

Digital Technologies and Generative Production: Art in the Age of Intelligent Machines

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Abstract

This paper offers a discussion of the history and theory of digital technologies in the visual arts and media. Areas of analysis include the history of electronic and digital arts design and practice, the history and theory of vision and imaging technologies, and theories of the spectacle in relation to virtual environments. The emphasis is on the relation of digital media to the development of the visual arts and the transformation of popular visual culture. The theoretical works cited include Norbert Wiener's Human Use of Human Beings, and texts by media and cultural theorists N. Katherine Hayles and Lev Manovich. These critical interlocutors provide a standardization of terminology that allows for a "cross-section" of language between scientific, technological and aesthetic fields. In my argument, I focus primarily on the role of the generative in the form and meaning of new media production.

Introduction Signal to Noise: Cybernetics Hold on New Media

One of the beautiful ironies of new media work is that the very thing which makes it most machinelike is also the quality which brings it full circle toward the organic: self-automation. Digital production is the most lifelike mode of representation one can experience. Not the most realistic or realist, but the most lifelike, in the sense that the digital format has the potential, like all cybernetic systems (human, social, machine) to create feedback and noise.¹ At their most complex, the dynamics of new media production relate to a generative system. As Norbert Wiener, the founder of cybernetics, points out, the nature of cybernetic machines is to continue whether "we" are there or not. To slightly rephrase the motto of the Tyrell Corporation, new media production is more real than realist.² What one finds in new media is a move away from the mimetic that has defined the boundaries of classical autonomous representation and a move toward the "systemic" as aesthetic.

In this paper I look at the ramifications of cybernetic theory, specifically the demands of contingency, feedback, and automation, on the workings of a generative aesthetic in new media production. I argue that particular forms representative of the categories of "new media art" or "new media" in relation to popular visual culture make a break with the tradition of plastic arts and film/video history exactly in regard to the issue of the generative. I use concepts basic to the theory of cybernetics as instructive guides by which to discuss "new" paradigms of cultural production that, as this paper argues, are influenced in equal parts by the history of computing as they are the history of aesthetics. I introduce some theoretical vocabulary in order to situate a discourse of new media and the history of that discourse, then go on to address three genre of new media works as different examples of a "generative aesthetics."

In 1951, Norbert Wiener wrote in his text for the lay person, the Human Use of Human Beings, “I class communication and control together”, and one directly recognizes in that phrase the C3 structure at work in the premise of cybernetics: communicate, command, and control (16). The transmission of information, not robotics or machine-genetic hybrids, is the mandate of the science of messages; the organization of information and the ways in which that information becomes disorganized relates information theory to the first and second law of thermodynamics.³ In other words, the paradigm shift rests with neither the computer (the tool) nor the acting subject, but with the relay of information itself. That shift from actor to *action* in regard to information is what media theorist N. Katherine Hayles means by the “posthuman.”⁴

Information scientist Gregory Bateson famously asked, “is a blind man’s cane part of the man?” That question points to, among other things, a fundamental shift in Western conceptions of autonomy: the human subject, in the Bateson information system, is always in relation to other information provided by sentient beings and objective phenomena. Information theory and cybernetics are beholden to the modern digital computer and computational networks such as the Internet for their greatest realizations. Nonetheless, in the science of cybernetic, the coin of the realm, the only thing with final value, is information—the possibility and probability of the relay of information.⁵

Wiener ascribes the modern innovation of cybernetics not to the giants of science, but to the work in statistical mechanics by the nineteenth-century American physicist J. Willard Gibbs. It was Gibbs’ poor calculations but brilliant insights on the theory of probability that set the stage, mathematically speaking, for the information and computing revolution that began with the innovations of the Second World War. Gibbs introduced the concept of probability into the predictable world of Newtonian motion and its analogues contingency, entropy and noise were also born. With probability and contingency, the possibility of feedback enters into the relation of systems as a fundamental feature of *communication*. The concept of feedback acknowledges the potential of communication to take multiple forms, where “best” is contextual and contingent, not hierarchical (thus Wiener’s talk of “multiple worlds” engendered by cybernetics is absolutely literal). Feedback is the notion that a system—an individual, a society, a machine—is *en rapport* with another: they are able to communicate back and forth (HUHB 33). Feedback becomes a crucial concept in our experience of new media. One begins to address systems that harbor complexity not in a finite form but a generative one.

