

How I Drew One of My Pictures: * or, The Authorship of Generative Art

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Abstract

The concept of value is traditionally bestowed on a work of art when it is seen to be unique and irreproducible, thereby granting it authenticity. Think of a famous painting: only the original canvas commands genuinely high prices.

Digital artwork is not valued in the same way. It can be copied infinitely and there is therefore a corresponding crisis of value. It has been argued that under these conditions of the dematerialised artwork, it is process that becomes valued. In this way, the process of creation and creativity is valued in place of authenticity, undermining conventional notions of authorship.

It is possible to correlate many of these creative processes into instructions. However, to give precise instructions on the construction of a creative work is a complex, authentic and intricate process equivalent to conventional creative work (and is therefore not simply a question of 'the death of the author'). This paper argues that to create 'generative' systems is a rigorous and intricate procedure. Moreover, the output from generative systems should not be valued simply as an endless, infinite series of resources but as a system. To have a machine write poetry for ten years would not generate creative music, but the process of getting the machine to do so would certainly register an advanced form of creativity.

When a programmer develops a generative system, they are engaged in a creative act. Programming is no less an artform than painting is a technical process. By analogy, the mathematical value pi can be approximated as 3.14159265, but a more thorough and accurate version can be stored as the formula used to calculate it. In the same way, it is more complete to express creativity formulated as code, which can then be executed to produce the results we desire. Rather like using Leibnitz's set of symbols to represent a mathematical formula, artists can now choose to represent creativity as computer programs (Harold Cohen's *Aaron*, a computer program that creates drawings is a case in point).

By programming computers to undertake creative instructions, this paper will argue that more accurate and expansive traces of creativity are being developed that suitably merge artistic subjectivity with technical form. It is no longer necessary or even desirable to be able to render art as a final tangible medium, but instead it is more important to program computers to be creative by proxy.

[The paper refers to *Autoshop* software, available from <http://autoshop.signwave.co.uk/>]

Authorship

Traditionally, the concept of value is bestowed on a work of art when it is seen to be unique and irreproducible, thereby making it authentic and granting it 'aura'.^[1] More recently, emergent technical possibilities emphasise processes of creation and creativity in an age of infinite reproducibility. Therefore, through reproduction, this lack of aura accounts for the emancipation of the artist from the religious mythologies of creativity, authenticity and authority.

Although the 'author-god' might be dead (according to Post-Structuralist theory), we are forced to accept this 'death' as an inability to claim the privileged source of meaning or value of a work of art and artist.^[2] This is by no means new; there are numerous precedents for collaborative experimentation in creativity and automatism within a history of art-machines, robotics, and deferred

authorship: the use of chance by dadaists, and automatism by surrealists, aimed to stimulate spontaneous and collective creative activity and to diminish the significance of the artist. As the creating subject or author has largely been discredited and dematerialised over the years, there is a pressing need to examine new demarcations, and the functions released by this disappearance.[3] Perhaps 'the death of the author' is simply too literal, (too obvious and final) a metaphor to offer a critique of the productive apparatus by which contemporary creative operations using computers are organised and regulated.

