

Generative Computer Art and the Unconscious

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Abstract

Psychoanalysis has proven to be eminently useful in art theory and practice, yet it seems generative art and computer-based practices remain outliers in this regard. This paper examines theoretical, historical, and contemporary contexts in which psychoanalysis and generative computer art can be brought into dialogue with each other. The discussion highlights how Jacques Lacan's cybernetic reconceptualisation of the unconscious and the Lacanian concept of the real offer ways to develop alternative lines of inquiry that depart from generative art's frequent preoccupation with genetic algorithms and ecological models. Antecedents for this conversation are located in psychoanalytic readings of surrealist automatism and in scholarship on machine art and computer art that implicitly connects psychoanalysis with a history of ideas relevant to generative art.

Contemporary machine learning tools present novel opportunities for artists to engage with Lacan's theory of the unconscious. In an outcome of my studio research, the black box of machine learning is reframed as a dimension of Otherness and fantasy.

The cybernetic unconscious

For Sigmund Freud, the discovery of the unconscious follows Copernican heliocentrism and Darwinian evolution by delivering "human megalomania [...] its third most wounding blow" [1]. This claim evinces a conception of psychoanalysis beyond a clinical treatment and as a radical theory of the human condition in which "the ego is not even master in its own house, but must content itself with scanty information of what is going on unconsciously in its mind" [1]. In his landmark work *The Interpretation of Dreams*, Freud outlines the theoretical basis for an investigative method to gain access to thoughts that have evaded consciousness. Central to this is the notion that dreams are presented as a rebus with the latent structure of intelligible sentences. Above all, the discovery of the unconscious reveals how "the most complicated achievements of thought are possible without the assistance of consciousness" [2].

Throughout the 1950s Jacques Lacan called for a 'return to Freud', accusing

ego-psychology, the dominant psychoanalytic paradigm at the time, of ignoring what was truly revolutionary about Freudian thought. In this context of a return to the radical core of psychoanalysis, Lacan points to a fundamental epistemological shift in Freud's theory at the turn of the twentieth century. Freud abandons neurology, transforming his earlier model of the mind into a properly psychoanalytic one by incorporating informational processes. As a result, the psyche "is no longer an apparatus" but instead "refers to something far more immaterial" [3]. Departing from a theory that localises mental phenomena within human anatomy, Freud transitions "from a mechanical model to a logical model" [3]. Lacan highlights how Freud "discovers the operation of the symbol as such" in the theory of dreams, that is, symbolic processes "working all on their own in the dream machine" [3]. The unconscious is thereby redefined in terms of an abstract machine that manipulates symbols autonomously. For Lacan, the advent of cybernetic machines reified this autonomous symbolic functioning of the unconscious, revealing how symbols "fly with their own wings" [3].

As an illustration of the symbol-processing machine in the unconscious, Lacan refers to a game discussed in Freud's book *The Psychopathology of Everyday Life* [4]. When someone attempts to say numbers at random, Lacan explains, the "associations which then come to him bring to light significations which reverberate so neatly with his remembrance, his destiny, that, from the point of view of probabilities, what he chose goes well beyond anything we might expect from pure chance" [3]. This example has a particular resonance with generative computer art, which has often relied on pseudorandom number generators as a means to the unexpected. The signifying

machine in the unconscious is a determined system, unable to create true randomness, analogous to the deterministic status of a computer program. In the production of dreams, slips of the tongue, jokes, bungled actions, and symptoms, the language of the unconscious involves a ciphering or coding that follows combinatorial rules like those of natural languages which regulate possibilities for combining letters and words.