I. The Question Concerning New Media: *principle of variability*

If one uses the standards of classical aesthetics (autonomy of form, singularity of vision, and totality of message), there is no art in new media. It might work wonders for a decentralized weapons system in a world of intelligent machines, but this has nothing to do with aesthetic works. From the perspective of a history of grand autonomous forms, new media is just so much “noise.” Yet one finds, parallel with Norbert Wiener’s insistence on feedback as essential to

any cybernetic system, among scholars of new media and its artists that probability and variability define the form.

New media is digital production. Its forms, text, image, or audio, are created from the numerical representation of information by a computer. One might also say that new media is the form produced (the thing readable in human-computer interface [HCI] such as the image or text or sound) as well as the software program (computer language) used to produce it. In discussing the ontology of new media works, one arrives at a rather paradoxical conclusion or, perhaps rather Heideggerian elocution: new media art is its objects and also its forms, and its forms are fundamentally that of contingent, variable, and therefore generative systems.⁶

There is a “question concerning new media” because new media, unlike the plastic arts and unlike the history of machinery, has no absolute object and no finale form. What describes new media production is that a computer can represent any signal that can be rendered into digital code. It is not photographic or mimetic; it is *virtual* in its renderings. New media is world of mathematical language with a thin skin of “narrativizing” images and sounds (HCI and GCI [graphical computer interface]), which creates the synthetic membrane connecting the two modes of articulation. What is “new” about new media is at least a half-century old.

It begins with the history of intelligence and computer science during World War II and continues with the cold War paranoia that built the distributed, self-organizing system of the ARPAnet (what became the Internet). That our aesthetic tools have a clear history in our military ones is an initial point in understanding the network, or systems logic, that must be applied in discussing new media works.⁷ What makes new media fundamentally different from old *tele* media, such as radio and television, and most like a cybernetic system are the attributes of variability and potential for feedback. These two qualities are also, I contend, what make for the most important and engaging attributes of new media aesthetics.

Lev Manovich, in the introduction to The Language of New Media, writes:

Although I deduce the *principle of variability* from more basic principles of new media—numerical representation and modularity of information—the principle can also be seen as a consequence of the computer’s way of representing data....as variable rather than constants. As new media theorist and architect Marcos Novak notes, a computer—and computer culture in its wake—substitutes every constant with a variable (15).

One might argue that the primary point Manovich makes in the book as a whole is to answer the fundamental, though not simple, question: What is new media? One does not ask with the same formal, materialist focus, What is film?

The limit of new media is an issue, i.e., its formal boundaries are unclear. If it is anything that can be translated into 0’s and 1’s then it is literally limitless. It is not only the audio-visual spectrum, but it is also the algorithmic rendition of smell or temperature or gravity. The sprawling nature of “new media” as an unlimited form also raises parallel questions about what are the aesthetic parameters. This too is a “borderless” question that haunts new media production. What I outline

below are some of the ways one already begins to find patterns or “systems” in place for addressing the kind of post-autonomous (yet certainly not post-automated) forms that one encounters with new media. I argue that the “systemic” on one hand and the “indexical” on the other define new media aesthetics.

