Jon McCormack [3], etc. The Cinema Beings world is different in that it is not even observed, nor regarded as a work of art, but instead it functions to produce feature films. Cinema Artificial Beings are artists, who by working together, following aesthetic rules and major theories of art history, and thus allow new types of films to be created. Cinema Beings are the elements of a complex System, a huge ecosystem inhabited by artificial beings, making pieces of cinema together.

The original idea for the creation of Cinema Beings from a study of great philosophers and film theorists highlighted the organic composition of cinema and its ability to be a machine. The foundations of the system presented here are therefore based upon the texts of Henri Bergson

[4] Gilles Deleuze [5], Sergei Eisenstein and Jean Epstein.

Indeed, in addition to producing films and experimental art, the system is intended to demonstrate some practice of film theory. It also opens new avenues of research into the use of aesthetic rules, including the widely used of divine proportion. Quote Bergson [4]: "The only cinematic consciousness, not the viewer, or the hero is the camera, sometimes human, sometimes inhuman or superhuman".

2 Relative Works

Cinema Beings produces some artificial cinema, and we can go back to the Italian Futurist movement as the first historical attempt to see a calculated movie with the film "Vita Futurista" directed in 1916 by Ginna and Corra. [8].

Subsequently, many artists have made works of experimental and calculated films, including Oskar Fischinger, László Moholy-Nagy, G.W. Bitzer, Alexander Alexeieff with Claire Parker, and Norman McLaren who made the first experiments in new cinema (with animation). We must also mention Ben F. Laposky, Mary Ellen Bute, Karl Otto Götz, and the first artists to use computers to create films with machines (including Charles Curi, James and John Witney, Stan Vanderbeek, Larry Cuba, Ken Jacobs, Jean Painlevé, etc.) [9].



Visual Music by Oskar Fischinger.

3 Algorithmic Cinema

Barbara Lattanzi [10] has written excellent texts on film and has created computational and experimental tools, but to better understand Cinema Beings' achievements, we must look at the work of Jim Andrews in regard to dbCinema [11]. dbCinema is an online graphic synthesizer that can produce real-time painterly cinema. It is a very good work, with experience based upon Kandinsky paintings, and many others. We can compare his work with some experiments made by Lev Manovich (especially The Soft Cinema) [12].

All of these works are based on algorithmic cinema techniques. My system for Cinema Beings is also algorithmic, but is more related to artificial life and goes further in a generative process.

Other interesting work is that of Iain Lobb [13] which attempts to explain how generative film might form a cinematic language. His very interesting approach is about "microworld cinema", which focuses on the algorithmic simulation of characters.

We can also mention the excellent work done at MIT Media Fabrics on Interactive Cinema by Glorianna Davenport and her research team [27], and the work of Gordon Pask on interactions of actors [29]. Finally, we have to compare our work to the research made by Stefano Bocconi, Lynda Hardman and Franck Nack on generating video documentaries [28]. Their work is based on semantic graphs for making relations between videos. Our work is a system based on relations between media elements, but with some evaluation based on a fitness value in a genetic algorithm process.



Soft Cinema by Lev Manovich

4 Art and Artificial Life

Artificial Life has already been used by many artists in different fields. Mitchell Whitelaw [14] has produced an excellent overview and a complete history. In particular, many artists have used art to create evolutionary new works, following the work of Karl Sims, with William Latham, Steven Rooke, Jeffrey Ventrella being among the most well-known.

Many worlds populated by artificial beings have been proposed, with a common point being the worlds that we see and which are in fact, considered as pieces of art. This is the case for example, with the ecosystem EIDEA by Lovell and Mitchell, and Iconica by Troy Innocent.

However, the work of Jon McCormack [3] and more specifically, Turbulence and Eden are the closest Cinema Beings System ever created.

5 Artificial Beings Designers

The uniqueness of our system is that it is an ecosystem populated by artificial beings whose world is not seen as a result of the work, but whose collaborative works produce arts (images, sounds, movies). These creations are directly connected to our real world.

We pop up on "the other side of the mirror" and the final result that we see is an artistic interpretation of our world, our ideas, and our knowledge through artificial beings, albeit primitive, but capable of self-organization, and especially sensitive to rules learned methodically.

All the Beings are built from the same class object, with the same DNA at the beginning.

5.1 Plant Beings

Our first work in this direction was the creation of Plant Beings [15]. They have methods which are based on L-systems and generations from cellular automaton. These artificial plants are genetically advanced, but at this level, we were still facing an artificial world that is only watched and not creative in itself.

5.2 Light Beings

Plant Beings are not integrated into the Cinema Beings system (because of their lack of creative vocation). This is not the case for their direct successors: Light Beings. These are built on the same principle as the Plant Beings, but with only one goal: producing light and shadows in the

world in which they live. We agree with the remark of Deleuze [5] regarding the creation of a moving image:

"While the light is moving, the movement-image and the image light are two sides of the same appearance...".

And naturally, to make a movie, you need light, just as in the Bible, where light was created to make the world out of darkness (Genesis, 1,3). Light Beings (Figure 3) are the first components of Cinema Beings.



Light Beings (2003)

5.3 Painting Beings

The first "creative creatures" of the world are Painting Beings [16][17]. These artificial beings are self-organized to create vivid paintings in motion (Paint) and also to try to interpret our world (through a webcam, or images, videos, etc.) to propose an adaptive artificial view. Initially, they use rules of cellular automaton or Boids systems (as described by Craig Reynolds in [18])

We may compare them with certain works of Tara Krause [19] who created the painting from cellular automaton, but also the amazing and interesting definition of "Arton" as an elementary particle of Art, proposed by Acerbi [20].

Thus, Painting Beings (see Figure 4) suggest a world of artificial painting in motion, and echo the words of Jean Epstein :

"All surfaces divide, truncate, decompose, break, as we imagine they are in the eye with a thousand facets of the insect. Descriptive geometry whose canvas is the plane of the end. Instead of undergoing the prospect, it splits the painter enters into it ... "[21].



Painting Beings (2005)

5.4 Eye Beings

Another important category of artificial beings in our system is Eye Beings. These are designed to "see" and "read". They see the world they are in (together with other Cinema Beings), but also see our world (with pictures from all sources) and read texts in all languages.

Their role is crucial: they are the ones that establish communication between the worlds (real and artificial), and between Cinema Beings. They transmit images, and seek to interpret words and texts. Because they are relatively primitive artificial beings, they use Google Images and other search engines for images and videos. These search engines enable them to transcribe any text in visual form. These images and videos, which are later forwarded to Painting Beings and other Cinema Beings, will be the subject of the first matter images [6] for films produced by the system.

5.5 Sound Beings

All sounds and music of Cinema Beings are created by Sound Beings. Their main activity is to listen (again via the Internet, with search engines such as Google Music Search) and also to play sounds on a computer and produce sounds and music following both chaotic and organized rules.

Sound Beings use fractal algorithms to generate their own music and are based on the Fibonacci sequence, following rules of interesting rhythmic construction, as described by Fauvel, Flood and Wilson [22].

5.6 Cut Beings

Cut Beings are artificial creatures whose task is to make the montage of the film. They are the timers of the film. They can work in real time, pointing out the correct Eyes Being and putting them to work. They can also make a metric montage for one or many created films after producing a series of numbers in time and collaboration with Eyes Beings. The first rules they use are inspired by Eisenstein's theory [23] about metric montage, which we can see also in his film 'October' and in some Peter Kubelka films. This type of montage rule is based on the length of plans in relation to the total length of the film, which is particularly interesting here (as explained below).

6 Implementation of the Ecosystem

The full Ecosystem was built with open source software tools. The main ones were Blender (for the establishment of the artificial world in 3D) and Python for programming the system itself.

All Cinema Beings are self-organized and can operate independently. Constantly changing and evolving, the artificial world cinema remains controllable by the user, who can impose a number of rules, including scenarii instructions.

The problem of the storytelling, which can be regarded as fundamental in classical cinema, is here strongly deflected by Cinema Beings (whose understanding is not easy), and is used here more as the starting frame of the real thread rather than a hypothetical history.

The important thing to understand here is that Cinema Artificial Beings are a creative community, where every being lives in complex relationships with others, but where none of them has the role of director.

6.1 An Evolving World

This system is a creator world in perpetual evolution. For this, it works on the basis of a genetic algorithm that tries to meet certain criteria throughout the process of making the film.

Cinema Beings lives like autonomous beings. Operating in conjunction with our real world through images, videos and sounds, they must apply rules to self-organize and produce interpretations of what they see.

All Cinema Beings have certain parameters:

color, position in space, rotation, light intensity (for the Light Beings), length and direction (for Eye Beings), duration (for Sound Beings and Cut Beings) etc.

The total number of parameters in the ecosystem is enormous.

As we cannot use all these parameters as part of an engine for evolutionary creation, a factor 'P' has been determined, which is a limited number of parameters used for each Being in the evaluation function, and which is constantly changing over time.

P is just a float number, used to compute relations between the Beings's parameters.

For Cinema Beings "living" in close relationships, their parameters (with the limit of the P factor), are associated either in pairs or in sets (up to 10 parameters). These settings are stored as a list. The system works upon a genetic algorithm, based on relations between Beings, not on the Beings themselves.

Here is the main algorithm for the System:

Begin World

Initialise Population:

Initialise Painting Beings

Initialise Light Beings

Initialise Eye Beings

Initialise Sound Beings

Initialise Cut Beings

Begin Simulation

Generation = 0

Eye Beings Reading (Web, webcam, etc.)

Image retrieval from a list of keywords (scenario)

Sound Beings Listening (Web, webcam, etc.)

Sound retrieval from the same list of keywords

P = random(1,10) # P is the number of parameters used for the fitness function

Relation Beings Selection (randomly)

Evaluate Population

While 1:

Relation Beings Selection (with roulette wheel)

Relation Beings Mutation

Relation Beings Crossover

$P = \text{random}(1,10)$

Evaluate Population

End While.

End Simulation

6.2 Rules of Divine Proportion

The selection criteria of fitness have become natural measurement units in very classical art, for example the values of divine proportion, as described by Pacioli [24]. See also the excellent work by Markowski about The Golden Ratio [30].

Four basic rules were retained; three of these work with groups of two parameters, and one with from 3 to 10 parameters.

Rule 1 uses the golden ratio as a direct relationship between two parameters, namely:

Golden Ratio, called Phi (ϕ), which is equal to:

$$(1 + \sqrt{5}) / 2 = 1.6180339... \text{ (Rule Factor 1)}$$

Thus, each Cinema Being may be related to another Cinema Being via the Divine Proportion, but this usually happens in a very complex way (and is therefore invisible to the eye, but may not be to the sensitive perception of the subconscious) (Figure 5).

(For example, the position of a Painting Being may be in the ratio of Phi with respect to the light intensity of a Light Being, etc.)..

Consider a Light Being with an intensity parameter set to 1.0, and a Painting Being with an x position to 3.4, (these two parameters are randomly chosen by the system).

This comes up:

LightBeing.intensity = 1.0

PaintingBeing.x = 3.4

The aesthetic ratio between the two is : $3.4/1.0 = 3.4$

The Genetic Algorithm is then run (for these two parameters but also for all the others). Fitness is based upon the Golden Ratio (Rule 1) for these two parameters.

F = 1,618

The next step produces n children for the parameters (here we have n = 50).

The best couple is now:

LightBeing.intensity = 2.2

PaintingBeing.x = 3.8

We get a new aesthetic ratio equal to 1.727, which is better, and so on.



Cinema Beings (2012)

Other rules work on the same aesthetic principle:

Rule 2 uses the opposite of Phi:

$$1 / \phi = 1 / 1.6180339... = 0.6180339... \text{ (Rule Factor 2)}$$

Cinema Beings also use the Golden Angle, the value of which is calculated as follows:

$$360 * (1 - 1/\phi) = 137.51^\circ, \text{ or about } 2.399963 \text{ radians. (Rule Factor 3)}$$

Finally, Rule 4 is intended to link more than two parameters (up to 10 here, but we could increase that number), and requires the associated parameters to follow a Fibonacci series (this is particularly widely used in the metric montage durations for Cut Beings).

$$0, 1, 1, 2, 3, 5, 8, 13, 21, 34, \text{ etc... (Rule Factor 4)}$$

Of course, other aesthetic rules may be used, and there are plans to add a few, including some directly from film theory, described by Aumont [25] Deleuze [5], Epstein [21] Eisenstein [23].

7 Experimentations

The Cinema Beings first experiment was to test a simplified version of the system, named Galaboids, which was mainly focused on the behaviours of Reynolds' Boids applied to Painting Beings. (Presented at GECCO 2010).

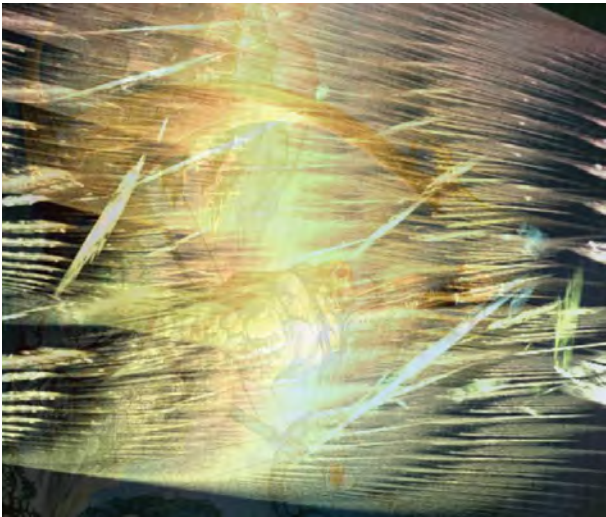
Then, a first complete film, named "Galaone" was released in 2011. This is the first realization of

fully autonomous Cinema Beings, a film created by an ecosystem of artificial beings.

Then, a new project is based upon the Silmarillion by J.R.R. Tolkien. The idea is to give the novel to Eye Beings, and also some knowledge found on the Silmarillion encyclopedia

(see at:

http://home.comcast.net/~mithrandircq/Sil_encyclopedia.htm).



Silmarillion Project (2012)

Hundreds of Phi values, its opposite, the Golden Angle and partial Fibonacci sequences were used to calculate the resulting images of the project.

Of course, it is very difficult today to analyze how these results work in relation to artistic theories. Because it is a very experimental system, we need to conduct many tests and search with it before achieving significant results.

One of the big questions is:

What visual effects can we expect with this system?

8 Conclusion

Cinema Beings result in an artificial creator world, for creating experimental films, and putting into practice the aesthetic theories of film, painting, and arts in general.

Films produced by this ecosystem are chaotic and seem abstract. However, they are created with precise rules, and scenarios that can be. In addition to being able to produce art films, the system is a platform for interesting aesthetic experimentation. It is also intended to serve as a link between the

achievement of production and great patterns of mind-set for cinema.

It is also an open system, based on the principles of Open Source software, which will allow many future improvements. It is an illustration of the thought of Epstein [21] that images are thinking, and this was strongly echoed by Schefer [26]:

"The cinema has a reality of matter and equipment specific to show, sometimes the movement of figures, sometimes the motion of matter of which these figures are imagined to be composed."

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Facebook Chronicles

Abstract:

In this paper I explore my **personal experience in Social Networks**, Facebook, in particular. In this narrative exercise I try to explore the way in which this media has become transcendental in our day-to-day experience, and how cyberspace has become an extension to what we call reality.

Sometimes I have the feeling that this (internet and social networks) answers to the nostalgic old idea of God, who watched everyone and that nothing escaped his gaze and scrutiny.

