Generative Art as a Response to Auto-Destructive Art and a Result of Technological Determinism

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While reading Gustav Metzger's article on auto-destructive art, it struck me as odd that very little attention was paid to its inverse, auto-creative art, which appears to have more recently taken the form of the very popular generative art genre. I began to think that perhaps at the time the article was written, it was more likely that art-work of an emergent or evolving nature would occur as a physical installation due to sheer logistics of construction. Now, with the advent of cheap computing hardware and high-level programming languages, the dynamics of the platform allows for a much more suitable medium for adaptive artworks. The real question becomes why generative and not degenerative.

A wave of fresh young artists have landed in the contemporary art scene, coming from varying backgrounds, but focusing on one thing in particular: art works that build upon themselves. Many of the leaders of the generative art community such as Casey Reas (a professor here at UCLA's Design | Media Arts department), Jared Tarbell, and Golan Levin all come from the Massachusetts Institute of Technology Media Lab, specifically the Aesthetics & Computation Group.

Reas's work in particular relates back to the period of auto-destructive art, and actually even earlier as he relates it to the period of kinetic art in relation to modern developments of interactive software, behavioral robotics, and artificial life in his masters thesis Behavioral Kinetic Sculpture. His work exists primarily as visual investigations into the emergent behavior of simple generative systems. He utilizes basic rule sets for programming the behavior of system entities, and then visualizes their interactions based on further rule sets.

Tarbell on the other hand has the tendency to create works that focus either on artificial life or growth as emergent behavior. He keeps a list of small, open source, projects for people to admire and learn from, all regarding the product as some form of emergent solution. Tarbell's work doesn't investigate systems like Reas's, but tends to offer ways for the audience to interact and become not just an observer of the emergence but a factor in it as well.

Levin's work is actually far more diverse than Reas and Tarbell's. He often makes pieces in a generative style, but always requiring some form of interaction from the audience. The work he creates won't come to life without an audience to interact with it, which is to me the main difference in generative style from Reas and Tarbell. His work definitely carries the same emergent qualities, as the different occurrences of interaction play off each other and slowly evolve into something, but it requires the initial seed to be planted by a human being.

All three of these artists work with the auto-creative aesthetic in mind. It would help to analyze a work in particular to get a sense of how this is done. One of my favorite pieces by Casey Reas, Process 7 (exhibited recently at the faculty exhibit; image on the back page), will do nicely.

The first aspect to review is the time/material/process factor which forms the basis for auto-destructive/creative work. Reas approaches this with a simple rule set, much in the same way that Sol LeWitt did with his wall drawings. By establishing the rule set, he states what process is undergone by the material over time. In the case of Process 7, the rule set is: "A rectangular surface filled with varying sizes of Element 1. Draw a line from the centers of two Elements when they are touching. Set the value of the shortest line to black and the longest to white, with varying grays between. Draw the perimeter of each Element as a white line and the center as a black dot."[1]

The time/material/prediction factor is somewhat outdated in this medium, since one can program their rule set and test it, review the product however many times and forms it takes on, and decide to change it given careful observation. It no longer exists as the time/material/prediction factor but rather the time/material/observation factor. Reas often spends little time coding his work, but a great deal of time reflecting upon it and making minor changes to perfect it to what he feels is suitable.

As Metzger pointed out, the falling bodies aesthetic becomes a rising bodies aesthetic in the case of auto-creative art. In generative art, the medium of software makes a big impact on how the aesthetic is perceived. There is a schism in generative art that I would say divides work based upon whether the generative aspect is from reproduction or from interaction. The rising bodies can either be quite literally, new bodies created through reproduction of previously existing bodies, or it can be the gestalt effect from the integration and interaction of multiple bodies. In the case of Process 7, the rising bodies effect comes from the visualization of interaction between invisible elements.

Metzger leaned towards auto-destructive work requiring the capability of fast subliminal speeds. I think this is not necessarily the case, so much as an amount of movement that is beyond human perception, whether it is dependent on individualistic movement or movement en masse. One could think of this as a formula: speed x quantity = subliminability[i]. Process 7 happens to be abundant in quantity of elements, but their speed is relatively low. In addition, the elements themselves are not visible, but rather the relationships between elements are visible. This adds another level of complexity to the subliminability of the piece.

The schism I mentioned earlier about rising bodies also applies to the aesthetic property of decomposition, dematerialization, and materialization (or in the auto-creative perspective; composition, materialization, and re-materialization). Process 7 initially begins with nothingness and quickly materializes into a composition. However, as soon as the composition has been formed it has evolved into something else entirely. The level of complexity within interaction leads to the re-materialization of the entire area. This form of generative art does not focus on the history of the elements so much as it focuses on the present context.

 Metzger's 6th property of auto-destructive work, "production of new form and colours through thermal activity" is rather specific in that it was created with the intention that auto-destructive work would exist in the physical realm, and that within the physical realm we can utilize heat and its subsequent result of fire to de-materialize the content of a piece, or equally use cold and its subsequent result of re-solidifying dematerialized matter. The thermal properties of most matter include a color changing effect that humans can identify with through experience (embers in a fire, coils on an electric stove, etc). When dealing with a software environment, all stakes are off when it comes to the physical nature of entities. The system relies entirely on the rule set provided by the author, in which case color becomes a property of whatever they specify. In the case of Process 7, color is never introduced, as it's not integral to understanding the interactions of the system created.