$$\pi = 4 \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}$$

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if tools.currenttool=12 then
//TVifier tool
tp=rectangle(128,128,16)
twens=(sqrt(pow(abs(1dx-dx),2)+pow(abs(1dy-dy),2)) / 8 ) + 1
twensx=(dx-1dx)/twens
twensy=(dy-1dy)/twens
for twens=0 to twens // Sum of the squares...
twmx=1dx+(twens*twensx)
twmy=1dy+(twens*twensy)
tp.graphics.drawpicture myPict,0,0,128,128,twmx-16,twmy-16,32,32
tp.graphics.forecolor=tools.forecolor
for spaint=0 to 4*((twmy mod 2)*4) to 128 step 8
tp.graphics.drawline 0,spaint,128,spaint
next
myPict.graphics.drawpicture tp,twmx-16,twmy-16,32,32,0,0,128,128
next
drawgfx
end if

```

Fig. 1.

The mathematical value 'pi' can be approximated as 3.141593, but a more thorough and accurate version can be stored as the formula used to calculate it. By analogy, it is more precise to express creativity formulated as code, which can then be executed to produce the desired results. Rather like using Leibnitz's set of symbols to represent a mathematical formula, creative work can now be expressed as computer programming (itself necessarily mathematical, a creative practice in itself). Programming is no less a potential artform than painting is simply a result of technical procedures (paintings are 'readymades' according to Duchamp, as they use 'found' manufactured materials as a result of commodity production). Under the conditions of the dematerialised artwork, it is no longer necessary or even desirable to be able to render art as a final material object or dead-end commodity; it is as if process and code is now rendered as the material artwork.

Execution



Fig. 2.

When a programmer develops a generative system, they are clearly engaged in a creative act but what kind of process is being executed? An artist makes creative decisions to produce a final artwork, yet it would be futile if these decisions were the same every time. In this sense, the focus of creating generative art is not trying to achieve a balanced output, but to capture these decisions as logical structures. The computer executes these rules but never produces the same result twice. In this sense, the code could be seen to be more like the chaos mathematics used to simulate complex systems than a mathematical formula like pi. Ironically, perhaps this idea of unique execution could be seen to re-establish aura, yet the decisions the code takes to arrive at a final result are of little significance (as in the case of a random number generator, for example). Perhaps the lack of aura is maintained all the same.

Creative decisions are influenced by various indeterminable factors, and in this way creativity cannot be simply reduced to a problem-solving activity or code that makes decisions. A great deal of generative art appears to focus on giving the computer some limited form of intelligence so that these decisions can be made, either through the use of neural networks or reference-based systems. However, a great deal of these so-called creative decisions made by artists are driven by chance, or other imperceptible influences. Why attempt to capture a creative action as a formal logical procedure, when in fact a random decision is often more suitable? Throwing paint on a canvas is not governed by precise directions of where the paint will go, but simply by the decision to do so. The decision was made and the action was unpredictable. In the same way, code systems undertake decisions, but the actual execution is (or can appear to be) random.

Generative creativity

Clearly the production of generative systems through this precise execution of decisions (and not actions) is a rigorous and intricate creative procedure. Moreover, the output from generative systems should not be valued simply as an endless, infinite series of resources but as a system - and not just any system, but a social system. It is possible to resolve many creative processes into instructions, but crucially according to Csikszentmihalyi: '... creativity does not happen inside people's heads, but in the interaction between a person's thoughts and a socio-cultural context'.^[4] If this is the case, does the computer programmer then, offer a radicalised art practice that reflexively engages with the productive apparatus and social context? If so, this surprisingly echoes what Walter Benjamin recommended in 1934 for radical art practice:

'An author who has carefully thought about the conditions of production today... will never be concerned with the products alone, but always, at the same time, with the means of production. In other words, his [sic] products must possess an organising function besides and before their character as finished works.'^[5]