The real

In *Seminar XI* Lacan addresses the problem of how the unconscious has been misunderstood as reducible to the symbolic [5]. Freud had already written about the navel of the dream, its mysterious central kernel that cannot be deciphered. One of Lacan's major contributions to psychoanalysis consists in the elaboration of this un-symbolizable aspect of the unconscious, which he calls the 'real'. The Lacanian subject emerges in language, "wresting existence from the real that it marks and annuls", yet what the symbolic produces is "in no sense substantial or material" [6]. The dimension of real subjectivity persists and insists as bodily enjoyment at the level of the unconscious. Due to the intervention of the symbolic into the life of a human being, the resulting human subject "solidifies into a signifier" and is thereby divided from itself as an indefinable living organism which is annihilated in the symbolic [5]. *Seminar XI* marks an important moment in Lacan's thought concerning how the unconscious is elaborated beyond its symbolic aspect to encompass the nucleus of the real that does not follow symbolic logic and resists discursive construction, even under the conditions of psychoanalytic treatment.

Slavoj Žižek is probably the most influential scholar who has applied Lacan's concept of the real to a philosophy of techno-science. In *The Parallax View*, Žižek draws on the idea fundamental to psychoanalysis that the human being is deprived of complete access to itself [7]. Crucially, the unconscious is nevertheless phenomenal — it is the way things are really experienced beyond the alienating appearances of consciousness. As Žižek puts it, in Lacan's theory of the subject "I am deprived of even my most intimate 'subjective' experience" [7]. The psychoanalytic unconscious therefore consists in a more radical and more unsettling "decenterment" than the cognitivist account of computational subjectivity in which consciousness is a "user illusion" concealing "blind asubjective neuronal processes" [7]. Žižek points to how psychoanalysis conceives of the human being as colonised from within twice over: on one hand by a "parasitic symbolic machine" (language working 'all on its own' as the symbolic unconscious), and on the other hand, by "the monstrous life-substance which persists in the real outside the symbolic" [7]. The distinction Žižek makes between techno-scientific and Lacanian theories of subjectivity exposes the potential of psychoanalysis as an alternative conceptual and critical apparatus to the prevailing biological, evolutionary, and ecological frameworks employed in generative art.

Surrealist automatism as generative art

Philip Galanter's essay *Generative Art Theory* contains a widely cited definition of generative art as any practice in which the artist cedes control to an autonomous system that determines features of an artwork or results in the production of a

completed work [8]. Accordingly, the field of generative art is detached from any specific tools or historical context and is "as old as art itself" [8]. This perspective invites a reconsideration of certain art historical practices and movements. Surrealism is one example, penitent to my purposes here due to its relationship with psychoanalysis.

Applications of certain surrealist techniques such as frottage and decalomania could be considered as generative art methods because they allow the agency of material processes to determine features of an artwork. These are reasonably simple examples that conform to Galanter's definition, provided certain physical and chemical processes determine specific aspects of the outcome which an artist is generally unable to predict. These processes would thus comprise a system possessing a degree of functional autonomy from the artist. In such cases, surrealism intersects with generative art without relying on the concept of psychic automatism and a surrealist account of the unconscious. This is important because surrealist notions of the unconscious depart significantly from psychoanalysis — it is rather psychoanalytic readings of surrealism that allow for connections to be made between Freudian thought properly speaking and surrealist generative art.

As outlined in André Breton's first *Manifesto of Surrealism*, psychic automatism is a privileged mode of artistic production dictated by an inner voice ordinarily split off from consciousness. Automatist practices aim to give free reign to unconscious speech, for which surrealists are to become "modest recording instruments" [9]. This conception of a generative art practice may have been original insofar as it proposes that artists are also their own 'external' generative system. However,

Breton does not adopt a psychoanalytic understanding of the unconscious. His implicit claim is that surrealists can, via psychic automatism as a method of generative art, engender an unmediated speech of the unconscious. Breton does not posit any limit to self-knowledge. In his theory of the unconscious, it is possible to merge dream and consciousness “into a kind of absolute reality, a surreality” [9].