Manovich gives a list of six attributes by which the behavior of new media can be identified.⁸ I choose three terms from this list on which to focus, as I argue that they are the critical terms to understanding what differentiates digital media production from mechanical and plastic works. The first term is MODULARITY, which addresses the recombinant aspect of digital production, i.e. that it is interchangeable on all level of production (LNM 30). Examples of the modular aspect of digital media include HTML code, the PhotoShop graphics application, or an alternative Internet browser such as Maciej Wisniewski’s Netomat, which bundles all aspect of digital signal in the same manner. The second term is AUTOMATION, which is to be understood as a self-organizing process beyond the mechanical. One experiences on a daily basis the low-level automaton processes the computer performs without the necessity of human intervention, such as word processing, graphics, and animation. High-level automation, as Manovich writes, “requires that the computer *understands* the semantics of the situation—interpretation is needed, not blind robots—intelligence” (LNM 34). AI (artificial intelligence) would be the best example of computer self-automation, but the most practical example in regard to human-computer interface is the computer video game. Within the tightly constructed game universe (less complex parameters than real life) the game engine is able to respond with comparative “intelligence.”

The third term is VARIABILITY (LNM 36). Variability is related to the same kind of “play” of digital media modularity marks—the fundamental recombinant of digital code. But instead of the bits that make up a virtual object, variability relates to the “infinite aspect” of any object created. In other words, with digital production, there is no final version, only the last version. In terms of a traditional discourse on aesthetics that relates to plastic objects, or even for the most part film and video, this is a major departure.

The variability of digital media, in my mind, has a firm relation to its *tele* presence (as in *tele*communication). It is the speed of new media aesthetics, being both the speed at which it moves and the speed at which it changes, that determines the boundaries of new media cultural production. Without a doubt, other media have addressed time-based forms (film, video, performance, etc.). Digital media though does not *play back* from a finite pattern; it is fundamentally *composed* of the time of transmission (Virilio). New media is marked overwhelmingly by the desire to notate the movement of information. It engages whole heartedly in the collection and redistribution of “messages” (audio, visual, and textual) and much less in the “original” production of them.⁹ The focus on the mode of information relay and not so much on the necessity of the message is already a kind of cybernetic engagement.

With the fundamentals of modularity, automation, and variability, one is taken into a realm of the synthetically complex. In his 2003 study on media culture,

Connected, cultural theorist Steven Shaviro, describes the post-cybernetic era by using the language of the “integrated circuit”:

Our current understanding of networks dates from the development of cybernetic theory in the 1940s and 1950s. The model has since been greatly elaborated, notably in the chaos and complexity theories of the 1980s and 1990s. As it seems to us now, a network is a self-generating, self-organizing, self-sustaining system. It works through multiple feedback loops. These loops allow the system to monitor and modulate its own performance continually and thereby maintain a state of homeostatic equilibrium. At the same time, these feedback loops induce effects of interference, amplification, and resonance. And such effects permit the system to grow both in size and in complexity (10).

On the authority of cybernetics, the science that in effect granted us the forms of new media, one can say that new media art is software, information relay systems, the linking of remote locations, and the connection of disparate forms of communication and/or representation.

Using the same gauge, one can also make a clear distinction: one thing that new media art is not is simulacra. In a sense, the painter Magritte provided the iconic “picture” of simulacra for the twentieth-century with his painted image of a pipe under which appears the inscription, “ceci n’est pas une pipe” [this is not a pipe]. I would contend that the telos of new media is not an endless cascade of the enframing of an image within an image (simulacra), but the affect of speed. New media is the creation of the parallel, the simultaneous, and the virtual. Its is an “aesthetics of disappearance” to quote the French technology theorist Paul Virilio that defines the appearance of a culture of information: the generative not the representational. For example, in the film The Matrix the world in which the protagonist Neo moves is pure simulacra—it is the rendering of an *image of the real world*. When Neo “wakes up” from his cocoon-like existence in the matrix he is able to see the code structure that *generates* the matrix. If new media aesthetics are to be taken seriously on their own terms, it is the code that is the artwork not the simulation.