Both the laboratories of art and science require reflexive work to fully comprehend their processes. Invention and innovation is made possible by groups and individuals operating necessarily within social systems and specific discourses. By programming computers to undertake creative instructions, it is possible to argue for more accurate and expansive traces of creativity that suitably merge artistic subjectivity, social context with technical form. For instance, to make a system more intelligent it needs to operate socially, as with a Neural network that needs feedback in order to learn.

Emergent creative practices have sought to examine creativity in the light of scientific investigations in artificial life, simulating the characteristic processes of living things, from the operations of ecosystems and evolution to the encoding of DNA. Eduardo Kac's *Genesis*, commissioned by Ars Electronica 1999 is a striking example of this tendency. The key element of the work is the reproduction of an 'artist's gene', synthetically created by translating a sentence from the book of *Genesis* into Morse Code, and then converting the Morse Code into DNA base pairs according to a conversion principle specially developed for the work.^[6]

One consequence of this emerging field are wild claims exemplified by writers like Kevin Kelly (in describing the work of artist Karl Sims) claiming: 'The artist becomes a god'.^[7] It has to be remembered that the 'death of the author' (as well as Nietzsche's claim that 'god is dead') was a metaphor to site the production of meaning in the act of viewing or reading; and so counter supplied dogma of authoritarian communication and in the spirit of democratic politics, in other words.^[8] So any claim that meaning now lies in the code, or that reality has collapsed into the code (to paraphrase Baudrillard out of context), must be treated with a certain amount of scepticism. This is rather like the biological reductionism of much of the debate about genetic engineering that negates social structures.

Creativity has become the engine for 'cultural reproduction' in the factories of Western technoculture so caution is necessary.^[9] Creativity has become a buzzword for western governments who valorise their creative industries,^[10] and continue to mythologise individual practitioners for the benefit of 'cultural capital' and the 'free-market' - which tautologically isn't free at all. But these 'false gods' or ideologies do not go unopposed, with active networks such the Free Software Foundation promoting shared 'open source' code, collective authorship and the legal protection of free distribution.^[11] Moreover, it is significant to note that this year's (1999) Ars Electronica Golden Nica award (for 'net.art') was awarded not to an individual artist but to the *Linux* operating system, the operating system of choice for the Free Software Foundation. Based on a set of false principles, some 'hackers' have taken Richard Stallman, founder of the Free Software Foundation, and/or Linus Torvalds, the creator of *Linux* as god-like. It is interesting to note that people are eager to attribute religious properties to key figures in movements that question traditional notions of authorship and creativity. Addressing this issue, Danny O'Brien explains that 'when we don't understand the motivations of others, religion stands first in line to explain'.^[12] The spontaneous and irrational actions of the creative human subject seem to be neatly explained in the dogma that 'art is a gift from the gods'.^[13]

Autonomy

The core of human creativity is notoriously difficult to define, as an individual and social phenomena. These cultural anxieties are expressed in many forms including intellectual property, from the patenting of software code to human genes.^[14] It is somewhat ironic to note that both machines and humans are more or less programmed, but not through 'natural' causes but cultural determinants. This is a recognition that subjectivity is determined by other destabilising forces and that creative-subjectivity itself is socially encoded. Echoing one definition of subjectivity that lays emphasis on discursive frameworks, the artist is revealed to be a rhetorical invention operating in much the same way as a coded machine that follows a crude rule-based system, auto-generating what already exists. If the artist has always been 'automated' to some extent, this offers the opportunity to mount a critique of autonomy as much as creativity. The point here is not to build artificial intelligence or life but to question the artificiality of its deployment in creative endeavours (or something along those lines).