In *Compulsive Beauty*, art critic and historian Hal Foster observes how “certain surrealist practices intuit the uncanny discoveries of psychoanalysis” [10]. An important point in this study is that key Freudian ideas, such as the concept of the uncanny, were not directly used by surrealists. Foster also covers a number of ways in which surrealist thought is at odds with psychoanalysis. A thesis developed throughout the book is that “surrealist automatism suggests not liberation but compulsion” [10]. Against surrealism’s celebration of automatist practices, Foster emphasises the uncanny and traumatic dimensions of automatism as understood through the lens of psychoanalysis. In this way, Foster’s psychoanalytic reading of surrealist automatism connects Freud’s theory of the unconscious with surrealist generative art. This raises the question of how contemporary practices might likewise make use of psychoanalysis to reformulate the association between generative art and the unconscious established in surrealism.

The uncanny in machine art

Andreas Broeckmann’s *Machine Art in the Twentieth Century* traces the genealogy of diverse practices that explore machine aesthetics and human relationships with technology [11]. This study provides much valuable analysis of the different fields, movements, and

terms in the history and aesthetics of ‘machine art’ — a term which itself has been used relatively rarely and defined inconsistently. Broeckmann proposes a more robust definition of machine art as “artistic works and practices that implicitly or explicitly articulate the relation between subjects and machines” [11]. An important argument Broeckmann develops is that the ‘machine’ must always be constructed in an artwork: the human subject speaks of a machine, which is not a technical category but rather an imaginary entity that emerges only “in the very instant when it is addressed” [11]. One way this is illustrated concerns a “slippage” found in the writing of computer art pioneer Frieder Nake, whereby the computer becomes a computing *machine* precisely at the moment when it is referred to in an encounter with the human artist [11]. The arrival of the computer does not necessarily entail a break with notions of the machine in art, inasmuch as computers may continue what Broeckmann calls the “myth” of the machine, that is, the machine as “a stand-in for the apparatuses that subjectivate living beings” [11].

By addressing something as a ‘machine’, Broeckmann claims, “it is always already conceived as a partly autonomous and subjectified assemblage”, and furthermore, “viewed as an aesthetic signifier, the machine regularly appears to be intimately tied to the concept of the uncanny” [11]. The persistence of uncanniness in the history of machine art is found across examples in the book from different periods: Bruno Munari’s useless machines in the 1930s and 1940s, Gustav Metzger’s autodestructive art in the 1960s, Harald Szeemann’s exhibition *The Bachelor Machines* in the 1970s, Stelarc’s prosthetic ‘Third Hand’ performances in the 1980s, and Maurizio Bolognini’s *Sealed Computers* in the 1990s. The experience of the uncanny is

thus “part of the aesthetics of the machine whose automatism appears to testify to the involvement of some other agency, or mind” [11]. Despite this prevalence of the uncanny, Broeckmann seems to dispense with Freudian thought rather quickly, leaving out any question of what psychoanalysis can contribute to understandings of the uncanny in machine aesthetics.

As Anneleen Masschelein acknowledges in one of the fullest, most in depth studies on the uncanny, the psychoanalytic conception of the uncanny is the primary focus of a continuing fascination with this concept in culture and theory alike [12]. Broeckmann’s emphasis on the concept of the uncanny would seem to imply the relevance of psychoanalysis to machine art, a field which, via Broeckmann’s notion of the myth of the machine, shares conceptual territory with computer art, and by extension, generative art.

Computer art’s hidden patterns

Grant D. Taylor’s book *When the Machine Made Art* documents the ‘troubled history’ of computer art from its origins in the 1960s through to the 1990s when computing practices became increasingly integrated with the discourses of digital art, new media art and generative art [13]. Taylor points to how computer art was met with antagonism in the domains of both science and fine art, on one hand for its scientific irrelevance, and on the other hand for its “scientific and technocratic heritage” [13]. Within the world of fine art, both humanist and anti-humanist perspectives rejected the computer as “symbolic of modern rationality and instrumental control” [13]. For humanists, the computer dehumanised art, and for anti-humanists, the repudiation of the computer was tied to critiques of technocratic reason. Despite this status

as outcast, within the discourse of computer art itself there was a somewhat hyperbolic celebration of practices that were “the ultimate synthesis of science, technology and art” [13].