I was born for Facebook on April 9th, 2008 at 6:53 pm, so I will ask an astrologer to tell me about my virtual future. This social network is a time machine, you can look for old friends, upload pictures from the prior party, settle appointments for the next day, but I know very little about my future here. I am young regarding cyberspace issues; I am barely five years old, at most, fifteen if we consider my first e-mail address, but all this was during the digital era, before having a wall and pictures that foreshadow my existence. My first *what are you thinking?* Was this gentle message: “This wall sounds lonely I hope mi

empty space will soon be filled with nice messages”

Five years later, having added 1178 friends, my situation is great, I went from the Freudian oral stage (here is called the chat stage), to the voyeuristic video era. I must confess that I spied friends and even enemies. I discovered that I became shy, so I preferred to communicate in intimate inboxes. I have collected contacts, pictures and quotes.

Since I am a teacher, I also use this social space to answer my students' questions and to upload notes. In the college where I work there are tools like Blackboard, but nowadays who wants to spend his free time at school? Facebook is the new public square, my evilness makes me post their absences to class and their grades, or distract them from their enjoyment when I post the instructions for the next project.

Before providing you with the predictions for my cyber future and the quadrature that the search engines show (I happen to believe that Google is my ascendant and Yahoo my regent house), I will tell you my story in this media.

My first impression was nostalgic. I found a friend from my childhood, but then I got my first network friend, Marco Levario, who I had met so many years before via e-mail and who made me part of his media magazine *etcetera*. The first time I listened to him was during an interview on the TV and I was captivated, so I decided to write to him and he wrote back. As of that day, he is purely my virtual friend. We met each other thanks to the cyber surfing, and despite we never see each other, in fact we are the Buzz and Woody of the Google era.

Thousands of students have come back to me with grateful messages; I also managed to find my elementary school teacher Lety and my fellows from that stage of my life. Since I was moved by all these facts, I decided to write my

Facebook chronicles. I thought that if the children of Narnia escape through a closet I could do the same through the screen. I express my fascination in these terms:

From Facebook I recover past life scenes, characters with whom I skipped a hug, or postponed a claim, we owned a kiss or we simply clarify an uncertain impression that today is satisfied. I discreetly struggle to elucidate the strong passion that the new media makes me feel; unlike some critics, I think that the Internet does humanize us.

Recently, I had a cyber-meeting with a friend from my childhood. A friendship request from a certain Mauricio woke me up one morning, he appeared as a friend of my brother and I accepted him thanks to the reference, but I really did not remember him until he sent me a message. I never thought it could trigger so many feelings. He was someone forgotten in a gully of my memory. When we were kids we used to play every day. It was a sort of Peter Pan commanding lost children. In spite of the distance, the network brought us back together once more, and all of a sudden, we were sharing life, and telling secrets again.

Going on with the chronicles, I found the Facebook page of Montessori de la Montaña, Lety's school, my former elementary school teacher. Now, she lives in Cuernavaca and I decided to visit her, so I asked for permission at work to sleep at my former teacher's place. My first surprise was to share the bed with Bob Dylan's and Garcia Lorca's dolls... what an ecstasies! It made my night a delight. Who can sleep with two of his idols without having to pay the consequences of a *ménage a trois* made in heaven? The next morning, Lety made my lunch, another dream come true. How many children would like to sleep at their teacher's place, then got her to make their lunch and arrive at school holding her hand?

Let's move now to my friends from high school who updated their profile on my new virtual life:

It is funny to periodically meet friends from the past and get up-to-date in our lives. The bearings take us away but we always meet again over a cup of coffee. I cannot blame facebook for what we did before, but thanks to the pictures, and

posts, new faces awake to tell their story. Every morning I wake up happy, I log on to see who is there, to call for e-assistance, to say good morning, to congratulate friends for their birthday and to arrange future meetings. I recover lost memories to decorate my wall. I upload photos to share my story and rescue some other pictures that several people had of my own. I write these chronicles of facebook hoping to reconstruct with words the faces that time vanished from my mind.

There was a time when my self-esteem grew presumptuous:

Lately, from my dissertation about facebook, I have found myself to be expensive, and what is more, there is a group of people competing to buy me. I still do not understand what this application called Owned! is about and it worries me. I hate being auctioned, one day I belong to a crazy blonde woman, another, to one of my students. They want to control me! I'm not a doll so they can toy me. Of course, it would be worse if my price was lower or no one would like to buy me at all. The pale division between being objects and subjects is unstable, that is why men and women get confused. Our material goods condition us and we do the same to them; you can enter to someone's home, walk among his belongings as if you were an inspector or a keen reader able to decipher the past, the present, and their best kept secrets. The objects tell us about our needs, about our ideology, they prepare the roads to launch our projects. Things are the double of our lovers, the ones we keep in our wallets or under our pillows, souvenirs of melancholy, the roots of our history. The ties that bind us to our things are stronger than we imagine, we use them to incite admiration or to provoke envy, a feeling that some people believe gives them success. I am auctioned in a game, but many people are actually kidnapped in my country to be traded in an infamous market where money, the symbol par excellence, is worth more than life itself.

Our bits and pieces are full of meaning; inside of them reside living premonitions, encapsulated memories. I wonder if my soul has not escaped letter by letter and bit by bit through this device, my computer has become a branch of my being, it stores my confessions, it is the key tool for all my work, my contact with far away people, the trunk

of the memories that keeps snapshots and movies of my life. It saves my favorite music and ideas, those I fear to forget. The network to the one you connect is an infallible tracker and in just seconds it can locate my physical whereabouts. I also know that it is intrusive, that it is keeping track of all the sites I navigate, and all my information is crime and alibi of my relationships, hobbies and habits. The network is like money, an ambiguous symbol, a way of contact and trade, a mean to make war or to promote peace proposals. A new impostor has bought me again; the notification arrives to my cell phone. I demand to be explained why I am being purchased and sold, I do not want to end up as an avatar in the caverns of cyberspace.

For sure, my Facebook shows my absurd assumption of myself as a literature intellectual and I sort quotes like a gangster that sorts bullets to his enemies, or the rich man who gives everyone tips:

“Mirrors are abominable because they increase the number of men”, said Jorge Luis Borges, but what would he say today if he learnt about Facebook?, he would probably think it is the worst aberration, its proliferation power makes it a cubic mirror and its manipulative capacity turns it into a compelling portrait capable of projecting the image that any subject wants to feed as his own shadow. The famous witch in Snow White, with a different attitude, loved her mirror until he betrayed her; it gave her an undesirable picture, incapable for lying. Like every bad lover, it could not keep it a secret the youth supremacy of Snow White. How many troubles would have been saved if the bland mirror had replied again: You, my queen, are the fairest of them all?! But except for that time, the mirror, as a faithful servant, helped her reclaim her beauty and gifts; it also served as a locator for lost friends or stepdaughters, an antecedent of the GPS without a doubt. It was even a faithful partner to talk to in times of loneliness. Another friend of mirrors, the oldest of them all, was the catatonic Narcissus, who spent his life watching his double in the waters of a benevolent lake that gave him back the picture of his virtues. This character as a germ of later fiction is presented as the icon for the sin of vanity, and with Oscar Wild's fable it reached diabolical excesses. The protagonist, Dorian Grey, sold his soul to the

devil to keep forever his fair and young appearance. Facebook (and all social networks) are the new mirror of us mortals, a kind of pink synopsis of our lives, where the hidden Narcissus is hopelessly shown. From there we can extract some profiles that can be summarized as follows:

The users who like to compete for the larger collection of friends.

Fans of Happy Family, those who exhibit their perfect clan.

The “I got money” character, that loves to upload the souvenirs of his trips and extravagant life mementos.

The insecure that feel they could be kidnapped, so its space is practically empty.

The forever-young who loves to imply “Look at me; I look well despite the time”.

Or the guy that feels to be Spiderman because he spends all day in the web and reports all its whereabouts.

All of the referred stereotypes are categories of the same loneliness and vanity. Perfect reflex of a society that fears its present, that attempts to find itself in the past, and that hopes for the future projects that always promise a better life. It is the ideal media of a speedy epoch which does not have time for physical contact and turns a screen into the new meeting point. At least, it is a kind gallery that allows us to edit life, to collect friends, and to share the perfect album in search of a bit of admiration from others, and to exhibit ourselves; after all, life turned into images looks better, and allows us to recover that moment that we could not taste because we had our sight fixed on the event that is going to become the post of the following day.

Thanks to an old friend recovered from my social site, I went to a Cold Play's concert and I could see my idol Paul McCartney, at these shows I discovered that the new generations are:

Three-eyed beings, two on their face and the other one is the cell phone's camera which records and feeds their social network with portraits from reality. Nowadays, without that evidence, nobody can be sure that life is actually going on. It seems

that we need the pictures to be geographically placed, and to give testimonies of our emotions; these images materialize our being, we have one foot set on Earth, another on the Internet.

Since I was born for Facebook and Twitter, the Earth quaked and disasters were present, then I learned that:

Thousands of people risk their lives by upgrading the drama and ordinary people become journalists overnight. The contingency and evacuation plans have to consider dead time that will be lost when portraying and narrating the disaster... Will there be people who, even in the midst of an orgasm, try to measure its intensity?

Love is another focused area in my social network:

Two lovers are separated; the screen approaches them once more. Their words touch and caress; they make love one another with the keyboard. They shortened the distance and they are together again, their souls smile, sing, dance and write, subdued they throw like confetti, here and there, love phrases, song's paragraphs, expansive joy winks that raises comments: "I like you", "I will copy the phrase", pleasure spreads.

A word shall be enough to heal me, seduce me, excite me or embitter my day. Twitter and Facebook enhance the word (of course, also the images) are an intravenous injection that travels directly into the bloodstream, lodging like a virus, an expansive idea that grows and spreads: tell me your wishes, the darkest ones, those who you would not dare to mention face to face and out loud. Are you tired of carrying that daily person, the rusty one, the one we've built since childhood, the one that has dents of old battles? Do not worry, we built a new profile. Our life in the network allows us to be reissued, to reinvent us, to open new living spaces, is brewing another possibility of being someone else or continuing being yourself and perhaps, the essential nature is unavoidable, but we get the luxury of walking possibilities that we had left on the shelf. Networks are the antidotes to every-day boredom and the new scenery to feel new emotions. We strive to understand our feelings and others' feelings; I give you my words in exchange of yours, my feelings are a

flower that slowly opens to you, you give me your secret flower back and we grow together into an emotional maze that palpitates in the same heart of our feelings, I'll give you a word!

Social networks have become dating sites, however, it is not easy to test whether they are more or less helpful than those in real life. We know that Facebook is very popular among those seeking greater certainty than with a blind date. The network has its romantic pathologies: the Cyberia and homogamy, the first one is to transcend one's generation and find younger or older partners. There are no ages for love! The point is to hit upon sharing views no matter the year of birth; the second is the tendency to gather people who are alike. We look for simultaneous passions and parallel sincerities; the networks make us feel that no matter what happens on the web stays on the web.

Going on with another point, I must admit I was a political activist. I recovered the notes of the victims from the drug dealing war, but my wall became bloody and I decided that my Facebook was an escape and not a tool for complaining:

In my country, Mexico, violence is normalized, the media is sensationalized, the fiction is fictionalized and death no longer scares anyone. I do not want to watch, I tell myself every day when the notes and images of a war I do not believe in display fragments of dead men and women abducted by misfortune, "They are the bad guys", my little girl says to me to spare my sadness but I know it's not true, because the story of my country is not about wonders, and the distinction between good and evil disappeared long ago, when we still had black-and-white TV... I'm tired of hearing raves about the achievements of Colombia, the luck of Brazil or the salvation that will come from outside. I'm tired of believing but I refuse to surrender. I know that from now on I will bear a name and tell the story of the victims, I will use all the means that an ordinary Mexican has to express herself: my social network...

My sister, my daughters and I have played to write stories of princesses among posts:

"The princess decided to definitely go away and she packed: her red shoes to dance until she dies; glass slippers to trace; red hood to run with wolves; apples of discord to sow anxiety, the helmet of Athena to avoid headers. She would leave the sword stuck in the stone; the head of her mother that, when looked at, petrifies her; the useless pumpkin that breaks the spell at 12:00; the treacherous mirror that eventually finds a more beautiful woman, and as an ecologist she would recycle "Once upon a time..." as many times as necessary."

"Andre I thought that thing about your mother was temporary but I think she is smoking peyote or other substance, now she wants to be Peter Pan, I have really tried, you know it, to deal with her things, but now she wants us to write 420 words x post, and as you see I have children and I can't devote myself to your mother's follies."

"Mirror, mirror on the screen tell me who is the fairest of all facebookers, you're the most beautiful Andre but there is an old fool who is called Patiki that competes with you despite she is in her forties."

"I'm sorry to announce that I may leave the game since I've noticed some discrimination or xenophobia on your behalf, you never pick Pocahontas or the Chinese Mullan. On the other hand I am invited to a site in which they are playing to be Pokemones and they let me play as the evolved Pikachu."

"Dear Prince I know you are afraid of me because I am just the perfect slipper that fits your dreams. I'm your princess my Cinderello."

"Dear evil sister, you're not a princess, in cyberspace and in real life, you will be known as the Iron Lady for your latent coldness and evil."

Yours truly,
Patricia the nice sister Good Heart and soul

We have also cried and laughed of over our family tragedies, Facebook became our shelter from an intensive care room:

I spent much of that night telling stories, from the intensive therapy room with my sister on Facebook. Patricia posted the picture of

a homeless woman who perfectly captures my lately appearance, she said that that day she would bring the stuff for me to make quesadillas so we could gather some money to pay the hospital bills. As of that day an entire story was born, with several added people and the truth is that my laughter was immodest; I feared I would be jogged from there. It is interesting how this tool is used today. My sister got a prayer chain around but I hate the religious roll and public mourning. It is not the same for me as an exhibitionist; I prefer to expose phrases, to send messages to my students, or even silly jokes, but that stuff of "poor of us, pray for my mom", no way! To tell you the truth, I was furious. My stupid sister stole my I-Pad for a moment and together with it my identity on Facebook, and posted: "I've always been a combination of Marilyn Monroe, Hugh Hefner and Octavio Paz." As you can imagine, the post unleashed a rain of comments until I noticed and cleared the encroachment. Intensive therapy enhances affects, dramas, emotions and even stupidity. Finally at home, I put a few drops of Channel Number Five, my silk robe and I began to rewrite the Labyrinth of Solitude.

I do not like video games or their imitators, but I've found a new way of family life, I interact with my father who uses his facebook just to play "The Wheel of Fortune" or "Jeopardy". My social network is my promoter and I call my friends to read my texts:

"Read me, read me, I talk about sex and it sells, read me because you are my friends and my students, and because I am a good person, and CARAMBA READ ME..."

Sometimes, I suspect that I am given some "likes" just out of pity or politeness; of course there are some more generous students who quote me to show that they did their homework. I also use Facebook to locate my elusive brother, or to make a party over the Oscar Academy Awards night. That movie night I tried to entertain my guests with memorable scenes and quotes of the nominee:

"I see the Oscars live with Marz and Leonardo, with Patricia, Eduardo, Aurora, Lili, Sebastian and many more, thanks to this network with which my generation never ceases to get amazed. What a

great Oscar Night!

"

Internet with search engines, social networks, emails and attachments of remote communication (camera, chat, Skype) binds souls. In that sense, modern cell phones, which also group this technology and have the advantage of being portable, are means of contact too. Thanks to the creative skills involving the use of a computer, this becomes a scenario that allows artistic creativity and facilitates the production of expression. Men and women of today spend many hours reinforcing individuality, much of this by using sophisticated tools put to our service that allow us to create from a phrase to a movie, it is itself a wonder; but it also gives us the catwalk to display our personality in front of millions of our peers and then, it has become an almost necessary validation.

The neuroeconomist Paul Zak tells us that networks delight us almost like an orgasm and reduce heart attacks, he found that oxytocin levels rise after a session of Twitter and stress hormones, cortisol and ACTH decrease. Social networks unleash powerful physical changes in the chemistry of our body, hence its addictive power. To our brains, interacting with people in the networks is so "real" like being with them physically. We have a narrative brain, we process information in stories, and so we are fascinated with this public diary.

