Process as aesthetic paradigm: a nonlinear observation of generative art
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Abstract:
Since the beginning, one of the strongest biases that generative art had to face is its devotion to beauty, to the surface. In other fields of contemporary art, the strong influence of conceptualism has led to an art production characterised by dematerialisation and cognitive immersion. “Process as aesthetic paradigm: a nonlinear observation of generative art” analyses the relevance of traditional aesthetic strategies and categories for generative art and finds answers to the question: Is generative art retinal?

When I first read the short outline of this conference, I stumbled over the term ‘true literacy’ as the ability to read and write software. It made me think what my contribution to this outstanding event could be – for I am definitely not literate in this sense, but nevertheless have been invited as a speaker.

Terms like this usually make art historians and theoreticians like me a bit nervous. Though we apply another form of literacy when approaching computational art, we unconsciously do feel bad about not being able to programme. Of course, there are some exceptions to that rule, such as Florian Cramer and Friedrich Kittler - whose knowledge of code and programming leads them to a very specific approach that focuses on code as cultural phenomenon.

My personal approach to computational and electronic art is doubtlessly that of an art historian/theoretician, understanding the present only as a small time frame, inevitably linked to the past and the future. I defined my own task in this conference as a focussed look into the aesthetic concepts of generative art - examining some of its cultural conditions and inherent specific ideas.

Focussing on the aesthetics is actually quite unorthodox - both in the electronic art scene, which is quite engaged in discussing the functional and political aspects, and in contemporary art, which, for the most part, tries to neglect the existence of traditional aesthetic categories in favor of the establishment of a different concept of art.

However, I will follow my objective in a manner untypical for an academically trained person, by presenting a nonlinear observation - or should I say a number of observations bridged by this topic.

From the very beginning my special interest has lied in understanding art as a phenomenological expression of the world in which it is created. Artistic work is an ongoing and never ending process, which I understand as a process of cultural crystallization.

The term “crystallization” refers to the formation of solid crystals from a homogeneous solution. It is essentially a solid-liquid separation technique, and a very important one at that. Crystals are grown in many shapes: cubic, tetragonal, hexagonal, trigonal, etc. In order for crystallization to take place a solution must be "supersaturated". Supersaturation refers to a state in which a liquid contains more dissolved solids than can ordinarily be accommodated at a given temperature.

Applying this concept to art, cultural conditions form the homogeneous solution. Some of the major cultural conditions are: the economic situation, availability of media, dominance of particular art theories or theories in general, and the distribution of knowledge. If supersaturation of the cultural conditions is accomplished, then specific art forms and forms of expression generate themselves.

This disprovable, though though-provoking, model interprets art as a self-generative, rather autonomous process. After all, this model explains why generative art or software art neither are rooted nor bloom in India – a country that is leading in software development and production.

In India, a supersaturation of these conditions has not been achieved: the economic situation forces computer-literate people to stick to their jobs – which barely offer any idle time for creative work with the computer. Moreover, the distribution of knowledge of software production is largely centred in software firms. Debates on art theory are exclusive matter of intellectuals, who usually do not mingle with programmers. Media equipment is available, but fairly expensive in relation to wages.

Whereas the situation in Europe, North America, and in some other parts of the world is a different – and to stick to the metaphor – supersaturated one. The culture of discourse – of which this conference is a lively example – on the institutional and non-institutional level, interdisciplinary research, an open source practice, and a stable economic situation enables a constant push of the boundaries of contemporary art and design practice into the computational field. For generative art, in particular, I hope I aim to illustrate some of its cultural conditions in the following minutes.

So let's zoom in from this general perspective on art to generative art specifically and take a look at what we are discussing in this conference. Philip Galanter has brought up a definition that is already well discussed and to which I wish to refer only marginally – though I like it a lot for its broad perspective, and accept it as a very useful concept for thinking about how various art forms are based on the concept of designing a process.

Galanter says that generative art refers to any art practice where the artist creates a process – such as a set of natural language rules, a computer program, a machine, or other mechanism – which is then set into motion with some degree of autonomy contributing to, or resulting in, a completed work of art.

One example of a work that Galanter's definition embraces is .walk, by socialfiction.org. The project won the transmediale award for software art in 2004. . walk was executed several in times in different cities. Each time a short programme typed on paper was handed out to the participants who explored the city following the given instructions – such as first street left, second street right, if you meet someone exchange programmes, and so on.

However, because this conference intentionally presents a more focused understanding of generative art, and one that I would like to pursue and enlarge upon, I come up with another, stricter, definition which we can discuss further later on, as this won't be the only definition of generative art that will be presented in

this conference.