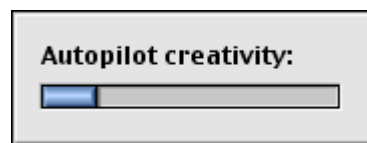


Fig. 3.

Many generative systems rely upon creating autonomous systems which can, to a limited degree, be aware of their surroundings, and therefore respond to their environment. The basic notion is that it applies logic it has learnt of the outside world to whatever input is given, causing new reactions which can be captured as creative output. However, trying to imitate art by imitating life is an unnecessary confusion. In this respect, *Autoshop* makes no attempt to be autonomous. It truly is a mechanic reproduction of creative decision-making, and so avoids the issue of 'artificial intelligence'. If a non-artificial intelligence system can still be seen to be creative (because the code is merely an extension of the artist's own logic) then there is no need to deploy artificial intelligence, as the artist already possesses intelligence (or not as the cause may be).

Creative agency

The creative subject has been traditionally viewed as possessing quite distinct cognitive and mechanical processes with other workers or machines playing a secondary subservient role. This has clearly changed but the auto-generative art-machine relies on its code, and as much as generating a deferral of authorship is still encoded and authored in itself. As Haraway says: 'it is not clear who makes and who is made in the relation between human and machine. It is not clear what is mind and what is body in machines that resolve into coding practices.'^[15] Former firm distinctions between biology, technology and code, are now unreliable, and under these changing conditions it is the issue of autonomy (rather than creativity) that appears most pressing. Both the social practices of science and art serve to establish myths of autonomy. Indeed, where does generative art generate from and under what conditions? There is a danger of excluding the possibility of the human subject as a potential agent of change in these scenarios.

If both humans and machines are conceived as coded devices, the computer programmer works in a tradition of a bricoleur in the assemblage and hacking of code, rearranging its structural elements. Coding is the ability to make judgements and render those as logic; for programming has always been about solving problems using logic. If we could resolve our creative impulses as series of logical decisions, we could code them. Yet, subjectivity is embedded in the social system like code itself. Its manipulation therefore is crucial to effective programming and an understanding of ideological processes.

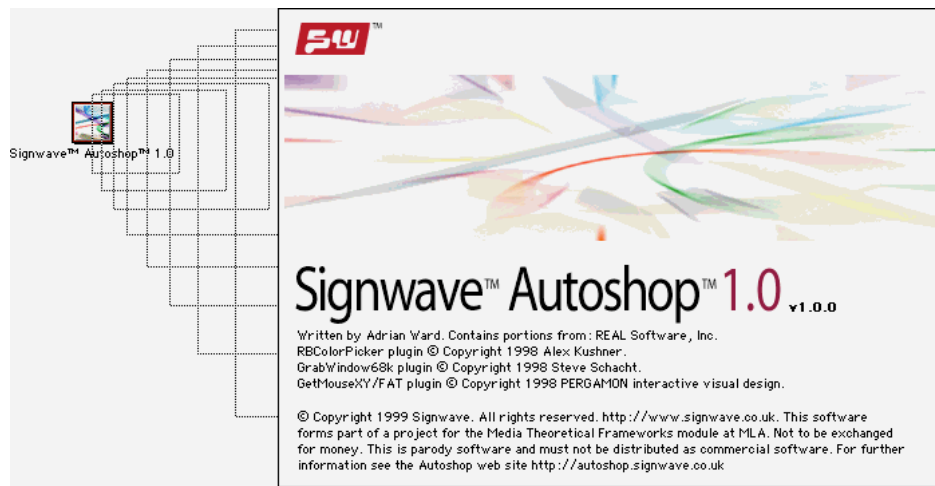


Fig. 4.

Numerous so-called creative works play with ideas of randomness, but it is intention and purpose that are crucial (in this way, the truism of monkeys with typewriters eventually coming up with the complete works of Shakespeare misses the point). Rather, *Autoshop* uses irony to articulate some of the expectations of commercially-available software and the limits of its functionality. Without this strategy, there is a danger here of irony merely perpetuating what it wishes to critique; in other words parody falling into pastiche. It purposefully breaks the logical sequence of prediction and consequence: if such and such, then do the following or something else. Extending this, one can make a compelling argument that *Autoshop* should only be appreciated as software, its output irrelevant. With this in mind, it is proposed that the next version of the software might 'patch' a bug so there is no 'Save As' feature at all. What this serves to emphasize is that creativity lies not in the modification of rules, but in setting the criteria for the rules, rather like conceptual art. Oddly, much 'neo-conceptualism' manages to avoid having a concept.

Practices that insist on separating form and function operate impoverished theories of representation. Creativity lies somewhere in the link between the act of representation and conceptual clarity. An automated programme might use its representational strategies but it has no concept in itself. This paper argues that responsibility for the concept as well as the criteria for the rules and code, remains in the domain of the author.

References

- The title of the paper is taken from Italo Calvino's 'How I Wrote One of My Books', *Bibliothèque Oulipienne* No. 20, in Raymond Queneau et al, *Oulipo Laboratory*, Altas 1995, explaining the formulation of structure in *If on a Winter's Night a Traveller*, Secker & Warburg, 1981. In turn, his title echoes Raymond Roussel's *Comment j'ai écrit certains de mes livres* Lemerre, 1935.