On the other hand, we like to build relationships: friendships, family, work, etc. Since the eighteenth century, sociologists study the power of community ties in various groups, such as tribes, families, and, labor, religious, and educational systems. In the fifties, the term "social network" was defined as a group of people who maintained ties with defined cultural traits. In the late twentieth century, with the appearance of virtual communities, human beings can meet each other in spite of distance, favoring traits of affinity on qualities of identity, we have friends because we sing the same tunes, and we are excited about the same plots, we are fans of the same painters, no matter the age or nationality, our tastes make us match. Manuel Castells said that social networks are part of the "network society", a structure composed of "digital communication technologies and electronic-based information" that affect human life in every corner of the planet through global webs: financial markets,

production, management, transnational distribution of goods and services, skilled labor, science and technology, media. Alternatively, Nicholas A. Christakis and James H. Fowler, considered networks to be any group that goes from a couple, to spaces such as Facebook or World of Warcraft. The authors of "Connected" analyzed information about the happiness of 4739 persons and its connections with thousands of people (about 50,000 social links) they concluded that when people changed from unhappy to happy, the social network contacts did it as well. So be careful what you say, show, or post (by using a neologism) in the network. Online, we are not anymore individual entities and gradually we become networks, microorganisms that resume individual strengths.


Social networks are here to extend our lives, they work slowly and increase our range of communication, we recover lost friends or distant relatives, we duplicate the work schedule (it is common to see families apparently together, but at the same time very far away from each other, at a restaurant, for example, without talking, answering calls or messages from other people, or solving tasks or setting meetings). Why wouldn't erotic and romantic possibilities be also extended?

All I do is related to stories; I guess that when I was a kid, somebody read me a story that contained a spell. We are the stories we tell ourselves, I always say that and I believe it. The new technologies relive old words; revive emotions just to remind us that, in the center of stories, projects, links, past and future stories, the creative word reigns. We are our words, those that now shine like neon in multiple, fast and fugitive showcases, social networks give us the opportunity to rewrite, it is always the possibility to reflect, to lie, to hide what we don't want to be, but at the same time, to become what we actually want to be. They are the diary that we always hide, but dream for other people to find and discover the best version of ourselves, the edited version of us that we do like. That's why I do not like Twitter, it is a pretentious social network, where users feel the obligation of being intelligent in 3 words, in Facebook we are exhibitionists, child-likes, sentimental, romantic, vain and attention-seekers, the Facebook showcase, the post-modern times biography that makes us

music, image, movie, quote, word, or translate the complexity of our emotions in signs that send us back to the pictogram:

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Regina, bored, bought a dog , continued
sad wanted to have a million of
friends

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To throw her flowers and messages, she joined Facebook, day and night her heart beats happily.

)}i{(

Fluttering like a butterfly.

Now, it's time to talk about the future, I appeal to Rasmunda the videnteastrologa.com, and she tells me that my web-life looks well, I will continue receiving friend requests, I will never get old with a new application that will wipe away kilograms, spots and wrinkles. It seems to be approached long fortune inbox, chats full of joy. By serving 35 years of my life in Facebook, I will prick mi finger with a key corner and I will die, the cursor arrow will be blinking, while popping chats will try to revive me, kiss emoticons will try to awake this senile Princess, there won't be success; my secrets, my heritage of trivial words and tricked pictures will be delivered to my daughters from iTunes in a pretty interactive device. Nine months later in a reverse childbirth, Google will erase any record of my steps over the web. In a 100 years of Earthly life, my niece Alexandra will be recognized as the first Mexican facebooker novelist and she will revive me as a Pancho Perules lover, Esthercita de la Mar's boyfriend, the one who abandoned her on the church altar, those were the non-existent profiles that she created at eleven years old and that became an example of my narrative class to prove that new media are in favor of creation, that a child was read by many, without knowing how to spell or perfect syntax, without distinguishing narrative techniques, only with the resources of her precocious imagination, her TV-serials and fairy tales collection, but above all, because she was born almost simultaneous in reality and virtuality.

"On facebook we never die."

Architectural Ornamentation and Fabrication with Multi Agent

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Abstract

From a historical perspective, we were extremely intrigued by the organizational complexity and integrity of traditional ornamentation styles in architecture & furniture design. One of the remarkable styles of interest is Rococo or "Late Baroque", which evolved in France & Italy for architectural structures and furniture décor. The research project conceived from the notion of how design computation could be a valid medium to generate ornamentation in design comparable to the one found in traditional architectural & furniture décor style. The research work predominantly studies the extent of ornamentation in Rococo Style at the scale of both Architectural Design and Product Design. Rococo was chosen for it resembles very closely with the degree of complexity and richness of ornamentation desired from the output of the complex computational design process. The rich grandeur and florid beauty of the motifs and the sculptural tectonics in Rococo is highly appreciated and thus, intent of the project was to develop a self-organized computational framework, which is calibrated to have the potential to form complex designed artifact. Adding to that, the project strictly adheres to the objective to create a computational methodology or script which can provide series of such designed artifact, based on designers input parameters and initial conditions. It is noteworthy to mention the objective of the research endeavor was not to simulate and imitate rococo design and pattern formation by design computing. However, our research goal was essentially to form a computational procedure with the aid of programming and scripting techniques to generate florid, graceful and ornamental design artifact in production, which might or might not resemble rococo design theme in its appearance. Rococo style is mentioned to emphasize our source of

inspiration to produce ornamental artifacts.

After setting up the computational framework to achieve the intended output, the next phase of the project indulges into 3dimensional artifact production with the help of state of the art rapid prototyping techniques and digital fabrication tools. This confirms the practical feasibility of the entire computational process and ensures the possibility of large-scale production of intricate design. Computational procedure adopted for the generation of the basic framework is Multi Agent System where in a self-organized system is established comprising of thousands of autonomous intelligent agents. These agents interact among themselves and educate each other with their embedded behavioral traits and in this process, they end up exhibiting complex non-linear designed pattern. These patterns are of value to the designer and they can calibrate the script so formed to get desirable design output.

Keywords

Multi Agent System, Swarm Intelligence, Artificial Intelligence, Design Automation, Digital Fabrication & Prototyping



Fig. 1 The study of the ornamental structure and motif formation in an 18th century furniture design.

1. Aims

1. To study a chosen old architectural design style-having ornamentation as a strong design feature. To draw significant inferences and conclusions from the same.
2. To conceptualize the logical flow of the preliminary computational framework .
3. To develop the design computing solution to achieve highly ornate and floral design work.
4. To produce 3d physical models or prototypes from the computational model to understand the integration of design computation with rapid prototyping technologies.

2. Rococo Design Style

In this research paper, we often use two terms, which are ornamentation and motif formation. We use and understand the term ornament as a decorative element to embellish parts of a building or object. We identify such delineation of buildings, furniture decor is dying, and this research endeavor is partly an attempt to relive the beauty and grandeur of ornate and florid design work. At this context, we also define motif as an element of a pattern or theme. It could be repeated in a design or composition, often many times, or may just occur once in a work. Refer Fig. 1.



Fig. 2 The analysis shows the motifs in the ornamental structure of rococo showing type of curve structure evident in its geometrical construction.

As mentioned before, we were inspired from Rococo as an ornamental design movement in olden times; we conducted historical research study of the same. Research data revealed that Rococo (also known as "Late Baroque"), originated in the early part of the 18th-century Paris, France. It is notable for its artistic movement and style, sprawling vivid domains of the arts comprising mainly painting, sculpture,

architecture, interior design, decoration, literature, music and theatre. The Rococo was developed as a reaction against the grandeur, symmetry and strict regulations of the Baroque. Rococo design characterized a more jocular, florid and graceful approach to Baroque art and architecture. The design during this era was ornate and made bold work of creamy, pastel-like colors, asymmetrical designs, curves and gold. Unlike superbly rich and extremely ornamental Baroque, the Rococo had more playful and witty artistic themes. About interior decoration, Rococo rooms were designed as total works of art with elegant and ornate furniture, small sculptures, ornamental mirrors, and tapestry complementing architecture, reliefs, and wall paintings. The above-mentioned design attributes inspired us to select rococo as our theme of research study. Consequently, the remarkable research results motivated us to make the preliminary computational framework to obtain such design pattern of ornate quality. Refer Fig 2.

Evidently, at any point of the research process, our goal was not to simulate or imitate exact behavior of rococo pattern. Moreover, we intended to be surprised and awe bounded by the complex and intriguing design work from the custom written script, in the computational framework.

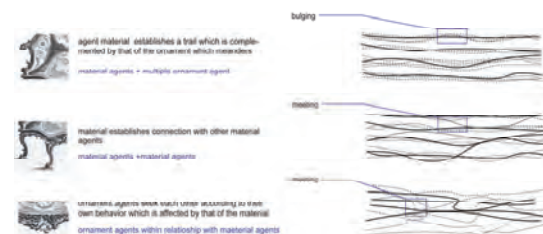


Fig. 3 The study above depicts the layers of curve interactions that can result into the degree of complex ornamental designs in the 18th century furniture design. The diagram outlines the classes in the computational framework and their interaction pattern to synthesize such design pattern.

3. Computational Framework

The coding for the computational framework was done in java based applet Processing. Basic programming technique adopted for the design computing was through distributed intelligence in a complex system of multi-agency.. We were interested to learn and develop from the self-organized interactions/ simulation of multi agent system, where the embedded artificial intelligence of each agent reacts with each other

based on predefined logistics. These reactions and feedback procedure imparted a visual pattern of self-organized complex system, having aesthetic qualities similar to traditional ornamentation style. Refer Fig. 3. Adding to that, the algorithm is based on Craig Reynolds Swarm model (Boid systems) specifically developed upon the behaviors of Cohesion, Separation and Alignment as exhibited by a swarm simulation. Research work encompassed pheromone trail formation in Ant colonies (as exhibited in Ant Colony optimization methods), by which ants lay down pheromones directing each other to resources while exploring their environment. This trail obtained after laying pheromones gets stronger & stronger in further simulations, essentially based on the ants who achieve stronger solution sets in the previous simulation. At the designer's level, this web of complex pheromone trail in 2 or 3 dimensions is of aesthetic and ornamental quality, which could be used as a potential artifact of high dimension sculptural tectonics.



Fig. 4 It shows study of motifs found in the ornate quality of Rococo. The study revealed procedural techniques in design computing that could be adapted to form such similar kind of motif formation. Mathematical curve formulae and logical rule sets governed the formation of motifs in the script.

4. Class Formation

The code begins with sub division of the agent systems into four different agent types, behaviors of each of them are defined by their respective classes. Each of the agents in the following classes portrays ant's behavior and they release pheromone at any change in their position vector. In the subsequent simulation, these agents then tend to follow the pheromones released by them

and other neighboring agents in previous simulations and thus the system continues. Analogous to ant colony optimization technique these agents follow those pheromones more strongly which fulfill predefined conditions like distance threshold, angle of vision or positioning close to certain kind of agent types. Along with the ant pheromone behavior, these different classes are embedded with the following behavioral traits, which makes the simulation produce obtained results;

1. Material Class (the base material following swarm movement)

- 1.1 Exhibits Basic Swarm behaviors
- 1.2 Agents aligns to self
- 1.3 Seeks trails formed by self
- 1.4. Has intelligence of range & angle of vision

2. Ornament Class (the ornamentation following the material agents)

- 1.1 Agents aligns to self
- 1.2. Strongly seeks trail formed by material class.
- 1.3. Selectively aligns with material trails based on distance
- 1.4. Forms branching due to inter relation with material class

5. Motif Class (Formation of motifs on the ornamentation class based on interaction) Refer Fig 4.

- 1.1 Formation occurs based on time factor on ornament trails.
- 1.2 Form is analogous to rococo flowers or motifs.
- 1.3. Steers towards a pre assigned curve formula.
- 1.4 Very strong steer scale
- 1.5 Dies based on distance from branched ornaments
- 1.6 Dies based on time factor, from the time of formation

6. Motif line Class (On ornament trail following motif formation)

- 1.1 Formation based on time factor
- 1.2 Forms after motifs
- 1.3 Steers to a different curve equation.
- 1.4 Steers with less strong factor than motifs

- 1.5 Dies after some time
- 1.6 Dies based on distance from branches.

The above structural organization was the basic hierarchy of the code at the initial stage, which we further developed to exhibit much refined pattern behavior.

5. Algorithm Development

5.1. Phase-1

The above organization of the code started to show pattern formations but the simulation result was not coherent and appeared to be uncontrolled haphazard pheromone trail formations. The pattern so formed was characterized by multiple pheromones branching within a threshold distance from neighboring agent. However, by the end of the simulation, the branching of the ornament trail and motif died into a single line. Moreover, it started from a random incoherent state and took some time to achieve desirable results. Refer Fig. 5.

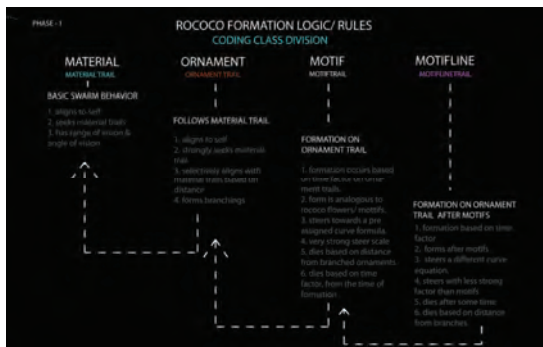


Fig. 5 Shows the flow diagram of the logical rule sets among the classes and their interaction in the program code at phase-1.

5.2. Phase-2

This phase involved addition of a deviate function into the material class, which primarily created a sense of controlled randomness in swarm behavior of all agents. This deviation of the material class exhibited unique output and design pattern. This function was initialized based on count factor of number of material class agents distributed. Motif and Ornament class were modified as below:

- 1. Different curve equations tested for

motif formation.

- 2. Steer factor calibrated to show different motif formation
- 3. Motif was produced after certain count of ornament trail agents.

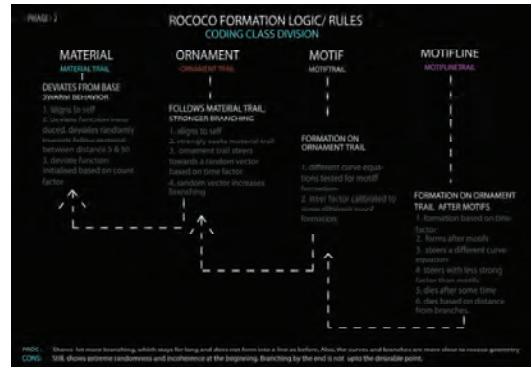


Fig. 6 Shows the flow diagram of the logical rule sets among the classes and their interaction in the program code at phase-2.

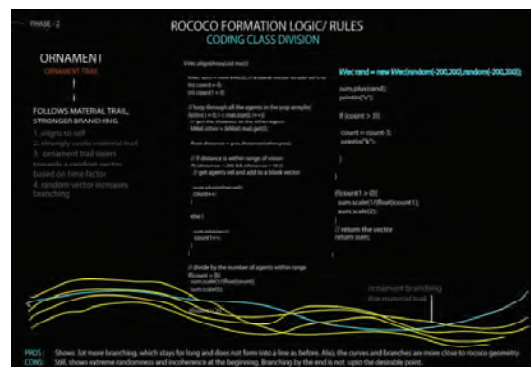
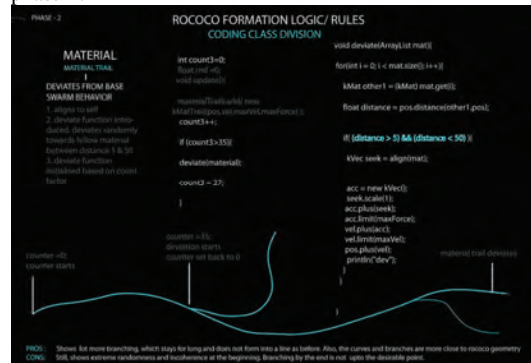


Fig. 7 The diagram above shows the curve branching and pheromone trail calibrating techniques adopted in phase-2 to create substantial improvement in pattern making from the code output in phase-1.