Whilst there was an impulse to “privilege the rational”, computer art nevertheless produced its own mythology, which Taylor identifies in the figure of the pioneering explorer, “a figure who explores the limits of the known world” [13]. One significant way in which this pioneering spirit manifested was in the contributions computer art made to fractal geometry, which “demonstrated the computer’s ability to recreate nature’s hidden patterns” [13]. Taylor underlines how models of the natural and the biological became an enduring presence in computer art, and it would seem that the symbolic dimension of human life did not hold the same widespread appeal for computer artists. However, an exploration of the hidden symbolic functioning of the unconscious would appear to align well with the characterisation of computer art as preoccupied with making visible the concealed processes of everyday reality.

In a similar vein to Galanter, who views generative within a history extending much further back than the twentieth century, Taylor writes that “the dream of conflating artificial systems and life can be traced back to Enlightenment automata” [13]. The conceptual underpinnings of generative art discourse are thus linked to the mechanisation of biological life. Although biological metaphors were implicit in early computer art, in the late 1980s the concept of evolution came to fore as a mechanism which could be replicated algorithmically by computers, and which allowed for the creation of potentially infinite and complex forms. Taylor claims that the emergence of generative art discourse is closely tied to the paradigm

of artificial life, highlighting that in the 1990s many artists developed computing practices to explore notions of emergence and “endless excess” [13]. As a consequence, generative art, and particularly computing practices, became associated with the themes of evolution, artificial life, and emergence. This may go some way to explaining why so far psychoanalytic theory has remained largely absent from generative art.

Nevertheless, computer art was theorised in relation to the work of major twentieth-century thinkers outside of science. Discussing the “trend toward criticality”, which appeared progressively from the mid-1980s, Taylor mentions the prominent French theoreticians Michel Foucault, Jacques Derrida, Roland Barthes, and Jean-François Lyotard [13]. Additionally, Taylor suggests the work of Gilles Deleuze and Félix Guattari, who used biological metaphors and notions of the machine extensively, is part of the technological discourse pertinent to generative art and of her contemporary computer-based practices. Given all these thinkers were Lacan’s contemporaries, his absence might seem somewhat conspicuous. As explained above, psychoanalysis was already implicit in the history of generative art via surrealist automatism and the concept of the uncanny in machine art. The lack of direct engagement with psychoanalysis underpins my ongoing practice-led research, which considers what Lacan’s theory of the unconscious might offer to the field of generative computer art.

Studio outcome

The Hole in the Mirror Machine (2020) is a digital moving image and sound work incorporating a series of generative methods, beginning with self-portraits taken whilst I was simulating a state of sleep. These images were converted to

texture maps to generate a 3D terrain such that the contours are determined by image data, with shadows corresponding to deeper areas and highlights to higher ground. The original self-portraits were reused as a final texture layer for the surface of the terrain. The resulting graphical landscape is explored through the flight of a virtual camera, giving rise to anamorphic forms in the terrain as the camera’s movement reconstructs the face or facial features by arriving at certain positions or angles where the forms become recognisable.



Figure 1: Still from 'Hole in the Mirror Machine' (2020). Digital moving image and sound, 3m 35'.

A voice over, produced using a text-to-speech program, accompanies the moving images. The spoken words, along with the title of the work, are taken from outputs of a pre-trained machine learning text generator model (OpenAI’s GPT-2), which was fine-tuned with draft chapters from my PhD thesis in an attempt to reproduce the style and content of my own writing. This speech is clearly a kind of nonsense, though at times it seems vaguely intelligible, resembling styles of poetic language such as outcomes of the Dadaist cut-up technique. The colour and lighting add to an atmosphere of liminality between the zones of sleep and wakefulness, recognition and opacity, and human and machine.



Figure 2: Still from 'Hole in the Mirror Machine'.