Generative art has taken the foreground in Metzger's 7th property of auto-destructive artwork, which is random activity. Although the randomness calculated within a computer is always an abstraction of some source, whether it's time or some generative algorithm, it has provided the largest field in randomness and complexity research and experimentation. Software has provided a medium in which seemingly random activity can be generated with little to no effort, and its results can be studied quickly and thoroughly. While the physical realm offers a more natural and analog approach to randomness, it can not offer it on demand or in a specific form. In Process 7 each invisible element has a directional vector of travel, which changes as it bounces off of the sides of the rectangular area. Its initialization is random but its travel can be predicted. However, a much higher level of random activity occurs through the analysis of the relationships of the elements as they move, which

 i) Subliminability: (noun) the qualitative measurement of an items ability to be subliminally interpreted. Not to be confused with "subliminable", a popular bushism.

increases complexity exponentially with each added element.

Discontinuous behavior can be seen in generative art, although mostly on the reproductive side of the rising bodies schism. This is most likely because the work identified with this sub-genre utilizes recursion and often times a synthetic life cycle, or electronic metabolism, that allows elements to die while their offspring live on. In works focusing on the integration and interaction of elements, the tendency of discontinuity doesn't arise nearly as much do to the fact that elements are not dying but rather changing their situation as a system. With Reas's work, the probability of seeing the exact same image twice is so staggeringly finite that to our human perception it is impossible (which is slightly more probable than winning the lottery).

Generative art creates irreversible processes by the entropy created in using large systems of decentralized simulated components. Generative art can attempt to simulate organic behavior in individual elements, but the real organic behavior arises from the interactions between elements. It's this same decentralized paradigm that is utilized in modern artificial intelligence research in artificial neural networks.[2] The organic behavior is simulated within individual components, but real organic behavior emerges from interaction between multiple components. Process 7 never attempts to simulate something from life, but rather creates a new form of organism unique to the software environment.

Metzger's last property states that the aesthetic experience of auto-destructive art should be revolting to the audience. Since generative art is the inverse of auto-destructive work, I was wondering if the inverse aesthetic could simply be applied; the aesthetic of attraction. It's common that generative pieces are designed to be soothing and attractive to the viewer's attention, sometimes even hypnotic. It is possible to make a generative art piece revolting, most likely through the combination of color and texture. This is usually not the goal of generative artists, and is often eliminated during the time/material/observation process.

It is clear that generative art is a contemporary form of auto-creative work, but it leaves the question; why has auto-creative art consumed the software realm and not the physical realm, and why has auto-destructive art consumed the physical realm but not the software realm?

I believe the most obvious reason why auto-destructive art exists in the physical realm is because destruction of physical objects is inherently more valuable an experience than the destruction of a simulated object. Within the physical realm, it probably took a while to create whatever the object was in the first place, and re-creating it after it has been destroyed is probably too difficult or too pointless (or a balanced combination of both) to attempt. This is not the case in software, where after creating something once it can be destroyed, recreated, and destroyed again. The ease in which elements are restored makes their destruction much less meaningful.

Auto-creative art exists in the software realm out of technological convenience. There are certain properties of auto-creative work such as rising bodies and re-materialization that simply can not be done in the real, yet done with ease in software. This same attribute of ease can be applied to the aesthetic experience of materialization, however materializing rising bodies in physical space can be impossible (depending on how those bodies are interpreted by the artist). It seems that the availability of a medium with the appropriate attributes has drawn the interests of the auto-creative community, and they have adopted it for their own purposes. I can relate this experience to my own work in information design, where I require the same software dynamics in information displays as the generative artists.

Generative artwork may not be confined to software for much longer, given recent technological advancements in the fields of nanotechnology, mesh networks, and claytronics, which is the development of systems of nanodevices that communicate to form dynamically shaped objects.[3] At this point in time, they are roughly micro-machine sized magnetically driven robots that can form two-dimensional shapes on a flat surface, but designs are already underway for robots that can construct three-dimensional spatial objects. Combined with

the ability of machines to self-replicate, the possibilities for generative display would be endless. However, this type of technological progression has some people imagining apocalyptic consequences, fearing self-replicating nanobots could spread uncontrollably like a plague and consume all living matter on the planet.[4]

There is also the aspect of commoditization of work. Auto-destructive work in the physical realm occurs only once, and lacks appeal to art collectors when their collectibles gradually destroy themselves. A piece that simulates its own destruction is even less valuable. On the other hand, auto-creative work that now exists primarily in the software world can benefit from its technological situation. While software art is usually not easy to commoditize given the ability to digitally copy it without loss, generative art has the unique ability to cross over from software into the static surface realm of print. A generative art piece can be run over and over countless times while coming up with a unique result every time. In this fashion, an artist could write a piece of software once and, given the current availability and ease of e-commerce, sell original prints, completely unique, to anyone who logs on to their web site. If an artist writes enough software that generates enough interest, the automated generation of prints could possibly fund their retirement, eventually pour into a trust fund after they're deceased, or be automatically donated to charitable organizations.

It seems clear that the direction auto-destructive and auto-creative work goes in is highly influenced by the adaptability of the medium to the ideas of the artist, as well as the aesthetic choices made in the quality of the dematerialization/materialization/re-materialization process. This in no way means that technology solely determines cultural outcomes, since culture will in turn reflect upon the state of things and drive technology in the direction deemed necessary. It is the ebb and flow between technology and culture that artists end up riding, reflecting upon, and often influencing.

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1) Process 7, Casey Reas. 2005.
< http://www.reas.com/iperimage.php?section=dam05&work=p7_s&id=0 >

2) Artificial Neural Network. Wikipedia. Oct. 31, 2006.
< http://en.wikipedia.org/wiki/Artificial_neural_network >

3) Claytronics – Synthetic Reality. Carnegie Mellon. 2003.
< http://www.cs.cmu.edu/~claytronics/ >

4) Grey Goo. Wikipedia. Nov. 2, 2006.
< http://en.wikipedia.org/wiki/Grey_goo >