The result shows lot more coherent branching (closer to desirable design complexity), which stays for long and does not form into a line as before, yet there is extreme randomness and incoherence at the beginning. Branching by the end is not up to the desirable point. Refer Fig. 6, 7, 8 & 10.

5.3. Phase-3

In this phase, the material trail was not updated as it showed appreciable results after the inclusion of deviate function for randomness. However, the ornament trail now is produced after periodic production of the material trail agents. Therefore, in this phase ornament trail agents was no longer produced randomly and thus the results obtained were more legible, coherent and controllable. Besides, both motif and motif line class were equipped with “Die” function, which specifically, calibrated the agents to die out of the simulation after predesigned time interval after going through certain number of interaction with other agent types near its threshold distance. These very important code changes produced commendable results in the form of detailed ornamentation as we see in traditional design ornamentation in patterns and motifs. Refer Fig 9.

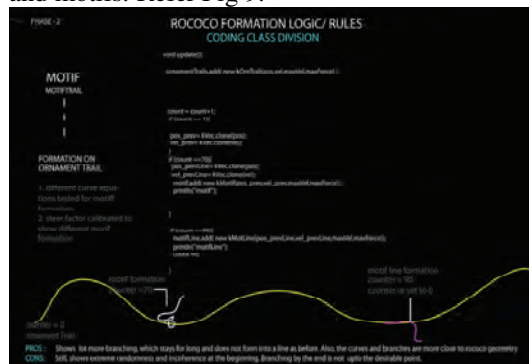


Fig. 8 Diagram showing motif formation rules in phase -2.

6. 3D formation & Digital Fabrication

Once the system is established and the coded simulation produced desired results, the 2 dimensional frameworks was converted to 3Dimensional setup with the addition of z- vector and z coordinates on each of the agents in all of their respective classes. This time their 3 dimensional simulations of reactions and

interaction resulted into similar coherent and controlled design ornamentation in 3-dimension space. Refer Fig. 9 & 10.

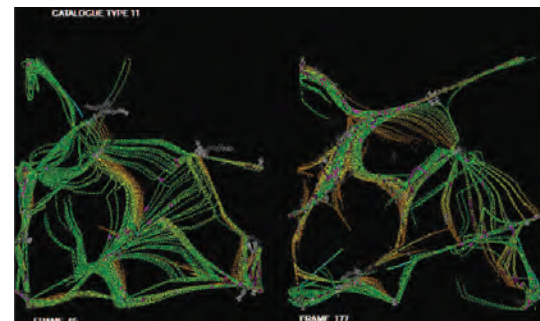
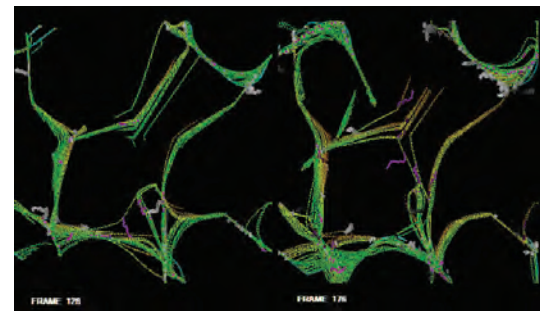
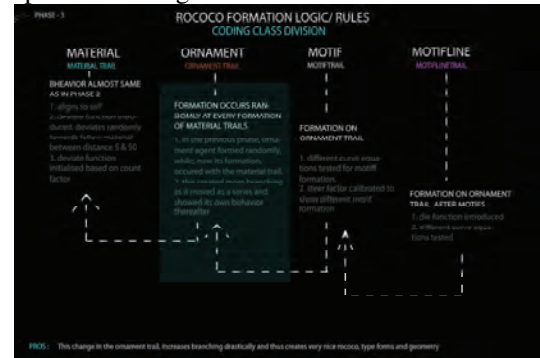


Fig. 9 The diagram explains final code logic with necessary changes in phase-3. This logical rule sets imparted calibrated and controlled design pattern work with desirable aesthetical qualities. The 2 dimensional pattern work obtained above is the result after phase-3 showing branches and motif formation. The script was calibrated to give different results at different parameters of input.

Eventually, another program code was written to form iso-surfacing between the 3D point clouds obtained from the 3D ornamentation pattern from the simulation results. The iso surfaced mesh was

exported as an .obj file and imported in Geomagic platform where it was fine-tuned with further mesh optimization and accuracy. The resultant mesh obtained was 3d printed directly from Geomagic interface. The workflow from digital to physical model was from processing original pattern formation script to custom written iso surfacing program. At the next level, the workflow was from exporting the iso surface mesh object from processing and fine-tuned in Geomagic interface, finally to be 3d printed as a digital craft.

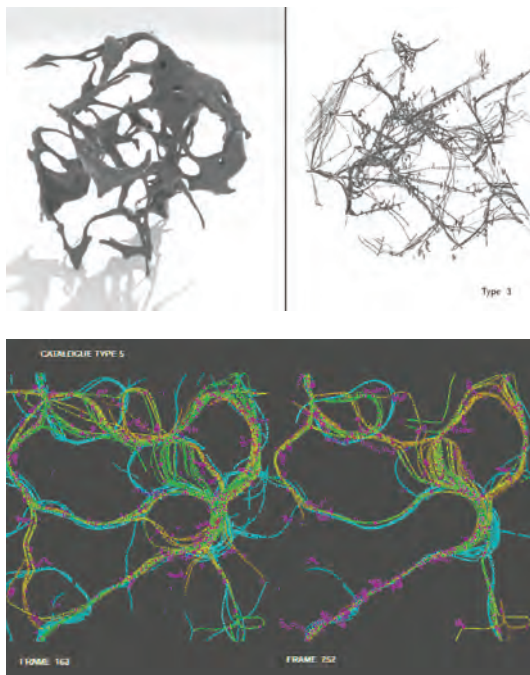


Fig. 10 The 3d printed artifact from the script at phase-2 with limited branching and motif formation.

7. Conclusions

The advanced computational coding and digital fabrication tools allowed us to produce ornate artifacts of desired scale, precision and proportion. The procedure followed clearly unravels a novel paradigm of design endeavor wherein very complex and intricate design patterns can be computationally studied, analyzed and reinvented. The research project not only facilitates a genre of ornate digital crafts, but also at the same time documents the complex computational framework adapted to synthesize such kind of design work. We firmly believe it is the process in the design

computing which is the real achievement of the research endeavor. Further calibrations and subtle modifications on the script and program code can bring about infinite number of such kind of crafts each type having distinct identity, aesthetics, and complexity at the level of geometrical formation. The digital production of these at a commercial scale has the potential to bring back old rich grandeur of ornate and florid design works at the scale of architectural design and furniture décor.

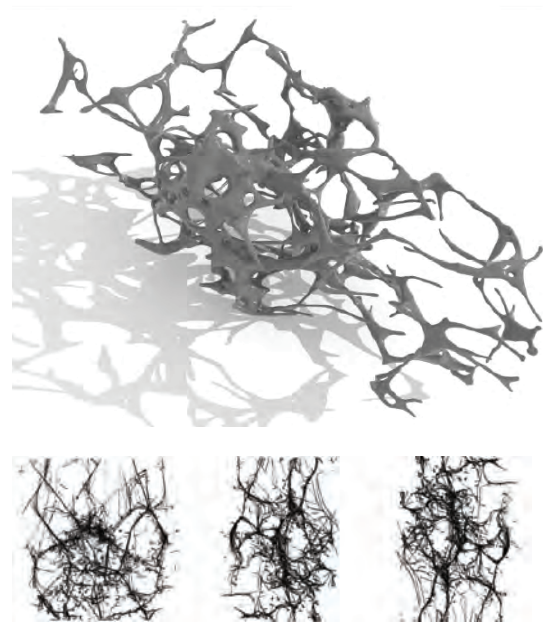


Fig. 11 The 3d digital artifact obtained from the point cloud in processing. They were processed in geomagic for 3d printing.

At this point, it would be notable to add that the scripted output and 3d printed artifacts, does not imitate the formation of rococo or baroque design works, but presents a new paradigm of genre of digital crafts, which is novel and unique in its own geometrical formation. The multi agent system adopted for the process, delineates a novel paradigm of its application, which is to produce complex digital artifacts by pattern formation from the movement of the individual autonomous agents. Application in this new field of inquiry by Multi agency is innovative and we observed further work in this direction, would definitely display enthralling results. The digital crafts so produced can be successfully applied at all the scale of furniture décor, building fenestration

components or ornamental units, sculpture design and so on. Refer Fig. 11.

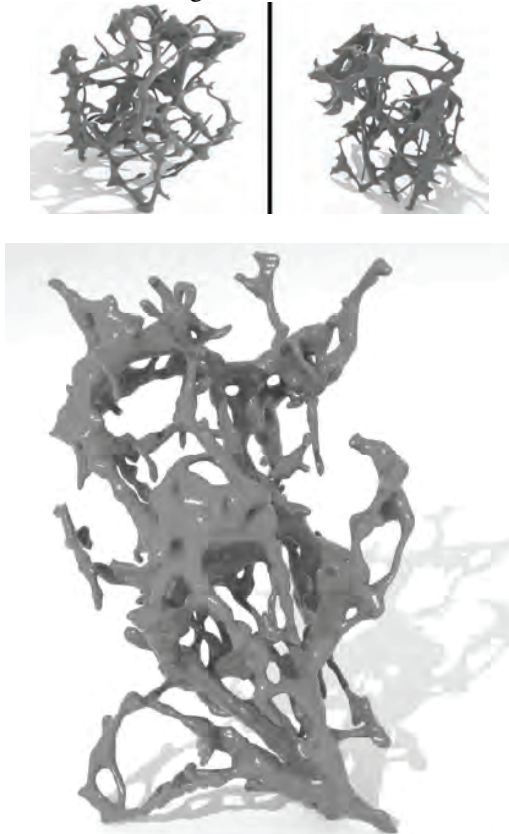


Fig. 12 The 3d digital artifact obtained from the point cloud in processing. They were processed in geomagic for 3d printing

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Fig. 13 Some more design options showing motif and ornamentation at different scale of precision and proportion.



Fig. 14 3d printed model showing different design options obtained from the script.

Autonomous social Avatars

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Abstract

"Autonomous social Avatars" (AsA) is an interactive social tool designed to provide an innovative experience in the sphere of digital communities. This application supports the idea of integrating digital environments into physical spaces, contributing to the evolution of hybrid worlds. AsA will serve as a continuum of our daily practices, particularly in both physical and cognitive levels. In addition, we intend to generate original fields of analysis regarding the socio-cultural effects of new information and communication technologies on our society.

Keywords

Social Networks, Social Avatars, Hybrid Worlds

Creating social paths

*"I thought of a labyrinth of labyrinths,
of one sinuous spreading labyrinth
that would encompass the past and the future
and in some way involve the stars."¹*

Without a doubt, thinking about the future and imagining a brand new world is a highly pleasant exercise for our mind. However, each one of us may have a different set of goals

¹ BORGES, Jorge Luis, *The Garden of Forking Paths* in "Labyrinths", New Directions, 2007, page 23.

and approaches - some of which may be inconceivable - to this mental exercise. These visions are usually attached to the purposes that we may have either as individuals or as part of a larger community. In this mental process, our imagination can set on a journey by projecting different perspectives and representations of our inner self into a potential future (i.e. how, where and with whom will we live in the next few years). It can also project various possibilities of the environment that surrounds our microcosmos (i.e. what the world in general - or our world in particular - will be like).

Science and new technology are typically linked to the most utopian ideas of our times. Our collective imagination has evolved to conceive devices that can transport our minds and bodies into places farther, higher or deeper than ever before. It has created gadgets that can make life easier and more comfortable. All in all, science and technology are nowadays more attached than ever before to the ways in which we achieve our life goals.

This paper lays out an ongoing study related to the HyperUrban² research project. In our

² The "HyperUrban" project also includes a reflection on the concept of a "social city," where the means of communication, socialization, learning, sharing, working, etc. go through different states of self-

eagerness to create a product that goes one step further in the evolution of digital communities, we wish to introduce the concept of Autonomous social Avatars (henceforth AsA); an interactive social tool for hybrid spaces. AsA was originally conceived as an experimental tool to show the potential social relevance of a hybrid territory such as TerraDynamica³. Therefore, AsA can be applied to any simulated and physical social space.

Our main purpose is to create a social experiment that will enable users to interact in real time with the actions of their digital representation, learn new ways of socializing and ultimately expand their connexion with the physical world. AsA is most significant in everyday activities, as it is intended to combine the physical trajectory of each user and the autonomous simulation of their avatar for the same itinerary, generating *real-time* independent decisions by the avatars that will offer users a new and original approach to social relationships.

The academic goals of our study are as follows:

- * To show the infinite number of interactions that may occur in the physical world, in the same space-time continuum and are not the most likely to occur.
- * To enable users to follow the actions of their avatars and increase their interactions within the physical world (or within the simulated world).
- * To introduce new uses of simulations for social purposes.
- * To provide a more active role to the online identity of users, with consistent feedback with their physical identity.

Eventually, AsA can be used as a different way of looking at the various roles that we simultaneously play in society (such as that of

regulation, and where many of them are based on information and communication technologies (ICT).

³ TerraDynamica refers to the dynamic animation of a city (in this case, the city of Paris) and complements the work of the TerraNumerica project on modelling and urban digitalization, with the aim of simulating "life in the city": people and their masses, their vehicles and their movement.

an individual and that of a virtual entity), in real-time and within a hybridized space. AsA is intended to generate a persistent feedback between the hybrid worlds and the traditional world, especially between users and their avatars. Its philosophy is based on the self-representation of users as they actually are (or as they consider themselves to be.) AsA is a social application that intends to be used passively or actively, adapting itself to the needs and wishes of each user.

Before describing our experiment in detail we must underline that AsA is, above all, an original contribution, as it enables the optimization and combination of several technological devices towards an innovative experience in social development. At the same time, the novel idea of AsA may give way to a brand new set of original tools and fields of study associated with the analysis of the impact of new information and communication technologies on our society.

Conception and evolution

As previously mentioned, AsA was originally conceived as a social demonstration for a hybrid territory like TerraDynamica. In order to realize the full potential of this project, we set out to create an experiment that could generate different fields of socio-cultural analysis. This is why it is relevant to describe TerraDynamica within the context of our work, so as to show the basis for the conception of AsA.

TerraDynamica is associated with the dynamic 3D representation of urban actors (crowds and traffic) within a detailed environment. It is an ambitious and collaborative work with the support of ten companies and academics that specialize in specific domains such as artificial intelligence and behavior modeling, vehicle and traffic models, 3D environment representation and real-time visualization, gaming, conversational agents, web and GIS.

The main goal of the project is to develop smart technologies that can provide animation and intelligent behavior (i.e., coordinated,

emotional, and motivational behavior) to pedestrians and crowds, vehicles and traffic, with multiple levels of detail, pedestrian/vehicle interactions and real-time constraints, all integrated into a unique "behavior animation engine."

The project also illustrates the use of this "behavior animation engine" within different fields of application, such as:

- Urban development
- Transportation
- Security & Safety
- New urban services
- Video gaming

Its prime purpose is to show the versatility of the proposed solution and its potential uses in different environments that could address several markets.

Within this context, we can describe the ideal steps for the development of AsA:

- Develop an interactive social application for dynamic urban

simulations. The perfect scenario would be a 3D simulation of Paris (such as TerraDynamica.) However, the first prototype could be realized with a 2D cartographical representation of Paris.

- Register the Avatar simulation of the trajectory followed by the physical user in the city through real-time GPS data.
- Create, characterize and personalize the avatar corresponding to each user. The cognitive development of the avatar is a key element of our research purposes.
- Incorporate data from popular social networks. This will be the easiest way to spread AsA in a large scale.
- Delegate the mission of creating new social interactions to the avatar. At this point, the autonomy of the avatar is the most important and innovative feature of AsA.



