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GENERATIVE PRACTICE. THE STATE OF THE ART

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Generative art is often misunderstood and mischaracterized: is it a process or an aesthetic or a critical category? The following is a conversation about the state of generative art with three generative artists- Leonardo Solaas, Marius Watz, and Mitchell Whitelaw – and the author.

Leonardo Solaas (Programmer, designer and professor at the Master in Electronic Arts program in the Universidad Nacional de Tres de Febrero, Buenos Aires, Argentina), Marius Watz (Founder of Generator.x, an important curatorial platform for digital art,

lecturer at the Oslo School of Architecture and the Oslo National Academy of the Arts) and Mitchell Whitelaw (Leading director at the Master of Digital Design at the University of Canberra, theorist who writes about digital culture and practice. His most recent book is “Metacreation: Art and Artificial Life”) and the author (Architect, writer, serves on the board of directors of Side Street Projects and the Harpo Foundation)



numero57_Generative Prattice 02

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Jeremy Levine: One of the most recognizable traits of Generative Art is its visual complexity. To what degree is visual complexity a structural characteristic of generative art as opposed to an aesthetic choice?

Leonardo Solaas: Complex systems are for more than one reason a natural fit for this partnership: mainly, they offer a clear-cut case of order that arises from an impersonal process of interaction between simple agents in a multiplicity, and not from a control-based decision process. But there are other possibilities: processes of repetition and random variation like Jean Tinguely’s drawing machines, or geometric rule systems like those behind many works of Sol LeWitt.

In short, I would say that the relationship between generative art and complexity is one of affinity, but certainly not one of necessity. An alliance perhaps, but not a dependency. Generative” can also go along with “simple”, “linear” or whatever we conceive the opposite of “complex” to be.

Marius Watz: Complexity (whether “true” complexity or merely appearing complex to the human eye) is not a necessary outcome of generative processes. However it does seem to be one of the most popular side effects, hardly surprising given the ease with which such systems can describe interactions between multitudes of objects. Obviously (visual) complexity is an aesthetic choice, but in the scientific sense complex systems are central to the practice of Generative Art.

Concepts like emergence, network theory and multi-dimensional parameter spaces defy reduction to simple principles, and artists using code quickly find themselves only partly in control of the software processes they create. So chaotic behavior, glitch or visual complexity seem like likely outcomes.



(http://www.digicult.it/wp-content/uploads/2010/09/numero57_Generative-Pratiche-03.png).

Mitchell Whitelaw: Visual complexity isn't an inherent characteristic of generative techniques – it's easy, if not very interesting, to make a generative process that turns out visually simple results. So to some extent it's an aesthetic choice, or a tendency that pursues a certain aesthetic or sensual reward. Susanne Jaschko has called this its “retinal” tendency. Computational generative techniques act as an enabler or amplifier for that tendency – they automate complexity to a certain extent, or reduce its cost. If generative art is a cultural organism, then the “retinal” charge of visual complexity is a kind of lure that attracts both artists and audiences to computational techniques.

On the other hand, complexity is, if not a structural characteristic, then at least a common representational strategy. Almost all generative systems define a range of possible outcomes – a space of potential forms that can be vast. Often the visual complexity in generative art is actually visualizing a part of this form-space by overlaying or combining a range of forms into a single outcome. Jared Tarbell's “Invader Fractal” is a great example of this, but so is the more common device of aggregating frames of an animation into a single still. This isn't really complexity in the sense of structure or dynamics (“complex systems”); I would call it “multiplicity” – sheer “moreness” – but it works to convey a sense of variety and potential that is central in generative art.

Jeremy Levine: Generative Art is often characterized as a style or medium, rather than a tool or strategy or system. Is it time to stop using the term? Is there a better way to describe artists who use generative systems.

Marius Watz: The term Generative Art certainly does have its problems. The most widely accepted definitions (i.e. Galanter, etc.) describe only a methodology, they do not address artistic content or unify artists into a coherent movement. I think we need to find new labels to describe the artistic endeavors currently lumped together as Generative Art.

Back when I was formulating the concepts behind the Generator.x project it was useful idea to tie together diverging practices by calling Generative Art. But today I am more interested in more specific ideas. Possible alternatives would include Software Abstractionism, Information Art, Data Sculpture or Computational Design.