In this definition, generative art refers to an art practice where the artist creates a process by the means of a computer program executed by the machine itself. The so-created process is characterized by some degree of autonomy and self-organization and can result in various manifestations capable of providing an aesthetic experience.

Actually, one of the strongest biases that generative art has had to face since the beginning is that it is solely devoted to beauty, to the surface. In her comparison of generative art and software art, for instance, Inke Arns emphasizes the quality of software art insofar as it is interested in the political and aesthetic subtext and the cultural impact of software. Software art is said to be predominantly related to code and programming as a concept, while generative art is associated with the surface, the phenotext.

In contemporary art the concept of beauty is only rarely addressed or discussed due to the strong influence of conceptualism. Focussing on the concept of an art piece implies neglecting, or at least not centring around, the execution of the concept. The method of conceptual art is dematerialisation, while its objective is the cognitive immersion of the perceiver. Both dematerialisation and cognitive immersion do not underlie the concept of beauty which, generally, is closely linked to sensory perception in the first place.

In this sense, conceptual art is the antithesis to 'retinal art'. Marcel Duchamps coined the term 'retinal' for a quality predominantly affecting the eye – in contrast to affecting a person's intellect. In contemporary art the notion of the retinal broadens to include anything affecting the senses. So, I would like to pose the provocative question: Is generative art retinal? In order to answer this question I would like to take a sidestep into art history and look more closely at the relation between art, machine and beauty.

Before Leonardo da Vinci neither the work nor the construction of machines was subject to any intellectual reflection. This slowly changed through Leonardo and his fascination with the machine. The major change came with the Baroque era that found beauty not only in man and nature but for the first time pursued the idea of a machine being constructed in a beautiful and elegant way. The elegance of the construction was either concealed by a splendid casing, which often could be opened for introspection, or was such that the inside was constantly revealed. In both cases the skills of the machines' creators were supposed to be evident in the design.

On the screen you see as one example; Agostino Ramelli's reading wheel, which allowed browsing through a large number of documents without moving from one spot to another. The device presented a large number of books – a small library – laid open on lecterns on a kind of Ferris wheel. It allowed skipping chapters and browsing through pages by turning the wheel to bring lectern after lectern before the eyes. Ramelli's reading wheel thus linked ideas and texts, reminding us of today's browsing software used to navigate the world wide web. As you can see from the illustration, the concept of elegance of construction was applied to the decorated casing, but at the same time importance was attached to the design of the inner construction – to the smoothness of operating and the harmony of elements.

In generative art, the medium and material is the code, which is supposed to be designed elegantly. Elegance of code usually means the smartness with which a computational problem is solved. This objective of smartness in programming is a common and relevant aesthetic category in generative art. Interestingly, elegance of code was, and is, highly postulated in the demo scene – which most of you will know of, as this movement was partly rooted in Scandinavia. For those of you who do not know, it should be explained what a demo is. Originally, a demo was the free version or sample of a computer programme that is released and distributed for marketing reasons – for instance the first level of a computer game. The demo scene sprouted in the 80s, but spread widely in the 90s with the first generation of computer literate kids. Those young adopters started to create their own computer programmes that would generate real-time visuals and sound. These programmes were supposed to be as small and lightweight as possible and were saved on diskettes and distributed via modem. In this particular field of digital culture, the intelligence of the programme – its elegance – played, and still plays, an important role. The quality of a programme is only evident to the practitioners in this field who constantly observe what is going on in the demo scene, and who can read the programme from the audiovisual appearance of its execution.

So what we can observe in generative art is an aesthetic strategy applied to the inner structure of the artwork: the code. The beauty of code is definitely not retinal at all. It is invisible to the ordinary perceiver, as opposed to a software literate person. In fact, generative art offers two basic levels of perception: the retinal, which is dependent on the audiovisual or sensory perceivable result, and the non-retinal cognitive recognition of the underlying code. This division into a sensory and rational perception of beauty leads us directly to one of the major debates on aesthetics: whether beauty can be experienced through rationality, as Winckelmann postulated, or only through senses, as Kant thought.

This is one of the major problems that generative art has to cope with in general: the invisibility of the code and the prerequisite of true literacy in order to recognize the beauty of the code, and thus the achievement of the designer. The fact that the beauty of the programme does not reveal itself to the ordinary perceiver impedes any broad effect of generative art on this level of perception. And this won't change in the future, although more people will learn to code. In any case, the further optimization of computer applications will create an even larger gap between truly literate and non-literate people.

So, if the beauty of code is irrelevant for the perception by a broad audience, what about the visible and perceivable elements of a generative art work? Is there a general idea of what aesthetic qualities generative art has?