The image of one's face in a self-portrait typically belongs to the realm of what is most intimate and familiar. Generative processes in the work manipulate self-portraits, opening the possibility for a shift from the familiar to the unfamiliar and a blurring of this dichotomy. The face transforms into something like an empty sack or a deflated balloon, deformed ears and other parts sprout from a surreal landscape, while in other moments the face is reduced to surfaces of skin and hair without any decipherable features of a human head. A comparable shift occurs with the text: one's own writing can become strange and depersonalised through the computer's generative simulation and in the tonalities of the 'canned' machine voice.



Figure 3: Still from 'Hole in the Mirror Machine'.

The work is principally engaged with the notion that markers of one's identity can be exposed as something foreign or 'Other' by means of autonomous symbol-processing procedures. Central to this is the idea of creative production carrying

on whilst the artist is asleep, or is simulating sleep, as part of the act of handing over control to an external system. This links the generative computational processes to the formation of dreams. *The Hole in the Mirror Machine* connects the autonomy of the computer's role in the art making with how the unconscious manifests as an Otherness that speaks through the subject, such as in dreams or slips of the tongue.

Phantasmatic black boxes

Lacan's famous dictum, "the unconscious is the discourse of the Other", makes his position clear that the unconscious is not simply 'inside' the subject [3]. Rather, the unconscious is governed by an external, distributed, transindividual symbolic order apparent in the operations of speech and language. What this also emphasises is the externality of the subject's most intimate expressions, which rely on a symbolic dimension of Otherness as the locus of agreed, conventional meanings. This is evident in how even the most spontaneous verbal responses take on an inherently symbolic form ('Oh my God!', 'Rats!') within a framework of rules belonging to a given community of language speakers who co-determine meaning ('Ouch!' in English, 'Aïe!' in French), — they are not private, made-up terms. The notion of the symbolic order as an external system is pivotal to Lacan's central claim that the unconscious is structured like a language, which is to say, the unconscious is composed of a chain of signifiers that unfolds according to rules like conscious discourse. Lacan stresses how the unconscious signifying chain "continues to run on beneath the surface, express its demands, and assert its claims" [14]. The unconscious thus entails a kind of automatic foreign speech

which can distort the consistency of conscious discourse.

The *Hole in the Mirror Machine* addresses the question of how generative computer art can make use of Lacan's ideas that connect computing to the autonomous functioning of language in the unconscious. One way this is explored is through the application of machine learning. The GPT-2 text generator model was pre-trained on a large corpus of text (forty gigabytes' worth in the version I used) scraped from the Internet to learn how to produce compelling examples of human language, before it was then fine-tuned to simulate my own writing. Machine learning presents novel opportunities to engage with ideas of the unconscious in its dimension as the Other's discourse, as an external repository made up of foreign material, which may disrupt the experience of consciously constructed identity. For example, by handing over control to the fine-tuned GPT-2 model, my work included text that departs from or contradicts ideas in my research, such as a line at the end which refers to an "installation that evokes a multi-layered story of humanism and technology in generative computer art". In such moments, the influence of the much larger body of 'foreign' text deployed in training the model interferes with the computer's capacity to produce anything I might perceive as resembling my own writing. This reveals how other people's writing, and how other people might speak about ideas in my draft thesis chapters, inevitably occupies a disruptive position in my own work, with the potential to engender conflicts at the level of conscious identity. As the psychoanalyst Bruce Fink puts it, "the unconscious is full of other people's talk, other people's goals, aspirations, and fantasies" [6].

In this paper I have sought to open possibilities for dialogue between psychoanalysis and generative art. In the context of contemporary computing technologies, one direction this discussion may take is to consider how the opacity of computational reality — the hidden dimension of the computer's manipulation of symbols — functions as a phantasmatic space. The Lacanian subject is divided, constitutively alienated from its own being, by emerging within a field of Otherness and fantasy in which symbols take flight on 'their own wings'. This theoretical perspective offers a compelling lens through which to view generative computer art and its defining concept of the agency of external systems.

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