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Leonardo Solaas: Marius is right to note the relative inefficacy of the concept to organize an artistic field in any conventional sense. Generative Art is not a movement, much less an avant-garde. There is no “Generative Manifesto”. It’s not either a genre or a technique such as painting or photography. What is it then? Well, maybe something like a metatechnique, a characteristic of certain artistic processes, a way of doing things, or perhaps merely an attitude.

Mitchell Whitelaw: I agree that these more specific fields are useful descriptors – but do we need any more “movements”? I am suspicious of names in general, but actually I like the breadth of “generative art” – the fact that it might apply equally to processes that are both computer-based and non-computational. It seems to me that the aesthetics and approaches of some non-computational generative processes – for example Tim Knowles’ drawings made by physical processes – are very much aligned with digital generativity. I would speculate that there is an emerging interest among digital artists in the non-computational or para-computational – for example Christopher Myskja or Chandler McWilliams..

Leonardo Solaas: It’s possible to track a concept behind Generative Art which is more definite than a mere “family likeness”. That would be something in the lines of: art where the artist gives partial control of the productive process to some kind of autonomous system. There would be much to say about this attempt at a definition, of course, but I’ll skip over the details and just paraphrase it: Generative Art is about the various possible forms of creative collaboration between a human and a non-human.

A definition like this one has the immediate effect of encompassing many things, including the work of artists who don’t usually call it “generative”. To cite just one possible case, there’s the way Olafur Eliasson lets the ripples on a water surface paint with reflected light in “Notion Motion”. It is this very generality that keeps my interest and curiosity alive. More so because I believe there is a very specific conceptual core there, which we are trying to pin down under the name of “autonomy”.



Jeremy Levine: An important distinction is being made between visual complexity and behavioral complexity – which is the dynamics of a complex system. This second definition of complexity describes what a system does, rather than what it looks like. Both types of complexity are expressions of the algorithms we associate with living organisms. Generative art expresses the dynamic creativity we associate with selfcausing agents. Which brings us to the question of autonomy. Leo points out that the relationship between human and non-human systems are at the core of generative art. Can generative practice provide a critical perspective on the growing autonomy of non-human systems?

Marius Watz:Autonomy is a flexible concept. Once separated from the body of the artist any aesthetic process can be said to have some level of autonomy, hence the controversy about the use of professional fabricators in contemporary art. To play devil's advocate one argue that it is really only processes like drawing, painting or the use of a potter's wheel that can be said to be *non*-autonomous in the sense that the outcome “flows” directly from the body of the artist.

The photographer accepts the biases of the mechanical “eye”, manipulating it by changing lenses and applying filters. The print-maker experiments with papers, inks and the material of the printing plate. The generative artist describes ideas in code and tinkers with parameters controlling the algorithm. All of these methods exhibit some level of autonomy, even though they are hardly similar in execution. I think the significant aspect of autonomy in generative art is the explicit externalization of the artist's decision-making process. For a generative system to produce acceptable output the artist must encode every micro-gesture and subjective expression needed to produce an interesting work of art.

This process of externalization is integral to the conception of a procedural artwork and differs radically from the situation of tool users such as photographers or potters. But I am skeptical of the notion of system-based artworks becoming so autonomous as to be “authorless”. This type of thinking has its conceptual usefulness, but in specifying boundary conditions and logic of the work the artist inevitably becomes its author. Sol Lewitt is irrevocably the author of his wall drawings, despite never touching the tools of their creation.

I suspect most artists working with code simply take the semi-autonomous nature of software process for granted. Others like Ralf Baecker make it their focus to explicitly examine the system as a cultural artifact in itself. Examples of this kind of practice can also be found outside the digital realm, such as John Powers' geometric sculptures or Jorinde Voigts meticulous drawings.



numero57 Generative Pratiche 06

(http://www.digicult.it/wp-content/uploads/2010/09/numero57_Generative-Pratiche-06.png).

Leonardo Solaas: Marius is very right to note that almost any artistic process or material can show a certain degree of autonomy. As any art student knows, even a matter as pliable as paint can have a will of its own. Limits are therefore foggy. I spoke of generativity as an attitude because we could think of the elusive point of difference between trying to control the matter and, so to speak, releasing it to do its own thing.

My hunch is that something deep lies in that distinction. It's a different set of mind. Namely, it clearly breaks with the figure of the romantic genius that is still the archetype of the artist in the imaginary of our culture. It is not any more about inspiration, a privileged sensibility or a unique talent to subdue matter and render an Idea visible. Instead of all that, there's an iterative process of experimentation. Something like: Set up a physical or conceptual device, kick it in motion, step back and watch it develop. There's a back and forth with the autonomous system that repeatedly finds the artist as a spectator of his own work.