Image: Schema "Autonomous social Avatars" (JP Bertuzzi 2012)

A) The experiment begins in the physical world. The user, equipped with a GPS device (such as a smartphone or a touchscreen device), activates AsA. This will result in his avatar appearing in the simulated city, in the same physical location as the user himself or herself. For example, if the user activates the device at the Saint Michel Fountain of Paris, her avatar will appear at the exact same place

within the simulation of the Saint Michel Fountain of Paris.

B) At the onset, the avatar will follow the user's trajectory, but it will be completely free to take a different path at any given time to pursue his or her interests. What is more, the avatar is predefined through a range of settings that will determine its affinity degree towards the other avatars or places in the simulated world.

In the physical world (especially in metropolitan cities) it is indeed possible to cross the path of people that we know without even noticing. AsA will be able to recognize these people (for example, by retrieving them as "friends" on different social networks) and will offer users the possibility of approaching them. AsA also has the autonomy of retrieving other people in the physical world that may have a high degree of affinity with the user. At the same time, a user's avatar could independently decide to visit places that may be particularly interesting to the user.

C) Users will always decide whether their avatar should follow their steps in the city or be free to pursue their own interests (initiate contact with other avatars, visit other places, attend cultural events, etc.) Additionally, users will also be able to check the activity of their avatar at any given time, and avatars themselves will also have the option of sending users a message whenever they encounter somebody. Finally, users will also be able to view the trajectory of their avatar and compare it to their own.

To sum up, users will have control over their avatar at all times to check their interaction with the environment, their contact with other people and their participation in different events. But they will also be able to simply observe the independent actions of their avatar in the simulated world. This way, users will have the chance of comparing their actions to those of their avatar.

The avatar characterization will have two essential parameters:

- *a system of interest or affinity* to filter their decisions (whether to interact with somebody, visit a place, etc.).
- *a personalization* which will determine the interaction of the avatar with other avatars (for example, a user's avatar will only find the people the user already knows, or they will be open to meet new people who share the same interest, or they will talk with friends of a friend, etc.).

Given a large amount of users and synchronizing the application with popular social networks, such as Facebook or Twitter, the data can be combined to generate a social graph of affinity (with friends or friends in common, with people who share rare interests, etc.) that is not easy to generate in the traditional world. Hence, the way of connecting with these new people with shared interests will be easier with AsA.

Origins

Sur de longues périodes de l'histoire, avec tout le mode d'existence des communautés humaines, on voit également se transformer leur façon de percevoir. La manière dont opère la perception - le médium dans lequel elle s'effectue - ne dépend pas seulement de la nature humaine, mais aussi de l'histoire.⁴

Our recent history is not an exception to Benjamin's postulate. Indeed, perception has clearly changed along with the evolution of time and space. Communication itself is also constantly shifting, and mental and physical representations continually morph into different ways of expression. The human desire to extend the body and the senses has reached a point in which any kind of progress is conceived as possible by the collective imagination, even the most chimerical achievement. The digital worlds, their avatars, the social networks and their profiles, are only a few examples of the possibilities that new technologies have opened up for us. They have created novel means of communication and innovative experiences, with new roles, new representations for ourselves (or our alter egos), and new conceptions of the other members of our community.

This contribution is in the field of Information and Communication Sciences, and it consists on the analysis of these changes, in order to interpret the causes and the effects of this

⁴ BENJAMIN, Walter, "L'œuvre d'art à l'époque de sa reproductibilité technique", Version de 1939, FolioPlus, 2007, page 16.

phenomena, to describe in detail their advantages and disadvantages. But also, our task is to think and contribute towards different uses and to find the best ways with which people can obtain more benefits from technology.

Theoretically, this work is partly devoted to the influence that digital self-representations (avatars) may have towards their creators (the users); to the relationship between society and digital communities; to the feedback between the traditional and the non-traditional (hybrid) worlds. After having analysed digital worlds and their social, cultural and educational effects on society, we propose to set up an experimentation of a social device with the potential to generate a strong relationship between users and their avatars.

AsA's main hypothesis believes that an avatar can be considered as a dynamic extension of the body; that it can bring original methods for cognitive development and, last but not least, that it can open up the way into a new dimension for social interaction. Sherry Turkle affirms that "mirrors, literal and metaphorical, play an important role in human development. In literature, music, visual art, or computer programming, they allow us to see ourselves from the outside, and to objectify aspects of ourselves we had perceived only from within."⁵ Indeed, our recent results have shown that an avatar is not at all a mere digital representation of the self. An avatar, depending on its degree of evolution, can have a huge influence on the user's physical life.

In fact, thinking about a preconfigured avatar in terms of character and personality could be linked to a user's own personal representation. For example, "in a role playing game, a player's central aim is the cognitive development of their character. Although statistics, nice weapons, and an interesting look may aid in this, the real engagement from most role players comes through the formation and development of their character

⁵ TURKLE, Sherry, "The Second Self: Computers and the Human Spirit", The MIT Press, London, 2005, page 161.

as a [real] person."⁶ On this level, we can estimate that sometimes, a digital representation with a rich history in a particular virtual community could become an entity in itself. As a player stated towards her avatar: "Her character is, she says, [a very beautiful creature and (I) would not want to shame her character since she has been in the company of my imagination for years.]"⁷ We could add to this that, in this case, it is the materialization of the player's imagination: it is indeed *the image* that is playing an important role. It clearly shows the case of an avatar functioning as a real extension of the self and that is why it has the potential to produce this kind of attachment.

A user or player will always have at least a minimal impression of being represented by his or her avatar, and it is expected because this is its purpose: to represent an entity, a character. We can also suggest that an avatar will probably leave traces that can tell us who his creator is. However, could we leave clues to our avatar? Could we benefit from these clues? Could an avatar expand our social and cultural background at any time and without a constant control from the user? These are the questions that we are eager to answer with AsA.

What we expect from this experimentation?

"La virtualisation n'est plus une manière de préférer la représentation psychique sur la réalité.

Bien au contraire, elle est un processus qui multiplie les représentations à partir d'un stimulus unique, permet de changer d'angle d'attaque dans la résolution d'un problème, de se dégager de ses habitudes de pensée, et finalement d'innover, à condition bien entendu qu'elle soit suivie d'une actualisation

⁶ MaCCALLUM-STEWART, E. et PARSLER, J., *The difficulties of Playing a Role in World of Warcraft*, en "Digital Culture, Play and Identity", The MIT Press, 2008, page 243.

⁷ HAGSTROM, Charlotte, *Gaming and Naming in World of Warcraft*, en "Digital Culture, Play and Identity", The MIT Press, 2008, page 272.

*qui permet d'en recueillir les fruits.*⁸

It is important to highlight that we do not want to focus this research on the sentimental reactions that can be simulated by an avatar. Instead, we want to observe human reactions from the autonomous actions of an avatar.

These could lead human social practices to follow an alternative pattern, like "waiting for my avatar to make a first contact" before meeting new people in the physical dimension. AsA could also bring to light an erroneous representation made by the user. That would lead us to think about the accuracy of our own thoughts about ourselves.

This kind of experimentation could help cognitive and social developments. In addition, AsA could enhance digital communities in a way that is unprecedented: overlying the physical space in real-time will impulse this social tool towards another communicational dimension. AsA may reach a place that other social networks or digital communities have not yet achieved.

AsA's hypotheses and expected results are ambitious:

- It may be use as a first contact encounter in physical life, leaving in some cases the decision for a future event to the avatar.
- Social networks may benefit from this kind of experimentation, as it could make digital life more attached to physical spaces.
- It may enrich user's activities in the physical world depending on the virtual path taken by his avatar.
- It may establish and cultivate social interactions with friends and potential friends nearby the user's itinerary (through profiles and a system of affinity).
- Academic poles may have alternative fields for socio-cultural research.

In conclusion, AsA can be an innovative opportunity to widen our field of study in human sciences. Further progress may be made as we continue to enrich our perception of the world.

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Digital Environment to Envision and Experience the Art of Light and Space

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Abstract

Installations of Light and Space art often present no objects but offer instead a perceptual experience to the viewer. The light is directly used as material in a space to evoke a particular illusory visual perception; the work is thus difficult to present in an alternative representational media that is limited to displaying the physical reality of light and the perceptual reality of how it is perceived by the human visual system. Thus, trial and error is the primary approach to creating Light and Space art, and the art can only be experienced by visiting the actual installation site. This study proposes a computational framework that integrates physically based rendering, perceptually based tone-mapping, and stereo imaging techniques to generate a digital representation that can provide a pictorial environment to envision and experience the art of Light and Space.

Keywords

Optical Illusion, Art of Light and Space, Lighting Simulation, High Dynamic Range Imagery, Stereo Image.

1 Introduction

An optical illusion refers to an error of the visual experience that occurs systematically between the visual stimulus and perceptual judgment [6][8]. It can be generalized as the discrepancy between physical reality and the visual perception of such physical reality [3]. Optical illusions have long been known, and their various applications can be observed in art and architecture. The two-dimensional patterns of the mosaic floor from the Antioch are an early example of creating illusory three-dimensional forms on a planar surface; the spatial configuration in *Theatro Olimpico*, on the other hand, utilizes false perspective to amplify the

perceived depth for the audience. The characteristic of the “forcefulness” of an optical illusion ensures that the illusory effect from a particular arrangement can be expected for a viewer with normal vision, and thus optical illusions have been incorporated in many visual artist works [6]. The Ames Chair Demonstration is a recent example of *Trompe l’oeil* that utilizes a geometrical illusion to create a peepshow installation in which a collection of random objects can appear to be a chair from a particular viewpoint [4]. The Art of Light and Space, a major development in modern art starting in the 1960s, on the other hand, employs optical illusions that arise from more complex visual perceptions [1].

The cause-and-effect relationship of the geometrical illusion employed in the Ames Chair Demonstration has been well established, and a representation of such an illusion does not require high visual realism. Similar design works can thus be depicted in representational media to test their capacity for conveying illusions. However, the Light and Space artists utilize perceptual effects that are far more complex than the one used in the Ames Chair Demonstration, such as the retinal afterimage in *Retinal Replay Volume* by Robert Irwin and the color compensation in *Arhirit* by James Turrell [1].

These optical illusory effects are difficult to represent on planar media. As a result, an empirical method of trial and error is the primary approach to creating this type of modern art, and the art can only be experienced by visiting the actual installation site.

In this study, we examine the possibility of representing the optical illusory effect used in James Turrell’s *Afrum*, in which light forms an illusory solid form. The intention is to develop a computational framework that can generate a pictorial representation that reflects the optical

reality of visual illusions, to mediate the design process of installations of Light and Space art, and to extend its perceptual experience from the physical site to the virtual environment.

2 Methodology

The design process is often mediated on representational media where the perceptual experience can be envisioned from the conceptual configuration. Figure 1 illustrates the design process of an art installation attempting to recreate an exhibition similar to the Ames Chair Demonstration. As the geometrical relation from the conceptual views can be fairly accurately previewed in the perceptual view in simple modeling software such as Google SketchUp, such a representation provides the necessary visual realism to mediate the design process of this type of art installation. However, since Light and Space art utilizes a complex visual process, the representation offered by Google SketchUp, as illustrated in figure 2, falls short of exhibiting the intended optical effect of the artwork.

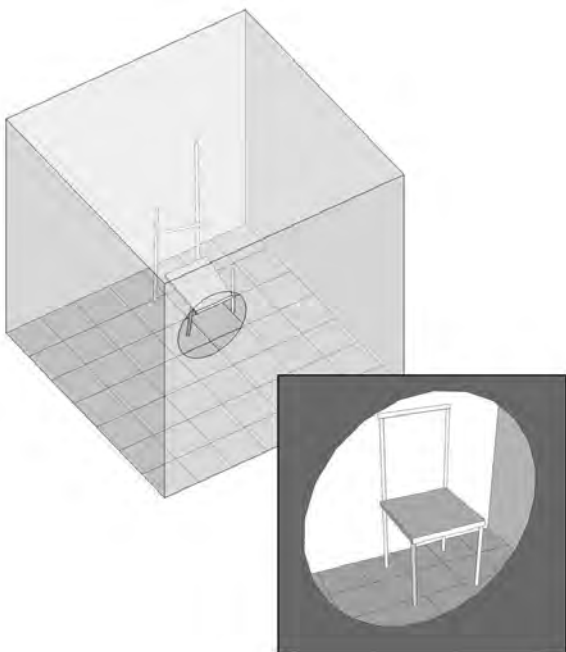


Figure 1: Conceptual configuration and perceptual experience of an art installation designed to create an exhibition similar to Adelbert Ames Jr.'s chair demonstration

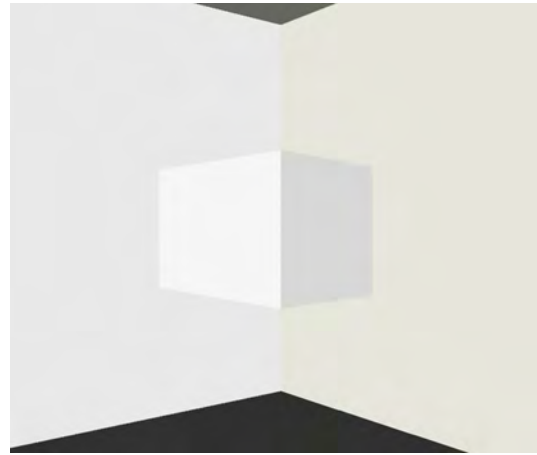


Figure 2: Google SketchUp simulation of the artwork similar to James Turrell's Afrum

As a visual illusion is based on the discrepancy between physical reality and its perception, to faithfully represent a visual illusion, it is essential that the representation encompasses the physical reality of the represented scene and be capable of stimulating the perceptual response just as the real scene does. Physically based rendering has been developed to allow the pixels of the image to store the actual lighting data of the scene [9] [13]. Several rendering software such as RADIANCE, LuxRender, and Maxwell Render, to name a few, are physically based simulation and visualization software that aim to simulate the complex lighting interaction of the real world in the virtual environment. Among them, RADIANCE has been validated by scientific investigation [7][11] and is thus chosen in this study to generate the scene to visualize the optical effects. RADIANCE outputs its final rendering in HDR file format, which can contain a luminance range that covers the complete range that humans can perceive, from 10^{-6} to 10^8 cd/m^2 . However, the HDR image cannot be displayed on a conventional display device, which is limited to a luminance range of two to three orders of magnitude. Tone-mapping is a computational method developed to compress the dynamic range of HDR images to a low-dynamic-range image [12]. Many tone-mapping operators (TMO) were developed, and the photographic TMO [10] is chosen as it has consistently provided good results in various perceptual studies [2][5][15].

In general, computer rendering is generated from a single-camera viewpoint, which fails to address the retinal disparity of our visual system. Stereopsis resulting from retinal disparity is a major factor that contributes to the geometrical illusion of three-dimensional form. Several computational techniques have been developed to create stereo images on digital displays. The common strategy is to create slightly different images for the left eye and the right eye, and to present the images to the corresponding eyes simultaneously to create stereo visual perception. Anaglyph technology was used in this study based on its affordability and the simplicity of the imaging process. The red and cyan color channels in the image can be eliminated accordingly for the images for the left and right eyes using an image editing program, and the modified images can be presented to the viewer's left and right eyes, which are filtered by anaglyph glasses (which apply a red filter to the left eye and a cyan filter to the right eye). As a result, a pair of physically accurate HDR scenes can be tone-mapped to displayable low-dynamic-range images and presented to the viewer stereoscopically on a common display device.