II. New Media Art as Macro Pattern: Martin Wattenberg’s Idea Line

The Whitney Artport is an online gallery of digital works organized by curator Christiane Paul that has been in existence since February 2002.¹⁰ Among the new additions to the commissioned works, one finds on the site the piece Idea Line by mathematician and artist Martin Wattenberg. Idea Line is a networked artwork that loads from an individual browser page. On the level of pure affect, it is a media sculpture composed of delicate white tentacles, which gently sway across the black background with the slow-drag elegance of under water motion. Nonetheless, and with new media the question is always shortly coming, one asks, “What does it do?” Historically, the use value of art has been anathema since the concept of “art for art sake,” even as use value has been continuously debated. Perhaps because of its military as opposed to atelier history, new media begs that question.

To the end of “use”, one finds coordinate markers at the bottom of the Idea Line page, designating “geometry,” “brightness” and “total art works.” At the top of the screen there is a list of numbers beginning with “pre-1995.” When one runs the cursor across the page the white tentacles open up to reveal buried fields of information. The movement is elegant, superfluous, and necessary. The movement and feel of the piece is superfluous in the sense that all the information Idea Line contains can be displayed in text-only lines. The formal presentation adds nothing to the functionality of the piece, yet without the form there would be pleasure, no delight, and no art to it. The piece presents a tension between the indexical, that which is purely information, and an aesthetics of information.

What Idea Line “is” in fact—well at least in its relations of facts—is a kind of cartography. Because of the *te/e* mandate, the movement of new media, Idea Line is able to chart its course across the axes of space/time. If an analog map charts space and an analog clock charts time, one finds both arms at work in this digital map. When one scrolls across the floaty white lines on the page one discovers an archive, a history of new media work broken down by date and category. Halting at any point in the chart, one can click on a hyperlink and go directly to that work of art. Even though new media is a world composed of the purely virtual, ironically, the access to the “real thing” is quite direct. Unlike a catalogue or photograph of a work, when one clicks the hyperlink and arrives, like a time warp, at the “original” 1994 Alan Sondheim Internet Text electronic writing or any other work indexed.¹¹

In describing Idea Line, Wattenberg uses the metaphor of tapestry to describe his project, which is apt considering that Ada Lovelace and Charles Babbage’s first collaboration in automated machinery were the punch cards for the Jacquard Loom that inspired the first Difference Engine. Idea Line “weaves” together various forms of new media production, interconnecting diverse category such as “animation” and “politics” or “software” by simply creating a hyperlink timeline. The artist writes on the “how to” page:

The Idea Line displays a timeline of net artworks, arranged in a fan of luminous threads. Each thread corresponds to a particular kind of artwork or type of technology. The brightness of each thread varies with the number of artworks that it contains in each year, so you can watch the ebb and flow of different lines of thought over time.

As the piece itself is labeled and as the artist describes it, Idea Line raises the issue of the endless quest for the “total art work”. Even though the term is used in a purely matter of fact, uninflected way, it is difficult not to hear in relation to new media aesthetics the call of the nineteenth-century “total artwork,” the Wagnerian *Gesamtkunstwerk*, that is as much parody as it is tragedy in the urge for formalist totality. In this specific instance and in general, new media presents a “synthesis” of all forms. Like theater, like the immersive context, all signals are channeled into one code form, be they text, image, or sound. The point of separation from the traditional “synthesis” of the total artwork, new media’s mark of differentiation is that its signal is always a meditation on mediation: one finds virtual worlds, not representative ones. Part of the beauty of the works produced

in digital media is that in the effort to reach a totality they most often point to their lack, their place of rupture and impossible completion. Idea Line longs, as much as any software can desire, to fulfill its mandate: archive the entire history of digital art, or at least that which is functional on some level as a networked project. It is a manifestation of archive fever (Derrida) that also points to the open-endedness of the endeavor. Idea Line is sculptural in its manifestation of modularity, recalling more Schwitters's endless Merzbow than the monumental. One might also ask, quite fairly and reasonably, How is this art?