That's a crack in the deep modern and occidental obsession with control. Let's be careful here: It's not a matter of giving up control altogether, but of balancing it with moments when you just let go and see what happens. Brian Eno has a nice word for that: Surrender.



numero57 Generative Pratiche 07

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Jeremy Levine: Let's continue with this idea of autonomy and the 'surrendering of control' that Although it's impossible to design a system to produce a higher level emergent structure, does generative art, by 'surrendering' some degree of autonomy to the system,

suggest another way? And how would you connect emergence with the computationally sublime?

Leonardo Solaas:Generative artists are often amateurs in both art and science, with all the good and all the bad that is implied in that condition. As “art hackers”, they can act with refreshing disrespect for established boundaries among disciplines, but they can also be naïve. From an aesthetic point of view, I think generative work is always assailed by two more or less symmetrical temptations: pursuing a straightforward imitation of traditional art (say, for example, Harold Cohen’s Aaron) or giving up to the pleasures of mathematical harmony – that is, a classicist Pythagorean aesthetic that degenerates very quickly into a sort of digital kitsch, the epitome of which are the countless renderings of the Mandelbrot Set.

MAs generative art leaves behind a childhood full of fractal toys among Lindenmayer trees, and reaches, if not maturity, at least some kind of confident youth, I regard it as its biggest challenge to find aesthetic venues that are not just uncritical imitation of art as we know it, nor imitation of nature for the sake of it. Venues that are, if you allow me, not too human, and not too inhuman, but a path open only by the collaboration between a person and an automated system: a really hybrid creature, an aesthetic chimera.

As a counterpoint to classic painterly and mathematical beauty, the old idea of the sublime may indeed have a fresh relevance here. Generative works are often tokens from simulated universes that stand as a sample of their vastness. They speak of the still uncertain possibilities that are being unrolled by our growing symbiosis with autonomous complex systems. As sci-fi dystopias constantly remind us, that change is also threatening. Nature might not be as overwhelming for men as it used to be when Kant created the concept, but we now have this “second nature” that unfolds before us as a mostly uncharted territory. Generativity is (or might become) a way for art to deal with this brave new post-human world that is dawning upon us.



numero57_Generative Prattice 08

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Marius Watz: I think Leonardo nailed it: Most artists working with generative processes are not really concerned with cybernetics or complexity theory as scientific constructs. Rather, they see generativity as a conceptual framework that handily provides a pragmatic

methodology for creating interesting output. There are of course purists who concern themselves with code structures as semantic constructs (i.e. Software Art), but they tend to form a creative scene of their own.

The notion of the computational sublime is seductive, despite its somewhat problematic romantic associations. I do think there are some aspects of the sublime in Generative Art, or that the very least that there is a sense of the incomprehensible and infinite in computational systems. The computer gives an inevitable quality of otherness to the work, a translation of agency that introduces a tension between artist and system. Generative Art finds itself at an intersection between science and nature, often emulating organic processes but realizing them in completely inorganic ways. It's not surprising then that one might encounter the Sublime in this "uncanny valley" between the recognizable and the alien.

Nature remains a constant reference in Generative Art, as an inspiration and as a yardstick for interesting behavior. But computational processes also point towards a kind of "second nature", a technological conception of intelligence and sensory experience. Software processes are the perfect answer to a new experience of human existence where real and virtual spaces are irreversibly intertwined, where always-on smart phones provide cyborg abilities and "apps" are the new cultural artifact.

The fascination with Information Visualization (which often might be better termed Infoporn) reflect the need to make sense of the data flows that have become the extension of our sensory experience. Writing code is a way to reclaim some control in this new territory of the digital, with users becoming active agents rather than passive recipients. Open source platforms like Processing, PD and Arduino are spreading a digital literacy that involves writing software as well as using it.



numero57_Generative Prattice 09

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Mitchell Whitelaw: SI agree almost entirely with Leo and Marius, but a few divergent thoughts. The surrendering of control and the "emergent" autonomy of the system are key moments in generative art – especially, I think, for artists. An interesting question would be whether this sense of autonomy can be conveyed to an audience (or whether it even

matters). The artificial life strain within generative art pursues that autonomy most strongly, but as an ultimate aim I think it's a mirage. More often autonomy and surrender are stories that generative artists use to describe their processes – and they are only partly true.