[1] This is a reference to Walter Benjamin's famous essay 'The Artwork in the Age of its Technical Reproducibility' (written in 1935/36), in *Illuminations*, London: Fontana 1992.

[2] Roland Barthes, 'The Death of the Author' in *Image-Music-Text*, London: Penguin 1982, p.146.

[3] This is paraphrasing Foucault, who writes: 'Rather we should re-examine the empty space left by the author's disappearance; we should attentively examine, along its gaps and fault lines, its new demarcations, and the reapportionment of this void; we should await the fluid functions released by this disappearance.' Michel Foucault, 'What is an Author?', in, Bouchard, ed., *Language, Counter-Memory, Practice*, p.128. On the removal of the Author, Barthes says: '(... the text is henceforth made and read in such a way that at all levels the Author is absent).... The Author, when believed in, is always conceived of as the past of his own book: book and author stand automatically on a single line divided into a *before* and *after*.' Barthes, op cit., p.145. Furthermore, it has become a postmodern truism to state that '... the artist invents nothing, that he or she only uses, manipulates,

displaces, reformulates, repositions what history has provided.' Douglas Crimp, *On the Museum's Ruins*, MIT Press p.71.

[4] Mihaly Csikszentmihalyi, *Creativity: Flow and the Psychology of Discovery and Invention*, Harper Collins Publishers: New York 1996.

[5] Walter Benjamin, 'The Author as Producer', in *Understanding Brecht*, London: Verso 1992, p.98; first presented in 1934, at the institute for the study of Fascism, Paris; Benjamin argues that social relations are determined by the relations of production and therefore progressive artists should try to transform those relations. Note: a popular alternative view to describe this is as a return to artisanship.

[6] Details on what Eduardo Kac calls 'transgenic' works can be found at

<http://www.ekac.org/transgenicindex.html>

Kac's *Genesis* was commissioned by Ars Electronica 1999 and presented online and at the O.K. Center for Contemporary Art, Linz, from September 4 to 19, 1999. Also see, 'Transgenic Art', first published in *Leonardo Electronic*, Volume 6, Number 11, 1998.

[7] Kevin Kelly, 'Genetic images', in *Wired*, 2.09.

<http://www.wired.com/wired/2.09/features/sims.html>, 26 August 1998. See also, *Out of Control* for more speculation.

[8] Barthes famously claimed '... the birth of the reader must be at the cost of the death of the Author', *Ibid.*, p.148.

[9] This refers to Pierre Bourdieu's use of the term 'Reproduction' that connects cultural phenomena firmly to the structural characteristics of a society, and shows how the culture produced by this structure in turn helps to maintain it, in Pierre Bourdieu, Jean-Claude Passeron, Richard Nice, Tom Bottomore, *Reproduction in Education, Society and Culture*, London: Sage 1990.

[10] Tony Blair, the UK Prime Minister is quoted as having said that 'I believe we are now in the middle of a second revolution, defined in part by new information technology, but also by creativity' and estimated to be worth £50 billion to the economy, in *The Guardian* newspaper, 22 July 1997.

[11] For more information, the Free Software Foundation's website is <http://www.fsf.org/>

[12] Danny O'Brien, 'Some Past and Future Clichés Regarding Linux' in *Mute Magazine*, Issue 12, 1999.

[13] Andre Spierings, 'You can't spell artifice without A-R-T', <http://hyperreal.webjump.com/> also, 'The Autonomous Artist in Theory and Practice'

<http://home.internex.net.au/~omgang/auto/TheAutonomusArtist.html> (sic)

[14] The *Guardian* newspaper's headline of 25 October 1999 carried the story that a US biotechnology company (Celera) was seeking to patent segments of the human genetic code. This goes against the British-led efforts to negotiate an Anglo-American accord to ban patents; to publish the code for each gene within 24 hours of its discovery (rather like the principles of 'Open source') thus making it freely available to the benefit of the world-wide scientific community as a whole (e.g. to tackle diseases and so on). In patent law, discoveries in nature are not seen as inventions; the counterclaim is that discoveries should be subject to intellectual property rights.

[15] Donna Haraway, 'A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s', in Linda Nicholson, ed. *Feminism/Postmodernism*, London: Routledge 1990, p.219.

Figures

1. How to calculate π , how to apply a graphic effect to a bitmap.
2. Toolbar from Autoshop

3. Progress indicator shown during 'Autopilot Creativity' in Autoshop.
4. Opening the Autoshop application.