The first and most obvious aesthetic, and at the same time conceptual quality of generative art, is its generativity. The concept of generativity is the basic concept of nature – and nature has been one of the major aesthetic concepts of art since time immemorial.

When Aristotle claimed, in the 4th century before Christ, that art, and in particular poetics, should imitate nature, he did not mean copying nature in its outward shapes, but was interested in the representation of acting individuals. Already this early aesthetic manifesto defines the process – in this case the process of man changing over time – as an aesthetic quality.

In the renaissance and classic era, a completely different concept of nature was pursued: the idea of god represented by an ideal nature. After a long phase of abstract and conceptual art, nowadays nature returns to contemporary art and design in two often interlocked ways:

a. on a conceptual level
b. on an iconographic level.

On the conceptual level, it is nature's potential to autonomously generate and develop that is viewed as an ideal way to create and shape systems, objects, and processes. Today's appreciation of generativity as a model and method of creation is certainly supported by the emergence of systems theory. Systems theory focuses on complexity and interdependence of relationships. A system is composed of regularly interacting or interdependent groups of activities/parts that form the emergent whole. Systems theory tries to understand, and provides methods to predict, the dynamic behaviour of any given system. Eventually, systems theory leads to the idea of control over self-organised and complex systems and the use of systems for generating aimed results.

In design and architecture, the method of using natural systems for the production of forms is just advancing. As one example I want to name the series Design by Animals, by the Swedish design firm Front. In this series of products - such as wallpaper, lamps, hooks and other everyday objects - animals determined the objects' forms. For instance, dog traces in deep snow informed the shapes of ceramic vases.

A step ahead are R&Sie architects, Paris, who are not using existing natural systems, but envision the creation of an autonomous nature-like system that is capable of building a city based on growth scripts and open algorithms porous to a number of real-time inputs (human, relational, conflictual and other data). Thus, R&Sie are trying to escape the tightly scripted determinist procedures and planning mechanisms based on predictability. The basic idea is to design an architectural structure that is always under construction; combining incompletion and self-determination as its constituent parameters. It develops by successive scenarios, without planning and without the authority of a pre-established plan. The structure is built by a machine that is a kind of parasite, or like the polyps that live inside, and are supported by, the coral reef they generate. The machine's purpose is to build the structure in real time through the secretion of the structural material that serves as the project's envelope.

In generative art, however, nature is imitated through the dynamic and autonomous behaviour of the systems' elements. The similarity of a generative system's behaviour and real living systems becomes evident not only in the actual performance, but also in its verbal descriptions - using terms such as "come to life" "pulsate", "breathe" and "growing". These terms are taken from a text by Jürg Lehni about his applet Fever Nightmare Generator. Quote:

> In the applet, the user's simple, fragile drawings all of a sudden come to life and start to pulsate and flow around. They breathe; move and overlap like tectonic shifts or blow up and explode in slow- motion. These movements are sometimes very hectic and uncontrollable, but they can also be calm or even still, giving the

control back to the user.

As Aristotle has correctly noted, it is this representation and recognition of natural behaviour that arouses the perceivers' interest and supports his/her emotional involvement. In generative art and design, a high level of complexity in the system's behaviour, and of autonomy and unpredictability increases fascination and suspense.

What we have seen so far is that generative art and design conceptually and functionally imitate, or are modelled on, natural systems. It could be expected that this is also the case on an iconographic level. In fact, in its visual appearance generative art often, but not necessarily, alludes to nature.

One of the early works that has to be mentioned in this context is the piece Life Species by Christa Sommerer and Laurent Mignonneau. Email messages sent from people all over the world create virtual creatures. The message and the reproduction and evolution of the creatures themselves decide how the creatures will look. Thus one cannot really predict how the creatures will evolve and what kind of creatures will appear. It depends on how many people send messages, how complex these messages are and how the creatures reproduce among themselves in the environment. A more recent example dealing with this mimicry of nature is the auto-generative audiovisual environment and performance askaa by the duo Skolz-Kolgen, which is inspired by vegetation and evolves in real time while it reacts to sonic influxes.

What can be observed in generative art is the play with traditional aesthetic categories and design concepts, alongside a general tendency to fulfil the established conditions of beauty, such as balance and harmony in proportion and colour. If we look closely, we can see that even old aesthetic concepts such as the sublime and grace are employed.

The sublime was described by various people, such as Edmund Burke or Immanuel Kant, with, more or less, conformity. Its basic meaning refers to the feeling of being overwhelmed by the inconceivability of infinity, for instance of space and time; the feeling of being inferior and subordinated to a bigger, uncontrollable and autonomous system - be it nature or god ruling nature.