3 Simulations

Figure 3 illustrates the configuration of an art installation design that resembles James Turrell's Afrum. A $360 \times 360 \times 240$ cm room is enclosed from all sides except for an irregularly shaped opening located at a height of 55 cm at the intersection of the two walls at the north end. Double walls were configured for the pair of walls that intersect at the opening. The double walls are spaced 60 cm apart, forming a chamber that admits daylight from two open ends, allowing the reflected natural light to come through the opening at the intersection and into the interior space. The wall thicknesses are 15 cm for the exterior wall and 30 cm for the interior wall. The shape of the void opening is based on how it would appear from the perspective of the pre-determined viewpoint at normal eye level when sitting on the chair shown in the figure. The viewpoint is set at a height of 110 cm and a distance of 300 cm from the opening, with the viewer looking at the center of the opening. To capture the stereo image, two cameras were spaced 6.5 cm apart,

offset evenly from the viewpoint location, pointing toward the same focal point as in the single-camera setting.

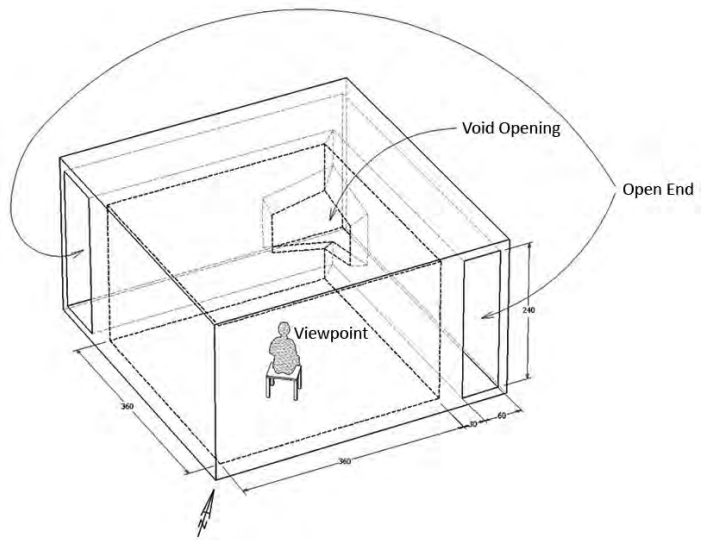


Figure 3: Configuration of the installation

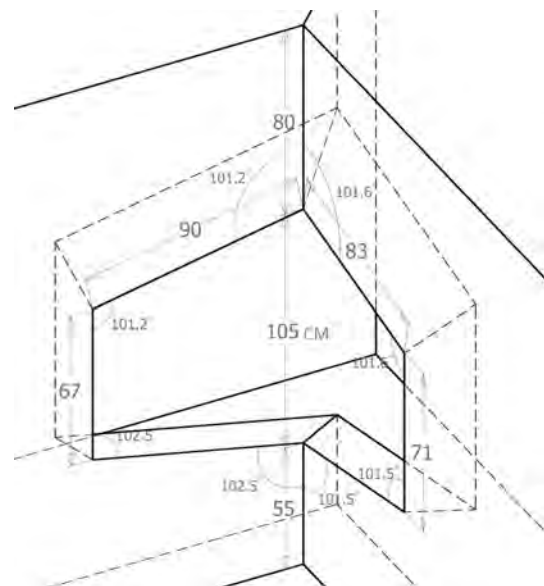


Figure 4: Detailed configuration of the void opening

Figures 5 and 6 illustrate the final renderings of both the single- and the two-camera settings for monocular and binocular vision, respectively. The scenes were rendered by RADIANCE and tone-mapped by the photographic tone-mapping operator. Figure 5 shows the image generated by the single-camera viewpoint; figure 6 shows the stereo image assembled from the two images generated by the two-camera setting.



Figure 5: Rendering from a single-camera setting

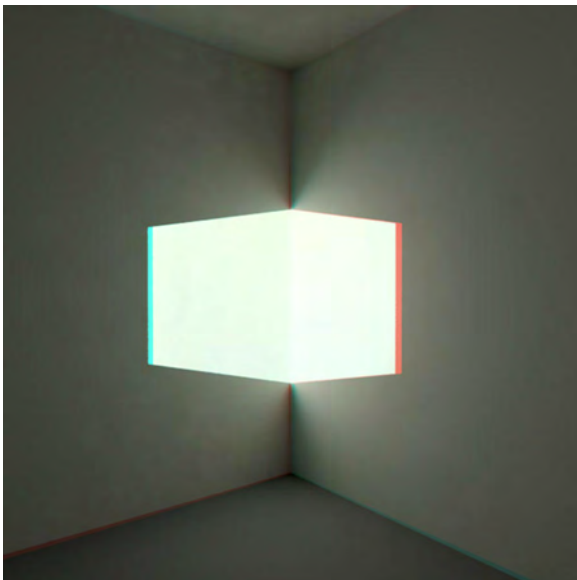


Figure 6: Rendering assembled from images generated by the two-camera setting

4 Discussion

Figure 7 shows comparisons of the perceptual experience of the art installation from the expected viewpoint generated by different computer simulation tools. Figures 7a and 7b illustrate the monocular and binocular views respectively generated by Google SketchUp, while 7c and 7d illustrate the same set of views simulated by the computational framework that integrates the RADIANCE and photographic tone-mapping process.

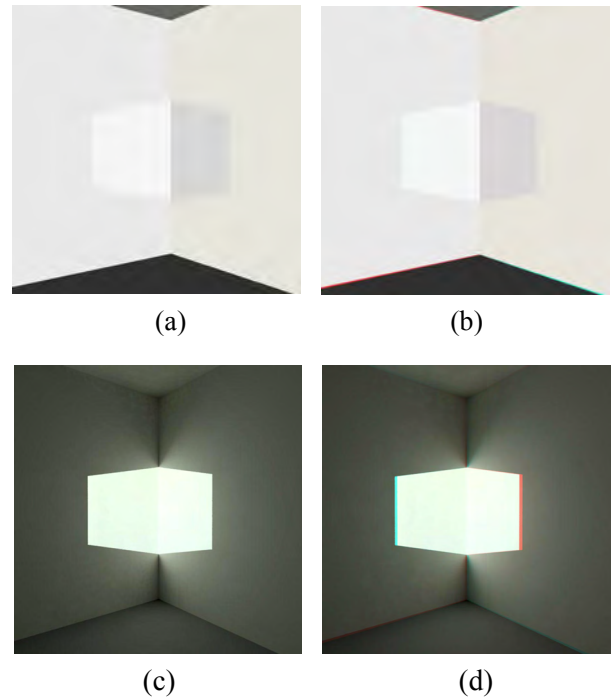


Figure 7: a) Monocular view generated by Google SketchUp. b) Binocular view generated by Google SketchUp. c) Monocular view generated by the tone-mapped image rendered by RADIANCE. d) Binocular view assembled by tone-mapped images rendered by RADIANCE

Google SketchUp offers a realistic visual representation of the geometrical relations, presenting fairly accurate lines and edges of the formal configuration, but it reveals no visual information about the lighting distribution. Neither the monocular nor the binocular representation can demonstrate the optical effect of the art installation. On the other hand, the image set generated by the physically based rendering and perceptually based tone-mapping illustrates the optical effect, with the monocular view suggesting the illusory three-dimensional form; the effect was more convincing when the binocular rendering was viewed with the anaglyph glasses. It is thus concluded that the computational framework that integrates physically based rendering, perceptually based tone-mapping, and stereo imaging techniques provides a promising approach for generating a digital environment that can mediate the design process of an art installation of Light and Space.

The Afrum by James Turrell uses a stable electric light source to sculpt out the three-dimensional illusory form. With the availability

of the digital environment to preview the conceptual configuration and the resulting perceptual experience, more complex interaction can be incorporated into the design considerations. The art installation presented in this paper attempts to utilize the ever-changing daylighting as the light source to create a more dynamic artistic experience. Figure 8 illustrates the sequential renderings of a modified design, with the two void open ends covered by additional green and purple glass, rendered under the same CIE sky condition at different times (8:00 a.m., 10:00 a.m., 12:00 p.m., 2:00 p.m., 4:00 p.m., and 6:00 p.m.) to simulate how the art installation interacts with the daylight over time. As shown in figure 8, the simulations demonstrate that the illusory solid form changes color throughout the day, suggesting that the art installation can be presented at the same location in different ways depending on the daylighting.

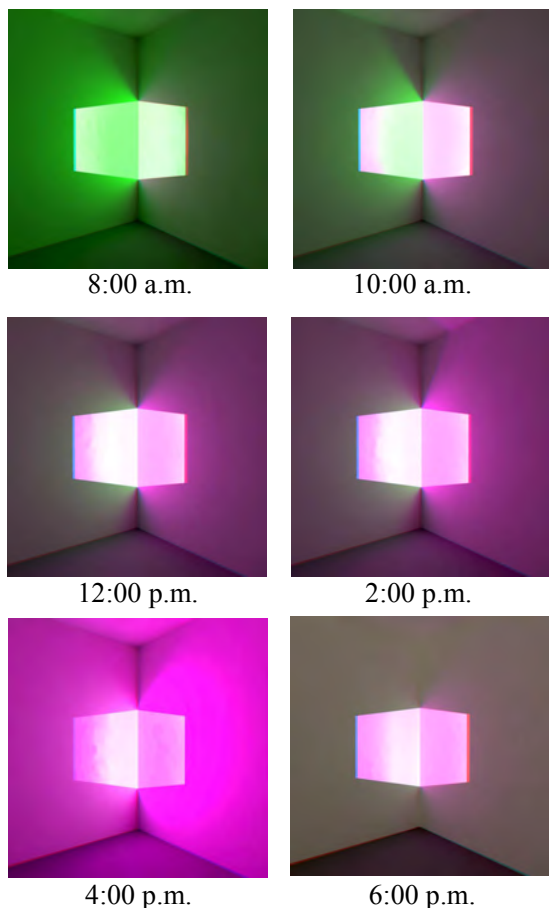


Figure 8: Art installation interacting with daylight throughout a single day

5 Conclusion

Every representational system is developed to offer different interactions and visual realism for a particular function [14]. In this study, we have explored a computational framework that can generate a pictorial environment to help visualize and experience the design process and result of an installation of the art of Light and Space. The art installations of Light and Space often present no objects but instead offer a perceptual experience to the visitor. The light is directly used as the material in a space to evoke a particular illusory visual perception. In this study, we propose a computational framework that integrates physically based rendering, perceptually based tone-mapping, and stereo imaging techniques to generate a digital environment in which both the physical and perceptual reality of how light is distributed in a space and how it is perceived by the human visual system can be simulated. It is important to note that we value the experimental method of creating the art of Light and Space, and this work is by no means seeking an alternative approach to replace the existing one. The work presented here is a beginning to explore the possibility of how the art of Light and Space can be advanced in the Post-Digital Art era.

The immediate future work is to refine the computational framework for simulating the art of Light and Space by validating the simulation with an actual physical installation. This work has demonstrated the possibility that the proper computational capabilities can facilitate a certain amount of trial and error in the design process, and allow more complex lighting interaction to be incorporated into the design considerations of the art of Light and Space. Also, the same environment can more realistically depict the visual aspects of the resulting work, extending the viewing experience from the actual physical site to the virtual world.

Figure 9 illustrates a possible application to sculpting illusory spatial geometries, formed by light and reflected light and utilizing the optical reflection from a physical mirror installation. With the availability of a digital environment that can reflect the visual realism of the perception of light and its visual illusions, the conceptual design can be first experimented with and refined in the digital environment, and

the final work can be also presented in the very same virtual realm in addition to the real site exhibition.

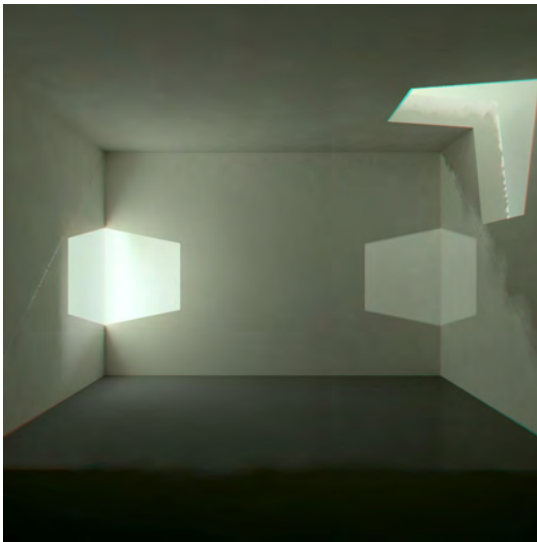
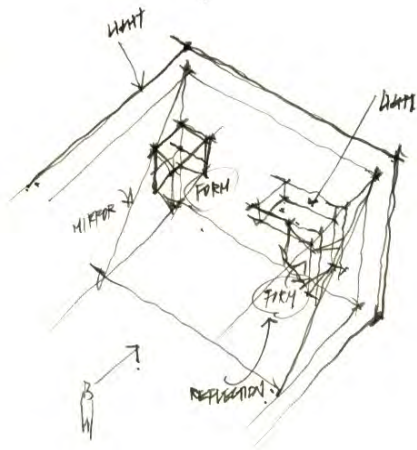


Figure 9: Design sketch and simulation of an art installation interacting with light and the reflected light

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Art images classification using Bag-of-Visualterms representation

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Abstract

We explore the problem of classifying scene categories that are the basis of the ideation and designing the sculptural production of an artist. The main goal is evaluate the performance of SIFT descriptors, the Bag-of-visualterms representation and the spatial pyramid matching when these computer vision methodologies are faced with this type of images. Results are promising, on average the performance score is about 70% and its standard deviation is about 5%.

Keywords

Bag-of-visterms, SIFT descriptors, pyramid match kernel.

1 Introduction

Image representation is a very important element for image classification, annotation, segmentation or retrieval. Nearly all the methods in computer vision which deal with image content representation resort to features capable of representing image content in a compact way. Local features based representation can produce a versatile and robust image representation capable of representing global and local content at the same time. Describing an object or scene using local features computed at interest locations makes the description robust to partial occlusion and image transformation. This results from the local character of the features and their invariance to image transformations.

The bag-of-visterms (BOV) is an image representation built from automatically extracted and quantized local descriptors refereed to as visterms in the remainder of this paper. The BOV representation, which is derived from these local features, has been shown to be one of the best image representations in several tasks.

The main objective of this study is assessing the performance of SIFT descriptors, Bag-of-visualterms representation and spatial pyramid matching for automatic analysis of images that are the basis of the ideation and designing of art

work. Additionally, we explore the capability of this kind of modelization to become useful for the production of software art.

2 Image Representation and Matching

The BOV representation was first used [Willamowski, J; Arregui, D; Csurka, G; Dance, C and Fan, L., 2004] as an image representation for an object recognition system. In the BOV representation, local descriptors f_j are quantized into their respective visterms $v_i = Q(f_j)$ and used to represent the images from which they were extracted. The quantization process groups similar descriptors together, with the aim that the descriptors in each resulting group arise from local patterns with similar visual appearance. The number of occurrences of each group/visterm in a given image is the elementary feature of the BOV representation. More precisely, the BOV representation is the histogram of the various visterms' occurrences.

To construct the BOV feature vector h from an image I four steps are required. In brief, local interest points are automatically detected in the image, then local descriptors are computed over the regions defined around those local interest points (occasionally local descriptors may be computed on a dense grid over the image instead over local interest points). After this extraction step, the descriptors are quantized into visterms, and all occurrences of each visterm of the vocabulary are counted to build the BOV representation of the image.

2.1 Feature extraction

The BOV construction requires two main design decisions: the choice of local descriptors that we apply on our images to extract local features, and the choice of which method we use to obtain the visterms' vocabulary. Both these choices can influence the resulting system's performance. Nevertheless BOV is a robust image

representation, which retains its good performance over a large range of parameter choices.