It's not enough to say, "oh, the computer just does it by itself" – the computer does a certain amount, given a highly detailed set of instructions that encode all kinds of very human ideas and aesthetic choices. So in that sense I'm wary of overemphasizing generative autonomy – the real process is a more complex and interesting one of system building, implementation, elaboration, tweaking and hacking. It constantly cycles between artist and computer but is really very human, all the way through.

By the way I agree that "artists working with generative processes are not really concerned with cybernetics or complexity theory as scientific constructs." But even if it's not what they signed on for, generative artists do become highly experienced in making and thinking about systems and processes. If visual complexity is the brightly colored plumage of generative art, then maybe systems thinking is the cultural payload – the important stuff. This relates to what Marius describes – the technological literacy required to gain some active agency in a digital culture – but it's also broader, a way of understanding the world.



numero57_Generative Pratiche 10

(http://www.digicult.it/wp-content/uploads/2010/09/numero57_Generative-Pratiche-10.png).

Jeremy Levine: Leo wrote that "Generativity is (or might become) a way for art to deal with this brave new post-human world that is dawning upon us." The phrase "post-human" often arises in discussions of digital aesthetics and is commonly understood as the merging of man and machine. The philosopher Manuel De Landa offers an alternative definition of "the post-human" as a critique of anthropomorphism and logical positivism. From the perspective of evolution it is the flow of information and bio-mass that is important. A human being is a temporary manifestation. A blip in evolutionary time. De Landa wants us to divorce the 'post-human' from its techno-futuristic associations.

Leonardo Solaas: I need to say that I was wary of using the term 'post-human', since it is to some extent a fashionable buzzword used by some people I don't respect very much for things I'm not very interested in. Let me be more explicit about what I was trying to say. On one hand, the "human" in "post-human" is for me specifically the modern subject; the

illuminist man that subdues nature through reason and will. I think we are in dire need of a term for this thing that comes after modernism but is not post-modernism – for this new way of being in the world that substitutes hierarchical structures for complex systems, control for self-organization, unity and universality for multiplicity and locality, and so on.

On the other hand, “post-human” refers to that very much feared and wished-for moment that scientific imagination has anticipated so many times: the encounter with an alien intelligence – the clash of civilizations. Well, fact is, the aliens are among us. We are breeding them. We now quite naturally (!?) live together with a sort of intelligence that is radically different from ours (basically, they are mostly serial, we are mostly parallel) which, as noted by Marius, complements and expands us in amazing ways. A person plus a smartphone is more than just a person in the scope of her possibilities – but at the same time, is less than the ideal of the unified, self-sufficient, all-controlling modern man. It’s a networked, hybrid subject.

Incidentally, this is also relevant for Mitchell’s observation that the generative process is “really very human, all the way through”. I understand his point, and in a sense agree with it. It is still us that do the art, and saying “the computer does it” is just plain silly. The point I’m trying to make is more nuanced: generative art is indeed human, but not just human. Some automaton has done something there which we cannot directly do ourselves. In modernity, art is essentially and completely human. Through inspiration and talent, the artist is the only source of the work. Now we assist to a secundarization of the artist-person as she builds a semi-autonomous device between her and the work.

“Secondary” means there are two to tango, and that the work must be therefore understood in regards to that human-non-human relationship from which it arose. As for the visibility of the autonomous system for the audience, I think it is essential. I would go as far as to say that generative art can also be seen as the *mise-en-scène* of such systems. If an artist uses some generative trick as a production tool in the intimacy of her workshop, but leaving no detectable trace, well, that doesn’t actually concern us. Be it an evolutionary algorithm, Eliasson’s rippling ponds or LeWitt’s combinatorial geometric systems, the automaton should be there, plain to see, on stage, because that’s what, in my view, generativity is all about.



numero57_Generative Pratiche 11

(http://www.digicult.it/wp-content/uploads/2010/09/numero57_Generative-Pratiche-11.png)

Mitchell Whitelaw: I find De Landa's "complex materiality" view of the post-human very appealing. Part of my earlier point about generative art being human, was to counter the simple idea of the autonomy of the machine – and in the same way, there's a simplistic "cyborg" idea of the posthuman (Kevin Warwick with his implanted chips) which I would rather complicate. De Landa offers a coherent philosophy for how to do that – flows of matter and information that traverse customary boundaries (living and nonliving, human and nonhuman). Crucially those complex flows self-organize at all levels of scale – structure and order appear, from chemical clocks to ice crystals and rocks, as well as living things and their artifacts and cultures.