II. Generative Art: Definition of Form

How is digital production art, or in what way is it aesthetic? It is not the simulation or the "illusionistic" aspect of new media production that I would describe as "new." Issues of representation and simulacra are as old as, well, representation. What is a primary coinage of new media forms is the potential for a work that is self-automating not in a mechanical structure of simple repetition but in a generative structure of an amalgamation of systems or structures. Idea Line demonstrates a modularity (finite bits of media information in moveable patterns) and variability (a lack of finiteness) in the basic concept of its construction. It is a continually aggregate work. It also, as a secondary function, provides a degree of automation: the hyperlink connections direct the user to the archived work. What I would like to look at in the next set of examples is the function automation plays when it is taken as the primary organizing set for a digital work: what is at stake with a generative form?

If one opens the page wryebread.com, one is greeted with the scene of a rather innocuous animation: a small flock of seagulls circling over a body of water with a mountain in the background. The birds dive, leaving circles spreading out in the water, their calls echoing off the landscape. It is a dulcet scene, not much happening, something more or less along the lines of a very nice screen-saver program.¹² The piece *Birds and Water*, by M. Natal, October, 2002, is posted with the dedication, "Searching for peace after the towers fell." It can be found on the generative.net Web site, and one thing that the piece does not do is repeat itself.¹³ There are ebbs and flows in motion. The birds move together and apart, similar to a real flock, and, one of the rules of the program, they never leave the confines of that virtual space. The algorithm on which the program is based is a generative one. It continues to create permutations of a pattern. Within the set parameters of its "world" the program is self-organizing and self-differentiating. The work is time-based, a telepresence that depends on its own proliferation of information to exist.

Starting with works from 1999, generative.net lists several hundred generative art pieces that span softwares from "infinite" sound compositions to low-res digital video streams. The definition of generative art, given by the artist-innovators of the form, relates to the "progressive" automation of a code sequence. Adrian Ward describes the generative in relation to process:

Generative art is a term given to work which stems from concentrating on the processes involved in producing an artwork, usually (although not strictly) automated by the use of a machine or computer, or by using mathematic or pragmatic instructions to define the rules by which such artworks are executed.¹⁴

Ward's colleague Philip Galanter focuses on the artist's role as initiator—the one who determines the limits of the program and its purpose—which is then “set into motion with some degree of autonomy contributing to or resulting in a completed work of art.”¹⁵

With these ambient atmospheres, digital media has fulfilled the futurist technological fantasy of the “destruction of syntax.” The generative programs replace the value of a “human” narrative grammar with that of a machine grammar. Once the maker has set the parameters of this synthetic Eden in place, the generative program produces machine artworks.¹⁶ In projects such as *Birds and Water*, and in fact most of the works on the site, one finds relatively simple visual applications of complex calculation. The potential of the generative form thus far has been best supported in the audio realm, where the syntax of information and the pull of narrative or allegorical form is less of an imperative than in visual culture.¹⁷

III. The destruction of syntax: the golden age of netart

Curator Marc Vogè describes Jodi, the Dutch collaborative team, as “one of the first to demonstrate the beauty of doing things wrong on the Internet... Today all of that has changed quite a bit. Today, more complex and powerful Web tools enable the user to avoid more and more mistakes. Too bad, for mistakes are at the heart of art.”¹⁸ When one dials up <http://oss.jodi.org/os.html>, the Jodi web coordinates, the same spirit of mischief (the not perfect rendition) is unmistakable today: the site, or the piece OSS, triggers a chaotic, random pattern of browser windows across the desktop, signaling, particularly for those without prior information, a system collapse. Everything has gone wrong, system error, forthwith panic, then meltdown. And that's the program doing what it's supposed to.

Jodi have been a perennial favorite among netart artists and critics since the mid-nineties, when the critical mass around netbased art began in earnest. Their hijinks and irreverence for the media in which they work is archived in Peter Lunenfeld's influential *Snap to Grid* and other netart glossary. Their recent full-scale, solo installation at Eyebeam Atelier (New York City, summer 2003) reminds the viewer what kind of trouble early new media work usually caused. The Eyebeam installation is composed of four large wall projections that projected a live-feed of various Jodi programs literally chewing up desktops and spewing them out as so much code gobbledy gook.