For better discriminative power, we utilize higher dimensional features which are SIFT (Scale Invariant Feature Transform) descriptors introduced by [Lowe, 2004]. The SIFT descriptor is a histogram based representation of the gradient orientations of the gray-scale image patch. Then, our features are SIFT descriptors of 16×16 pixel patches computed over a regular grid with spacing of 8 pixels.

Our decision to use a dense regular grid instead of interest points was based on the comparative evaluation of [Fei-Fei, L, Perona, P, 2005], who have shown that dense features work better for scene classification. Intuitively, a dense image description is necessary to capture uniform regions such as sky, calm water, or road surface. SIFT was also found to work best for the task of object classification [Sivic, J., Russell, B. C., Efros, A. A., Zisserman, A., and Freeman, W. T, 2005] and [Quelhas, P., Monay, F., Odobez, J.-M., Gatica-Perez, D., Tuytelaars, T., and Gool, L. V., 2005].

2.2 Visual Vocabulary

In order to obtain a text-like representation, we quantize each local descriptor s into one of a discrete set \mathcal{V} of visterms v according to a nearest neighbor rule:

$$s \mapsto Q(s) = v_i \leftrightarrow \text{dist}(s, v_i) \leq \text{dist}(s, v_j),$$

for all $j = 1, \dots, N_{\mathcal{V}}$, where $N_{\mathcal{V}}$ denotes the size of the visterm set.

We will call vocabulary the set \mathcal{V} of all the visterms. The vocabulary construction is performed through clustering. More specifically, we apply the k-means algorithm to a set of local descriptors extracted from training images, and keep the means as visterms. We used the Euclidean distance in the clustering and quantization processes, and choose the number of clusters depending on the desired vocabulary size.

Finally, the bag-of-visterms (BOV) representation is constructed from local descriptors according to:

$$h(d) = (n(d, v_1), n(d, v_2), \dots, n(d, v_{N_{\mathcal{V}}}))$$

with $n(d, v_i)$, $i = 1, \dots, N_{\mathcal{V}}$, denotes the number of occurrences of visterm v_i in image d . To classify an input image d represented either by the bag-of-visterms vector $h(d)$ we employed Support Vector Machines (SVMs).

This vector-space representation of an image contains no information about spatial relationships between visterms, in the same way the standard bag-of-words text representation removes the word ordering information.

For such whole-image categorization tasks, bag-of-features methods, which represent an image as an orderless collection of local features, have recently demonstrated impressive levels of performance. However, because these methods disregard all information about the spatial layout of the features, they have severely limited descriptive ability. In particular, they are incapable of capturing shape or of segmenting an object from its background.

2.3 Spatial matching scheme

To overcome the limitations of the bag-of-visterms approach we have implemented the pyramid histogram of visual words (PHOW) descriptor introduced in [Bosch, A., Zisserman, A., Munoz, X., 2007], which is based on spatial pyramid matching [Lazebnik, S., Schmid, C., and Ponce, J, 2006] and [Grauman and Darrel, 2005]. Informally, pyramid matching works by placing a sequence of increasingly coarser grids over the feature space and taking a weighted sum of the number of matches that occur at each level of resolution. At any fixed resolution, two points are said to match if they fall into the same cell of the grid; matches found at finer resolutions are weighted more highly than matches found at coarser resolutions.

The similarity between a pair of images I and J is computed using a kernel function between their PHOW histogram descriptors D_I and D_J , with appropriate weightings for each level of the pyramid:

$$K(D_I, D_J) = \exp \left\{ \frac{1}{\beta} \sum_{l \in L} \alpha_l d_l(D_I, D_J) \right\}$$

where β is the average of $\sum_{l \in L} \alpha_l d_l(D_I, D_J)$ over the training data, α_l is the weight at level l and d_l is the χ^2 distance [Zhang, J., Marszaek, M., Lazebnik, C., and Schmid, S, 2007] between D_I and D_J at pyramid level l computed using the normalized histograms at that level.

The spatial histograms could be used as image descriptors and fed to a linear SVM classifier. Linear SVMs are very fast to train, but also limited to use an inner product to compare descriptors. Much better results can be obtained by computing an explicit feature map

that "emulates" a non linear χ^2 -kernel as a linear one [Vedaldi, A., and Zisserman, A., 2010].

3 Results

In this paper we propose to automatically analyze images from a database of photographs by Dr. M.A. Planas Rossell (Professor of sculpture, University of Barcelona). The database consist of 150 images previously classified in 5 categories: Central architecture (CA), Geometric stone (GS), Irregular stone (IS), Textured stone (TS) and Silhouettes (SI). These categories correspond to 5 different typologies identified in the photographic images from the database. Images are the basis of the ideation and designing the sculptural work of the artist. Figure 1 shows a sample of the database in our experiment. We have analyzed a training dataset of 75 images, 15 images from each category. From this dataset we have build a vocabulary of 300 visterms. Then we have computed the PHOW descriptors of each image. Finally, we compute the feature map associated with the χ^2 -kernel and estimate the multiclass SVM classifier. Efficient code to compute our feature maps is available as part of the open source VLFeat library [Vedaldi, A., and Fulker-son, B., 2008].

We classify a set of test images (75 images; 15 images from each category). The classification process is repeated 10 times (changing the training and test sets), and the average performance score and its standard deviation are 70.67% and 5.03%. Table 1 shows a sample of the misclassification rates obtained in the analysis of the 10 test datasets.

	CA	GS	IS	SI	TS
CA	12	0	1	2	0
GS	1	7	5	1	1
IS	0	4	9	0	2
SI	2	0	0	13	0
TS	0	0	6	0	9

Table 1: True category in rows and Predicted category in columns.

4 Conclusions

The problem of classifying images by the object categories they contain constitutes an area of great activity in computer vision research. The result of this research is that currently available a set of methodologies that address the problem

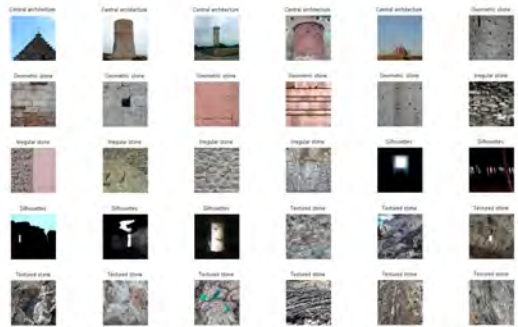


Figure 1: A sample from the dataset of images.

of classifying images into categories very efficiently. In this work we have explored the behavior of some of these techniques when faced with a database of images whose category are not determined by the objects they contain but rather respond to conceptual categories in the ideation process of the work of an artist. We conclude that although the database analyzed in our study is quite specific, results in the classification are very promising and comparable to the results of other studies reported in the literature dealing with database of images with object categories.

5 Acknowledgements

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Post Anxiety Art: Economies and cultures of digital painting

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Abstract

Digital technologies such as the iPad, apps and content sharing websites present novel ways of producing and disseminating art. Searches for iPad art on Flickr revealed a vast archive with one "Brushes" app group producing more than 41,000 images. Content analysis suggests that the work conformed for the most part to standard art taxonomies: portraits, figurative, flower, etc. This paper explores questions of the economic value and cultural anxiety around new and emerging practices.

Keywords

Digital painting, iPad, social media, identity, digital economy.

Introduction

Apple released the first iPad in April 2010, selling three hundred thousand units on day one and three million in eighty days (Wikipedia *iPad*). When installed with one of the many available painting apps, such as Procreate or Brushes, the device offers the aspiring or established artist a combined tool and medium through which to conveniently generate art. The British artist David Hockney has received much attention for his iPad and iPhone drawings and paintings, not least because they present a challenge to traditional notions of what an original work, or limited edition print is. Recent journalism captures this anxiety:

A friend of mine, the historian Michael Burleigh, boasted that he had acquired a collection of 65 Hockneys — iPad drawings can easily be emailed, and Hockney had taken to sending them out to his friends [...] I have a collection of 20. I can [...] send them to my friends. The country is now littered with original Hockneys. This raises an awkward question. "I don't know how we're going to make any money out of this", he [Hockney] mutters, the Yorkshire intonation flattening even further. (Appleyard 2011)

Appleyard claims that "in fact, he does", because the emailed files are very low resolution, though

Hockney's team use very large files to create prints for exhibition and the market (ibid).

However, control of digital files is problematic, as the ongoing crisis in the music industry demonstrates. There are then economic questions for artists using digital media, but there are also questions of cultural legitimacy.

As part of an ongoing project investigating the notion of a digital original (*Digital Originals* website) a workshop was held where seven artists sketched from a still life using iPads. One of the artists, Hilary, reacted with a strong exclamation of frustration. The device was "*a way to make... diarrhoea*" she cried, with apps determining that everyone's art has "*the same marks, same look*". Hilary wanted something novel, perhaps something more authentic: "*I want to see some-thing come out of this machine that I've never seen before.*" Hilary utilises a range of materials in her urban shared studio space and admits that she has yet to fully engage with digital tools. She was quick to disassociate herself from what she perceived to be "low-brow" cultural phenomenon, in the process seemingly revealing resolutely "highbrow" tastes (Bourdieu 1984, 1990).

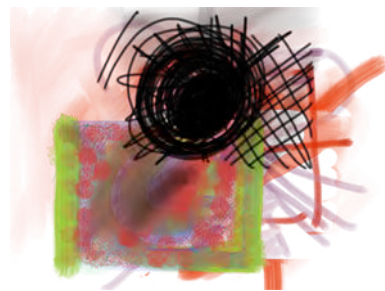


Figure 1. Hilary's first iPad painting

This paper explores the questions of both cultural and economic value by considering established, emerging and aspiring artists' uses of the device and the new venues that have emerged for displaying and archiving digital paintings. The paper presents a content analysis of work produced on the iPad and shared on the image sharing site Flickr, beginning with a small sample of returns on a search for the term "iPad art". This reveals a wide range of content which is further explored in more

focused searches within a Brushes app users' group on Flickr. These returns are further categorised and explored in depth, with examination of a sub-set of self-portraiture informed by cultural and social theory.

Finger painting

Apps such as Procreate and Brushes are programmed to simulate painted and drawn marks made with the finger or a stylus on the touch sensitive screen. Marks made mimic some of the physical properties of material paint such as fluidity. The palette is only limited by the significant display affordances of the iPad screen, enabling the digital painter to access a spectrum of pigments unlimited by expense or conservational instability. These paintings are never sullied by undisciplined use of an artists' mixing palette and colours remain vibrant however many layers are added.

Autodidact digital artists

Educationalist David Buckingham has noted that software interface design typically facilitates creative production whereby the "process of constructing meaning (is) clearly visual" (2007: 167) and the activity of selecting, editing and manipulating images is one of "visual thinking" (ibid 168). Production is intuitive, iterative and provisional (most apps have a multiple "undo" function) and this has contributed to a collapse of the traditional production cycle. The creative producer can "get stuck in" and begin generating artifacts with little preliminary planning — or training — pushing most of the activity along the production cycle towards postproduction design (see Burn and Parker 2003; Kress and van Leeuwen 2001). However, Software tools' particular effects filters etc., especially if left at "default" setting, may dominate inexperienced producers' artifacts (Briggs 2010: 91–92).

Research in the field of Human Computer Interaction (Bardzell 2007) suggests that digital software tools have inherent "enabling factors" (ibid 13) leading them to be enthusiastically taken up by amateur producers. In turn, amateurs' use has facilitated 'tremendous artistic innovation' (ibid) such as machinima where video game environments are used as stages for cinematic productions. Bardzell says that amateurs' multimedia artifacts must display aesthetic "elaboration" to be judged as being of "quality" (ibid 28). This suggests that work must have more than aesthetic merit *per se* and

demonstrate interesting configurations and uses of exploited tools.

However, increasingly software tools and generative devices are "locked down" facilitating use by a novice but perhaps obstructing access to fine technical and aesthetic control.

Established artists

The iPad and Brushes app have generated artifacts that have received critical acclaim. Hockney's practice now incorporates what he calls iPad drawings that are exhibited internationally (*Royal Academy* and *Guggenheim Bilbao* websites). YouTube reveals that another early adopter of the Brushes app to capitalise is animator Shawn Harris. He combined hundreds of individual iPad paintings in the production of a music video animation for British girl group, Blush (*Blush* on Youtube). The video generated a level of positive mainstream media coverage not usually associated with urban black music (e.g. Madison 2011).

Otherwise, YouTube is awash with what might be called didactic time-lapse videos of iPad painting and drawing techniques. These utilise a function within some apps that captures durational image making, mark by mark. Occasionally, the URL of an e-commerce site is shown, advertising for sale printed copies of the final painting. Preliminary web searches suggested that while the time-lapse painting videos are posted to YouTube, a digital file of the finished still images is posted to sites such as Flickr, and this became the focus of the enquiry.

Content analysis of the top 100 returns within Flickr for "iPad art"

At the time of writing the search "iPad Art" returned more than eleven and a half thousand results. These were sorted by the "most interesting" Flickr filter and the first one hundred were sampled on 25th May 2012. Although this is a very small sample scanning the subsequent pages indicated that the first hundred interesting returns were not entirely atypical. Figure 2 shows a page of results selected later in the data set.

A Qualitative Content analysis (Mayring 2004) was performed. This method is frequently used in studies of mass media such as newspapers and advertisements (ibid). Items are coded and counted to indicate patterns and trends in data sets (e.g. sexist imagery in advertising). In this analysis each image was categorised by artist, subject matter and technique. "Most interesting" pictures within Flickr

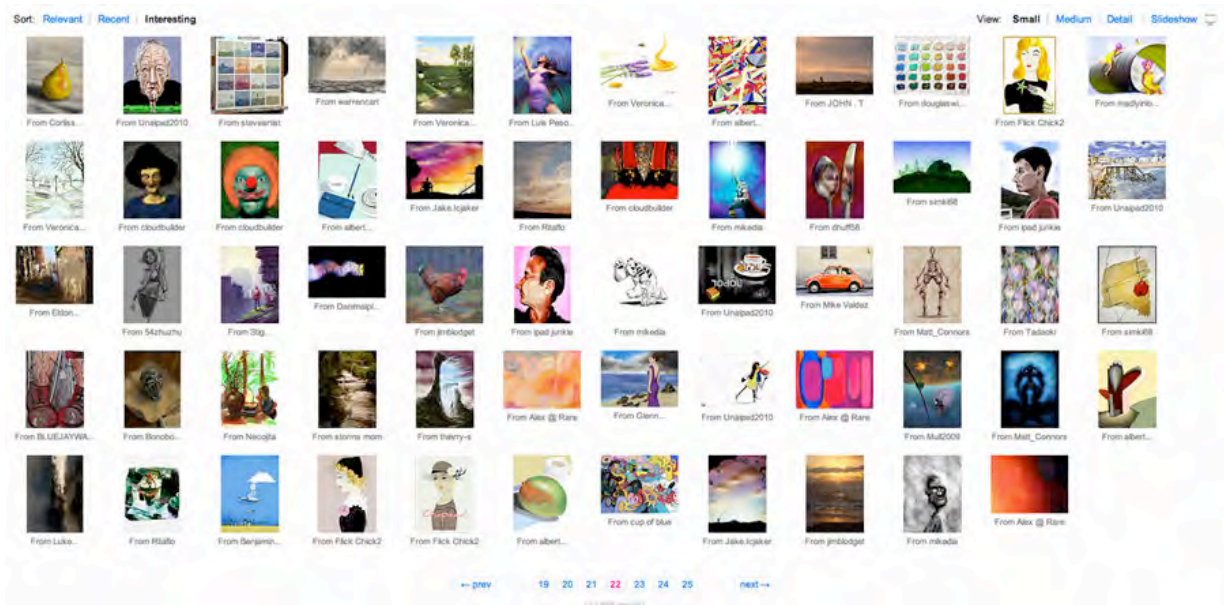


Figure 2. Screen shot of page 22 of results from Flickr search “iPad art”

are determined by an undisclosed algorithm that is said to take into account: the number of views (internal/ external), the number of comments posted and status of commenter, the number of times the image is tagged as someone's favourite (a form of intra-site bookmarking), the number of discussion groups a particular image is tagged to belong to (with more selective group association being favoured) and issues of "time varying behaviour" of these factors (see Wesley Hein blog).