So in as much as it taps into or manifests this sweeping, cosmic generativity, generative art connects us with De Landa's flow. Non-human? I would rather say super-human – if De Landa is right then it is us and everything else, but crucially all connected in ways we might not otherwise recognize. Certainly at its best generative art gives us a whiff, a sensation of that self-organizing flow.

Jeremy Levine: Imagine that you are given the opportunity to curate a exhibit of generative art at a major museum. How would you conceptually organize the show? What would you want to say by way of curation about generative art?

Mitchell Whitelaw: This is really hard, and I have a handy example: the "Process as Paradigm" exhibition at the Laboral Center for the Arts. Process as Paradigm is an exciting show for me because it has some of that transversal quality of De Landa's thinking. It includes some brilliant digital generative work, as well as hardware, robotics, bioart, and lots of other non-computational processes. It complicates the association between code and generativity (unlike some earlier shows that foregrounded or fetishized code). More, it shows that purely material processes (like Driessens and Verstappen's box of sand) can be as rich or richer than digital processes; and that digital processes have their own materiality.



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Leonardo Solaas: Well, in keeping with my last answer, I imagine it would be interesting to plan it, not in terms of artists or artworks, but in terms of the autonomous systems involved. I would try to get together a wide variety of species and personalities, from the

mechanical to the digital, and from the abstract to the physical – a veritable assembly of automata that would open a space for the richest possible dialogue and contrast among them. Or, from another point of view, a zoo of self-organizing processes, considered in the diversity of the roles they can play in their alliances with us people, with our plans, stories and ideas about the world.

I think Mitchell's idea is similar: making it evident that we are talking about something that crosses disciplines and realms. I'd like the show to be a bit science fair, a bit science fiction; a playground of simulation and experimentation, somewhere between art, artifact and artificial life.

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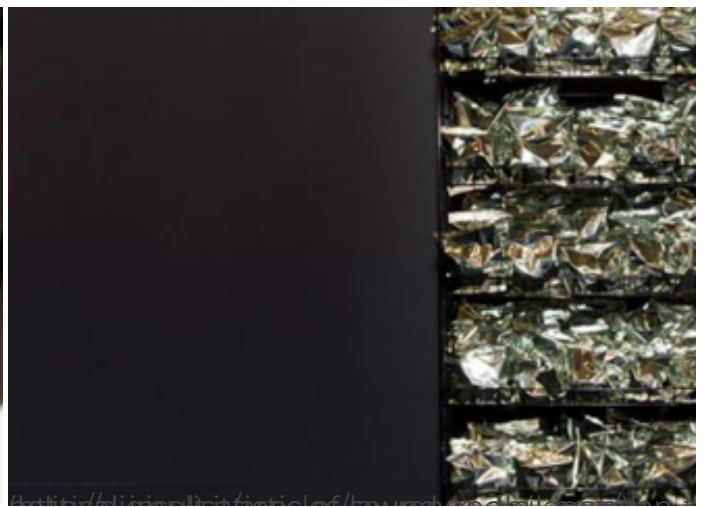
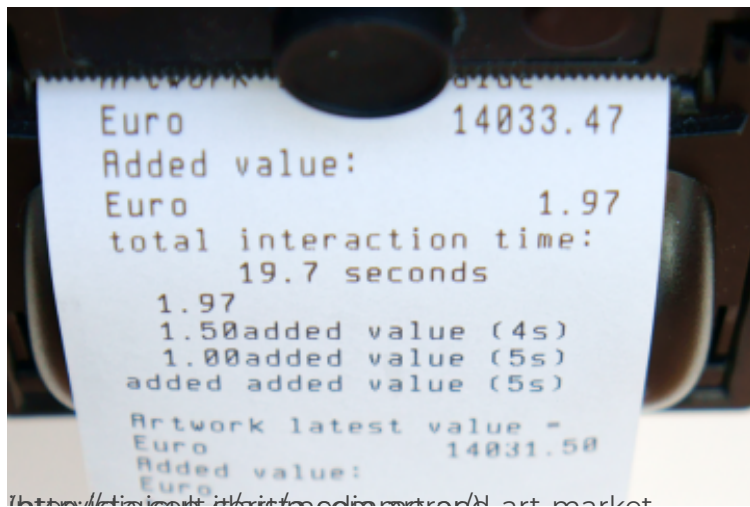
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