Jodi's installation points out that the orderliness which seems inherent to digital production (it is all math or it is all subject to the rigorous, clean rules of math) is a construct to be turned on its head. The same tools, in the right hands, can produce visual wreckage. The pristine a synthetic culture, the *Blade Runner*

perfection of the replicant, is overthrown for the error—for the possibility of the noisy transmission. The Jodi aesthetic is fundamentally cybernetic in form and focus in the fact that the transmission of information is the “purpose” of the work. It simply addresses the flip side of the C3 structure. Jodi says of their work:

But we are not cyber-supremacists, our work is not about making fun of people who don't know how to use computers. It is the opposite, we are clumsy, and we disrupt the slick surface of the information systems. We get a lot of ideas from making errors ourselves at our computer, when the system locks, gets frozen, shaking and flipping while crashing. That is OSS/blue panic. We want to share these rare moments.¹⁹

Jodi evoke in their language a “spirit of '95,” a sense of the hacker aesthetic. Appropriation, deviation, and “wrong way” are the calls to action, which OSS demonstrates in spades. Nonetheless, close to ten years on in netbased artworks, one might also claim for this literal deconstruction of HTML syntax (the programming language of most Web sites) that the generative aspect of the piece should not be overlooked. OSS takes apart the common syntax of the multimedia language of the Web. In doing so, it also suggests that the random (or perhaps habitual) play of the signifier—the syntactical, the sense making process—is wide open for reform in this “new” language of new media. OSS is, in this sense, a generative piece, generating, in its deconstruction, the possibility of opening forums of multimedia syntactical representation. Like futurism's “destruction of syntax”, the analogy I draw comes from the early twentieth-century avant-garde, specifically dada. If one can see in the disruptive practice of Duchamp and others the reorientation of the familiar, I argue that a similar gesture is made with the disruptive aesthetic of Jodi where the reconditioning of the familiar is the work that is generated. But it must be noted that even from the point of view of cut-up and collage, the “integrated circuit” of contemporary production is a different animal all together. The industry of the telecommunicative, the dynamic, and the self-organizing in Jodi's work point to the reordering, if not the full replacement, of the role of autonomy in new media art.

IV. Conclusion: Integrated Circuits

The technology theorist and entrepreneur Steven R. Holtzman writes, in Digital Mantras, 1994, “The meta-artist's contribution is the software: the instructions, the rules, the grammar. Will the media used for representing structures—sound, visual images, virtual worlds—be the art? Or are they simply ways of interpreting software? Will the art of the future be the software?”

There are many forms that can be categorized as “new media” forms for their use of digital technologies in part of all aspects of production. Beginning with netart or networked art, but also including such works as Jeremy Blake's “video paintings,” the morphogenic digital and prosthetic productions of Matthew Barney, the viral “informatics” of @rtmark, or Ricardo Dominguez and Coco Fusco's international Internet activism—these all address the gestalt of new media. Yet, if one is to locate a site of postmechanical technologized production, it would be, as Holtzman and others argue, with software. In its broadest sense,

software is the generative aspect of new media, the “lucidly” synthetic aspect that leads one back to echoes of the organic. What the works under discussion illustrate is that new media finds its own form not in relation to the mimetic and mechanically reproductive, but in terms of the (self) generative—the systemic and the relational. Art in the age of intelligent machines mandates a shift in criteria that is still under exploration.

In concluding, the final new media form I discuss is Machinima. Machinima are animated movies made from the 3D rendering technology of game engines. They are also a set of new media tools that have been in use since 1997, but have only begun to reach a broader audience and application in the past three years. Machinima are both final product and revolving aesthetic. Digital media and game theorist Katie Selan describes Machinima as “part theater, part film, and part computer game.”²⁰ Game players—not game makers—enlist commercially produced game engines such as Quake and Half-Life to create works in real-time. For those who have spent anytime working in computer animation, the “real-time” distinction is valuable. Instead of hours of rendering, there is no delay between the command that executes the animation and the animation being resolved on the screen.