(Self) portraiture

It is striking and unsurprising that portraiture, including self-portraits (25 percent) and figurative work (representing some of the human body but not a specific subject, 16 percent) constitute together 41 percent of the "most interesting" images returned. The next largest categories were: flower (9 percent); animal (8 percent); landscape (8 percent). The other categories at 5 percent or less were: word as image, abstract, still life, vehicle, caricature / cartoon, fantasy, figures in landscape and montage.

Artists have traditionally pictured themselves in their work, partly due to convenience of being their own subject/object (Doy 2005: 46). Another readily available visual source evident in the images returned is "celebrity" media culture. A small subsection of six portraits featured celebrities including Grace Kelly, Audrey Hepburn, Beyonce, Humphrey Bogart, Marilyn Monroe and Sharbat Gula, a young Afghan subject of a National Geographic cover.

It's also worth noting that one of David Hockney's favourite iPad painting themes is self-portraiture, with his two other dominant subjects being still

lives and landscapes (Appleyard 2011). The art critic Martin Gayford (2007) sees in Hockney's iPhone drawings views on the self expanded by the ready availability and portability of the iPhone:

What other painter has had occasion to record, as Hockney has, his naked foot beside a slipper when he got out of bed? Or his Bathroom taps with the window behind, a morning bather's of the world, or the washing-up in the sink of the Bridlington kitchen, a glass ashtray full of cigarette butts? (p195).

The iPhone is, in some respects, more “ready to hand” even than a notebook and paper. It is kept on bedside tables and Hockney uses it to record sunrises in light conditions that would be too dark for traditional media. The foot by the slipper and the view through darkened curtains of the dawn's first glimmering light suggest new kinds of subject.

However, the returns in this Flickr search are for the most part traditional head and shoulder compositions with a significant number functionally captured, as though for an online profile image or passport photograph. A majority of the self-portrait paintings are reproduced from photographs. Of 376 images in the Brushes gallery, tracing evidently generated 230. Typically, the photo-derived portraits seem to have been captured by their maker working alone in a domestic setting. Some subjects exhibit a seemingly distracted "YouTube gaze" (Adami 2008) — apparently watching their image as it is recorded, possibly by a capture device (e.g. webcam) positioned askew from the screen. Other artists use an iPhone or iPad

close to the body or at extended arms length. Some images reveal how the device helps generate ideas, for example appearing as a prop. One sketch shows the shape of the fingers holding a mobile phone (Figure 3).

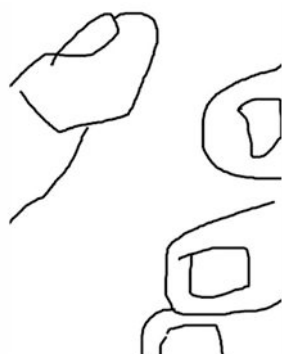


Figure 3 shows an image by Julia Kay

The Brushes App and Flickr Brushes Gallery

The initial search on iPad art indicated that there was a wide variety of work archived on the site and suggested more focused searches around existing Flickr groups and communities. The same search for iPad art revealed the existence of 1,954 discussion/ community groups. The largest focusing on art production is the Brushes Gallery – iPhone/iPad Art group, or Brushes Gallery, with 3,918 members and 41,070 images. As well as being the largest group, the specific focus on the Brushes app suggested this group's relevance for enquiry into digital painting as opposed to more general iPad art practice. Brushes is a painting app designed specifically for the Apple devices (iPhone, iPod touch and iPad). Functions include: "Advanced color picker, several realistic brushes, multiple layers, extreme zooming, and a simple yet deep interface" (*Brushes* website). The app also records all actions during the creative production process and stores these in a .brushes data file. This can be posted elsewhere in video format representing the durational unfolding of the digital painting (ibid). The rules of the Flickr Brushes Gallery membership are explicit. Posted artifacts must be created using the Brushes app in combination with one of the Apple devices. Other apps utilised must be clearly indicated, as should images generated from photographs, though this rule is not always adhered to.

Analysis of the Brushes Gallery

Flickr offers limited meta-tagging functionality determining that contributors must classify each artifact, rather than selecting from pre-existing

categories (for example, relating to medium, genre, subject matter, app used etc.). Sixty-eight focused searches were made on the 1st June 2012 to try to ascertain particular areas of interest among the Brushes Gallery group, as evidenced by the tags used in describing work. The top ten identified classifications are presented in Table 1.

art	8583
drawing	4419
me	4385
digital	4137
illustration	3330
photo	2498
portrait	2292
abstract	1633
artist	1311
landscape	1051

Table 1: Returns within the Brushes community for genre classification

For comparison, relevant search results relating to art "movements", mediums and painting genre are given below in Table 2.

Modernism	126	ink	182
Pop	62	oils	169
Impressionism	45	montage	42
figurative	20	self portrait	376
watercolour	233	still life	164

Table 2: Returns within the Brushes community for art history terms

Descriptors selected by members are general or popular rather than appropriated from conventional art history and practice discourse. Informed by the earlier emergence of portraiture as a dominant theme, the sample of 376 "self portraits" was selected for further analysis. Images were sorted according to artist, subject matter and artistic style. These were examined, with particular focus on the most prolific self-portraitists.

Brushes' most prolific self-portraitists

This small cohort of Brushes Gallery artists has each developed sequences of self-portraits, some extending back to September 2008. A representative image for the nine most prolific artists is shown in Figure 4, alongside Flickr user name and number of self-portrait images produced in brackets.



Figure 4, Self portraitists on Brushes (no. images) from left Julia L. Kay (109), patricio villarroel (22), MiaBia_DC (18), frnjpn (13), ipad junkie (9), Tabogallery (9), bavaroland (8), hgberk (6), BLUEJAYWAY2011 (6).

Amelia Jones in her 2006 book "Self/Image: Technology, representation, and the contemporary subject" describes how a "confluence of beliefs and discursive articulations" during the Renaissance, led to the increased prominence of self-portraiture (ibid 5). She goes on to outline how industrialisation and the development of imaging technologies (including photography) provided the means to reproduce art (ibid). This was important as it placed a "premium" not only on art but on the "source of creative genius", that is, individual artists (ibid). Similarly, Richard Howells notes how modernism led to an understanding that all art might be considered as a form of self-portraiture, as the artifact reveals as much about its maker as the subject he/she chooses to represent (2003: 49). During this period, art became a vehicle for communicating "deep emotions" to its publics, fostering a "special tie" back to the artist (ibid).

Gen Doy, asserts that the physical act of painting helps construct and reaffirm ones' artist identity (ibid 59). She discusses how self-portraiture is utilised by artists, sometimes over prolonged periods, as a platform for self-interrogation (ibid 46). Jones takes this further stating that it is artists who push the "boundaries of subjectivity" (2006: xvii). All motivations are further complicated in an online exhibition context. Jenny Sundén says that to exist online, we must continually "write ourselves into being" (in Boyd 2006). Online painters are repeatedly creating and posting new work, in the process reinforcing their artistic and wider identities.

The Brushes Gallery constitutes a shared display space for encouraging and displaying what are generally mutually supportive comments. As the most prolific self-portraitist, Julia L. Kay's portfolio (109 images, almost a third of the total sample) reveals an uneven spread of diverse stylistic treatments and artistic influences. Her output is represented in the images above by her copy of one of Matisse's self-portraits. "Julia K's portrait party" is a group whereby weekly study of a historical or contemporary artist (e.g. Matisse, Rego, Giacometti) generates new work by members. This in effect is an "affinity space",

whereby learning and sharing take place amongst groups formed online (see Gee 2004). Members post comments about each other's work in a process of exchange and mutual influence forming a shared collective identity.

Sharing and Commenting

The following section briefly considers the artist statements and comments posted on the Brushes Gallery around the images in Figure 5. The self portraits typically garner between ten and twenty comments which include dialogue with the artist himself. The first image (14) in Figure 5 featuring the artist in a Batman Cowl is called "I Dream of Being Super". BLUEJAYWAY2011 tags the image with an informal statement which includes reflective self criticism:

I have just realised that it's my version of an Alex Ross Batman cover. Alex Ross is the guy who does those huge superheroes — Superman on steroids! Hey with post modernism everything is ok! I'm still not entirely happy with my colours, and Sue is right they worked well, with extreme highlights etc. it's all part of the journey.

Although there are elements of self criticism here the work is also situated in art history, it is post modern so "everything is ok". This is clearly ironic but it nevertheless makes a case for the legitimacy of derivative work within post modern traditions of quotation and inter-textuality. The first two responses reassure the artist that the colours are fine. One explicitly references the reflexivity of the comments: "*The vibrating blue here speaks volumes. And another thing, I like the way you so candidly speak of your process, very enlightening, helps in our own introspection. ^Up^*" (SUZ54241). A discussion follows with the artist who thanks them for "*lovely feedback*". Later in the thread Julia L. Kay adds a comment comparing BLUEJAYWAY2011's work to her own previous work and reflection on celebrity representations of the self. Here then is a community of practice where artists comment reflexively on their own and each other's work both in terms of technique (e.g. colour) and theme (superhero selves).



Figure 5: BLUEJAYWAY2011 Self Portraits

Discussion

Gunther Kress and Theo van Leeuwen (Kress and van Leeuwen 2001; Kress, 2008) have discussed an ideological shift away from economic "consumption" and associated values towards human needs. This is evidenced in a move away from the dominance of commodities and capitalism towards design (of products, and also identities). A myriad of digital and networked resources have been created through open-source and commercial activities for autodidacts to generate and display artifacts and identities. iPad art practices are enabling a diverse range of individuals — not just the "cultivated" or educated — to explore aesthetic interests (see Bourdieu 1990, on photography), and marginalised artists to develop a practice (see Doy, also on photography, 2005).

While it's recognised that early rhetoric concerning the democratising properties of the internet were overstated, the convenience and accessibility of the Flickr communities might constitute a "democratic" space fostering creative production and identity exploration beyond the mainstream art world. The spatial constraints of buildings mean that any analogue art collection must be exclusive. The arbiters of taste and cultural gatekeepers such as curators and collectors have long been criticised for expressing and promoting little more than class taste (Bourdieu 1986). Online galleries and archives such as the Flickr Brushes group are unlimited by physical space. Facebook is now the largest image archive on the planet with some 100 billion photographs hosted there in mid 2011 (Pingdom 2011). The same source estimates that some 4.5 million photographs are uploaded to Flickr each day. The 40,000 iPad paintings is then a very small subset of the larger image archive but is likely to grow. The image archives are too large to navigate as a whole. They must be filtered by tags, searches or groups of interest. It is perhaps for this reason that the identity work in evidence in the comments and networks of artists is so important.

Further, groups within archives such as Flickr enable networks of users to occupy a collective curatorial role. However, Kress and van Leeuwen (2006) describe on the one hand, an inherent tension between "authoritative discourses", as expressed through rules, assumed knowledge and explicit and implicit understandings (ibid 12) and inherent social aspects of creative exchange. This determines that meanings are generated for interpretation within a particular social group (ibid 13). It may be assumed that art production and curation groups can now thrive outside the art establishment. However, content analysis of the Brushes Gallery Flickr group revealed in the main conventional and in many cases quite banal forms of art production.

Towards a conclusion

Writing on technology is very often either triumphalist or catastrophist (Haas 2012). It would be possible to make a triumphalist account for the digital painting produced on iPads and archived on Flickr. It could be argued that it democratises not only the production but the dissemination of art. Anyone can now create images which up until relatively recently would have required specialist knowledge and equipment. More than this they can share this work with other artists, find publics, even perhaps eventual buyers. Contrariwise catastrophism is equally possible: iPads cost around four hundred pounds and are then the preserve of the relatively privileged and well off. Far from offering a new forms of dissemination Web 2.0 technologies rather exploit the artists as producers of free content.

Dmytri Kleiner and Brian Wyrick recognised early on how open source principles have been subverted by corporations:

investors pocket the value produced by unpaid users, ride on the technical innovations of the free software movement and kill off the decentralising potential of peer-to-peer production (2007: 10).

The critique of Facebook is now also a slogan: if you are not paying for the service then you are the product. The Flickr service is “free” but users must sign up to Yahoo or Google and share information that will enable this company to sell ever more targeted advertising. There are options to upgrade membership and gain access to more archiving space (which, perhaps enhances an artist's "interestingness" ratings?). Members are generating vast amount of "user generated content" for Flickr, and subsequently its parent company, Yahoo. As David Buckingham (2008) has asked: do such sites promote user generated, or "loser generated" content? If there is a new economic model here it is not for artists but for Yahoo.

What now, is art?

Triumphalism and Catastrophism are also both options in response to the question of cultural value. As Hockney points out, the technology undoubtedly offers new possibilities for art. It offers infinite layers so colour never becomes muddled as it would with a watercolour. The devices are extremely portable, far more so than sets of travel paints, and so offer the potential for new subjects as well as styles. The facility to draw with photographs puts the artist again at the centre of representation. Equally, it might be claimed that the device in fact merely reproduces banality. The marks simulate oils, water colours and other older forms. Digital painting then is nothing but a Baudrillardian simulacra, an exact copy of something that never existed. The iPad is Hilary's diarrhoea machine, another symptom of the "portable confessional" that Zygmunt Bauman identifies as a means of identity disclosure in relation to self commodification (2007: 3). His dystopian analysis of identity in individualised society — a "modern liquid setting" due to the perceived weakening of human bonds (ibid 49) — necessitates that one continuously make and remake the self.

These concerns are further complicated by cultural anxiety about what art is and what it is for. "Signature art" constituting material artifacts produced by the individual artist, in the twentieth century became capital. Its job, as Robert Hughes pointed out, was to sit on the wall and become more expensive (1990). The form and content of this sort of work were largely irrelevant. As in any commodity market what mattered was what people believed it was worth, not what it was. In this sense, as EM Gombrich claimed, there is no such thing as art. Although Gombrich is quick to qualify this, noting that there are, however, artists engaged in various activities. “There is no harm in

calling all these activities art as long as we keep in mind that such a word may mean very different things in different times and places, and as long as we realise that Art with capital A has no existence” (Gombrich 1985: 4) For both Robert Hughes (1990) and John Berger (1965) the central dilemma for the art of the twentieth century was that it lost its power to shock or even to be new because it could always be reduced to a commodity. However shocking the images of Francis Bacon they could always be reduced to a status symbol on banker's wall. The new models of production and dissemination considered here mean that models of value through scarcity become impossible. But, in decoupling art from commodity production the digital may enrich visual art at the same time as it impoverishes artists.

While the Brushes group artwork may escape the trap of becoming a commodity it has not escaped the fate of being Flickr content. For Bauman Flickr becomes a platform for practices of "subjectivity fetishism" and self-idealisation (ibid.: 14–15) whereby a seemingly never ending supply of artefacts and would-be artists are encouraged to explore and display their various selves in visual form. More than twenty years ago Paul Willis (1990) pointed out that theatres, art galleries and classical music concerts were of very little interest to the vast majority of the UK population. In contrast to these publicly funded but relatively elite activities he described "common culture" around football, pop music fashion and television (ibid). He argued that such activities did not centre around passive consumption, as is often argued, but rather active participation or "grounded aesthetics". For Willis people do not watch TV in a passive way, they shout back and argue. A love of pop music might begin with buying a record but end with forming a band. The Flickr groups that have formed around iPad apps like Brushes are perhaps similarly engaged in a grounded aesthetics. Although there is a vast collection of work here it receives little to no critical attention. Although there are thousands of images viewing figures are for the most part in the tens or hundreds. Most publicity around iPad art has centred around established artists like Hockney. These communities are unconcerned or at least ironic about whether or not what they are doing is art. They produce and consume their own and each others' work, they are their own publics.

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