Kant also described the sublime, in relation to how the mind operates under its effects, as rapidly alternating between two states: attraction and repulsion. Goyas Colossos is one of the standard examples for the sublime: The sitting giant turns his head and he is caught in this moment of unpredictability: what is he reacting to, what will he do, why is he there? He is an unpredictable and dark force of nature. If you look at Casey Reas' piece, for instance, it has the same effect and plays with equal notions of the infinite, darkness and uncertainty. In this case, the aesthetic concept of the sublime that already inheres the notion of infinity and of an uncontrollable, autonomous system is transferred to an infinite and autonomous process.

Let's see if we can discover the use of another old-fashioned and unhip aesthetic category found in generative art: grace, which is defined as the absence of violence and disturbance. In aesthetics, the concept of grace has been debated among philosophers such as Schiller, Schlegel and Goethe. In spite of the usual small disagreements, grace has been generally understood as an attribute of motion.

Schiller put it this way:

> "Grace is always and only the beauty of the figure moved by freedom."

Grace has always been associated with movements of playful easiness. Absolute grace is achieved, if complexity is managed, with intriguing easiness, and results in purity and simplicity. Grace is an obvious aesthetic quality of generative art works being complex but balanced systems, built of autonomous parts and external feeds or interventions. An autonomous system creating, for instance, audiovisuals, is of fascinating grace if the complexity of the programming, or the system's elements and behaviour, is accompanied by impressive smoothness of process.

Self-organization and generativity imply another important aesthetic category that is valid predominately in time-based art: suspense. In contrast to other aesthetic theories, a prominent theory of suspense in art does not exist beyond music and drama, evidently because it is not relevant to all art forms.

Etymologically the world suspense derives from the Latin words "sub" and "pendere", meaning "to hang, to stop", and was used in the variation "en suspense" in Anglo-French for legal affairs - in the sense of "in abeyance" and "not paid, not carried out". In cinema and literature, suspense is built between the starting and the end point of a narrative and usually dissolved by a final plot.

In his book "Reiz und Rührung", (appeal and emotion) Konrad Paul Liessmann analysed the property of suspense by noting: "The tense is exciting because it can be relieved. That is what characterises the suspense: It is not a steady state. Nobody can stand tension forever." If we believe Liessmann, suspense is the antithesis of the infinite and can only exist through termination.

Generative art is characterized by a new form of suspense that is missing the terminal, as the executed process is theoretically infinite. Some generative art pieces are designed for permanent evolution, while other are not supposed to run forever, but at least have the potential to create endless variations.

This new type of moderate suspense is built between the initial point which is the programme - with all its implemented creative potential - and the autonomous way in which the process evolves. It is a kind of suspense that takes us from one situation, or state of the process, to the next, which is carried out in the following moment.

Evidently this type of tempered suspense is part of our zeitgeist, expressed for instance in the "lounge culture" - an entertainment culture that is a manifestation of our need for a slower, but nevertheless long-lasting, maybe even permanent, movement.

I could easily extend these observations regarding the aesthetic concepts and strategies of generative art, but that would surely go beyond the scope of this talk. So let's return to the initial question: Is generative art retinal? I would summarise my observations on the aesthetics of generative art by answering: yes, it is strongly retinal in its best sense, but not solely.

We have seen that generative art, beside a general tendency towards a strong sensory experience, offers an underlying, invisible, non-sensory, but nevertheless

aesthetic quality of the material: the code.

Although generative art builds a completely new art genre, it is closely linked to other past and contemporary art forms and categories such as performance, moving image and painting. Accordingly, traditional aesthetic strategies and principles are applied by the artists, but advanced and modulated and through their application to processes.

The particular field of generative art and design is a consequent advancement of the long history of art that is dedicated to sensory perception and that will always exist as a parallel to conceptual art.

Culturally, generative art integrates partly into a perception-driven subculture searching for complete sensory immersion and partly into visual art and art market – if its manifestations, such as prints, adapt to contemporary aesthetics and usual formats.

Unfortunately, the emphasis on sensory perception continues to keep it out of the core of the media art discourse. Its closeness to design is as suspicious as its widespread neglect of media critique or self-reference that is so popular within media art.

For the same reason – the focus on the front end, as Christiane Paul called it – generative art does not play a larger role in the contemporary art discourse, which has just started to slowly rediscover the value of the retinal – for instance through Gerhard Richter's paintings. Compared to those generative art offers much more complexity and a sensory experience that is theoretically infinite.

Links:

http://www.philipgalanter.com
http://www.socialfiction.org/dotwalk/
http://www.medienkunstnetz.de/themen/generative_tools/software_art/
http://demoskene.katastro.fi/art.html
http://www.frontdesign.se/
http://www.new-territories.com/
http://www.scratchdisk.com/Work/Fever+Nightmare+Generator/
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