Beyond the technical functions of Machinima tools, the catalyst for the energy around Machinima as a form is the overlap between the direct-response of game culture and the feedback mechanisms of cybernetic culture: the exciting idea about Machinima is that an application can create in real-time the virtual workings of a miniature universe of one’s own creation. Selan expresses it in this way, “The technology of the game code is giving shape to a new form of storytelling born from the culture of the first person shooter (FPS).”²¹

Although Machinima are finite productions, each piece plays back like a video or film, the process of this genre is uncompromisingly modular, automated, and variable. The history of the form is that game players would perform runs through games at top speed and document them for their cohort (an international, networked clusters of gamers). At some point, users began to adapt the game systems so they did not simply reproduce a run, but would reflect instead of the record of a first-person-shooter a first-person-film. Uwe Girlich, a German gamer who developed some of the first publicly shared Machinima tools, describes the process. He writes, “LMPC is a decompiler/compiler. It can be used to convert a binary demo file into a simple ASCII text file (decompile). Such a text file can be edited with any editor and afterwards it can be converted back into a binary demo file (compile). So it is very easy to analyze and also to alter the demo file and even to create a demo file, which is not the actual recording of someone playing the game but a purely fictional movement in the game engine.”²²

The intense popularity of video games as the height of international entertainment culture is a staggering thing to witness.²³ Its off shoots such as the Machinima culture are certainly reappropriations of form by users from commercial makers, but that does not necessarily make Machinima either parasitical or revolutionary. The results of the first few years have produced pieces that fall into two main categories: the first-person-joker, cartoonish skits using the familiar faces and environments of the game play, and graphic

animation wonderlands, fantastic anthropomorphic landscapes that are heavy on visual development and low on concept.²⁴

Nonetheless, as a kind of fan-culture run amok, Machinima is a form wholly suited to the times. Its behavior could be described as the animated model of an integrated circuit. To view it is to see the stamp of a new coinage that demonstrates, often somewhat stupidly, Wiener's unnerving prediction about the many systems one begins to occupy within the relay of information.²⁵ It is a generative system that produces infinite variations on a set of code parameters. This "infinity of variation" is not to be mistaken for a techno-liberation utopia revival, but, actually, should be understood as synchronic. Somehow the "old" models of use are not particularly relevant as Machinima is a purely cybernetic invention. Perhaps the best way to describe the form, at this point in time, is noisy. In this sense one might say that new media production demonstrates the effect and affect of telecommunications on contemporary culture.

¹ Wiener gives the following as a definition of cybernetics: "Since the end of World War Two, I have been working on the many ramifications of the theory of messages. Besides the electrical engineering theory of the transmission of messages, there is a larger field which includes not only the study of language but the study of messages as *a means of controlling machinery and society*, the development of computing machines and other such automata, certain reflections upon psychology and the nervous system, and a tentative new theory of scientific method. This larger theory of messages is a *probabilistic* theory, an intrinsic part of the movement that owes its origin to Willard Gibbs." Norbert Wiener, Human use of Human Beings (Da Capo Press/Houghton Mifflin Co 1950), p.15.

² In the film Blade Runner and the novel by Phillip K. Dick, the motto for the company making "replicants," the high performance cybernetic beings, is "more real than real."

³ The first law states that energy, or in this case information, is conserved. The second law states that all systems move toward a point of entropy—toward disorganization or noise.

⁴ Hayles writes, "Of all the implications that first-wave cybernetics conveyed, perhaps none was more disturbing and potentially revolutionary than the idea that the boundaries of the human subject are constructed rather than given. Conceptualizing control, communication, and information as an integrated system, cybernetics radically changed how boundaries were conceived." How We Became PostHuman, (Chicago: University of Chicago Press 1999), p. 84.

⁵ Wiener allows for human-to-human communication, human-to-machine, and machine-to-machine all to fall under the same rubric of "communication." He distinguishes between ants and humans (ants have their behavior "hardwired" in—there is no chance or choice or self-selection involved). But he does not draw a hard and fast line between machines and people. Human use of Human Beings, p.16

⁶ In "The Question Concerning Technology," Heidegger discusses the pressing importance of technology not in terms of its manifestation in machines but its "essence." I do not invoke an "essence" of new media here, but I do direct one's attention not to the digital print or Vocoder audio processor but toward the network of shifting code structures that are at base the binary code that make these "legible" objects.

⁷ See Manuel Delanda's War in the Age of Intelligent Machines for an excellent discussion of this history (New York: Zone Books 1991).

⁸ The terms are transcoding, hypermedia, automation, modularity, variability, and numerical representation. Manovich, The Language of New Media, (Cambridge: MIT Press 2002), pp.30-36.

⁹ Manovich, whose book addresses the form of new media, notably discusses very few new media works themselves, spending more time on the golden age of avant-garde cinema than new media works. He acknowledges the absence of the traditional art object in a rather offhanded manner, but what the acknowledgment boils down to is a recognition of archive mania inherent in new media: “We are in part two of the media revolution with part one being the industrial revolution--creation of automated technologies, now we are in the age of storing, archiving, organizing all of the media we have made” (LNM 35).

¹⁰ <http://www.whitney.org/artport/>.

¹¹ This piece is described on Idea Line as a “continuous meditation over 4000 pages long, written, programmed catalyst produced, http://www.anu.edu.au/english/internet_txt/. The historical access to the “original” is reinstated in a sense with a project such as Idea Line. If one is to attend to Benjamin, the original has been in the precinct of royalty, the church or the rich, until the opening up of mechanical reproductive machines. Digital art takes that process one more step in “returning” to the virtual as the original.

¹² <http://wrybread.com/g-flash/diving-birds.shtml>.

¹³ www.generative.net. More theoretical discussions of generative work can be found at such forums as <http://www.generativeart.com>, but generative.net provides one of the strongest catalogues of the artwork itself.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Artists such as Roxy Paine, using MAX patches, has used this idea to a provocative end: he programs a laptop to give the dimensions of a blob-sculpture then has a mechanical machine produce the plastic works.

¹⁷ Brian Eno, not so surprisingly, one of the innovators of electronic ambient music in the 1970s, has also been an early adopter of the generative form in music. Eno has said of his work with ambient music in the 1970s, “All of my ambient music, I should say, really was based on that kind of principle, on the idea that it's possible to think of a system or a set of rules which once set in motion will create music for you.” His projects in the late '90s with the Koan software are the best known generative art projects to date. He has said of his work with computers, “I quickly realized that for me this was the future for computers. Computers seen not as ways of crunching huge quantities of data or storing enormous ready-made forests of material, but computers are the way of growing little seeds.” Eno and the Ambient, <http://www.inmotionmagazine.com/eno1.html>.

¹⁸ http://www.cca-glasgow.com/new_media/new_media_right_archive.htm

¹⁹ Ibid.

²⁰ Katie Salen, “Telefragging Monster Movies”, Bart Cheever and Nick Constant (eds.), Dfilm, (Cambridge: MIT press 2001).

²¹ Ibid.

²² uwe@planetquake.com.

²³ Johnathan Dee, "Joystick Nation", New York Times Magazine, December 21, 2003. Dee states that video games are the number one entertainment market in the world.

²⁴ The Ill Clan's 2002 Hardly Working short, starring two lumber jacks developed from the quake III engine is a good example of first person-person joker. The feature-length Anachronox is a more complicated combination of game-interface, cartoon pathos, and one-liners. For a basic sense of the field, <http://www.machinima.com/> is currently the hub of Machinima downloads and dialogue.

²⁵ "Instead of one world coming into being from among a galaxy of possible worlds, one message comes into being from a cacophony of possible messages...the word and the world are both essentially probabilistic in their natures," Norbert Wiener quoted in Hayles, How We Became PostHuman, p.90.