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On Generative Digital Modular Synthesis and Cellular Mitosis: Audulus as Preserving Artistic Aura and Attention Span Through Bifurcation and Gestalt Concentration

Future Aztec Man

Modernist Thought and Culture

April 27, 2025

This article seeks to outline a prominent position about the role of art in society in order to challenge it. While the dominant formats for distributing music have restricted the nature of listening and therefore support this view, new mediums have emerged that call for a reconsideration of the state of music creation and appreciation. Such mediums, it will be argued, make it necessary to rethink the state of art in general.

Deconcentration is the perceptual activity which prepares the way for the forgetting and sudden recognition of mass music. If the standardized products, hopelessly like one another except for conspicuous bits such as hit lines, do not permit concentrated listening without becoming unbearable to the listeners, the latter are in any case no longer capable of concentrated listening. They cannot stand the strain of concentrated listening and surrender themselves resignedly to what befalls them, with which they can come to terms only if they do not listen to it too closely. Benjamin's reference to the apperception of the cinema in a condition of distraction is just as valid for light music. - Theodor Adorno[1]

The dragon is a serpent — like the Aztec feathered serpent, Quetzalcoatl…The serpent symbolizes lightning…In disruption, thinking would be perpetually outstripped and overtaken precisely because optoelectronic digital tertiary retention can move twice as fast as lightening… *To go faster than what goes twice as fast as lightening is, however, possible: it is* the only possibility, *if the possible is what is fundamentally different than the probable, and as the* Möglichkeit *through which desire is realized.* This possibility is precisely that of bifurcation, which moves infinitely faster than every trajectory presumed in becoming, *since, as its quasi-cause, it reverses this becoming within which it* opens up *the sole motive for hope: the future as improbable possibility.* -Bernard Stiegler[2]

1.

In *The Work of Art in the Age of Mechanical Reproduction* (1935) Walter Benjamin engages with art history in order to think about the state of his society. In doing so he makes several claims in defining what an artwork is. First, "presence in time and space," in the form of

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[1] Theodore Adorno, "On the Fetish Character in Music and the Regression of Listening," (1938) *Essay's on Music,* ed. Richard Leppert (Berkeley: UC Press, 2002), 305.

[2] Bernard Stiegler, *The Age of Disruption: Technology and Madness in Computational Capitalism* (Cambridge: Polity, 2019), 311-312.

a "unique existence," establishes priority of importance by locating an 'original' in terms of authentication.[3] Then he makes some metaphysical claims.

> The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced. Since the historical testimony rests on the authenticity, the former, too, is jeopardized by reproduction when substantive duration ceases to matter. And what is really jeopardized when the historical testimony is affected is the authority of the object.[4]

These are the sort of statements one has to generalize by practically imagining the implications of the assertions to see if they produce incompatible commitments.[5] It terms of a claim about substance in the physical sense, 'duration' is a fair criterion (for some metaphysicians) to stipulate since for an object to exist it must persist through time. When one adds on the history of its experience, identity relations start to lean more toward the conceptual aspect of a thing. For example, even with a simple object such as a rock, it was never conceived as a doorstop until someone started making doors and put it into use in a certain way. Obviously, however, it had

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[3] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," *Illuminations: Essays and Reflections*, ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken Books, 2007), 220.

[4] *Ibid.,* 221.

[5] The subject of metaphysics within academic philosophy is complicated to say the least. To get a sense of the discussion around the persistence of the identity of objects through time see, for example, the Persistence section in Robert Pasnau, "A Lewisian History of Philosophy," *A Companion to David Lewis,* ed. Barry Loewer and Jonathan Schaffer (Oxford: Wiley/Blackwell, 2015), 64-68.

the potential (it had to have it) — virtually, in terms of an unexpressed capacity.[6] In Benjamin's thinking, for an object to loose the relationship with its own history (evidenced by dings and gashes, perhaps by restoration beyond the original colour choices of the painter), is to put its authority in jeopardy. He worries about the loss of cultural heritage since,

> the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced. These two processes lead to a tremendous shattering of tradition which is the obverse of the contemporary crisis and renewal of mankind.[7]

What gets left behind is what Benjamin calls "cult value," which is connected to the ritual aspects of art throughout history, where one had to travel to a location in order to be in the presence of the object.

He then looks to Hegel's *The Philosophy of Fine Art* in order to relocate the experience of the mass produced art object as taking place in terms of an emotional affect. This seems to move the authority of a work of art into the realm of its conceptual designation rather than its physical

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[6] Manuel DeLanda's interpretation of Deleuze and Guattari's work in his book *Intensive Science & Virtual Philosophy* is helpful on this subject. "The alternative offered by Deleuze is to avoid taking as given fully formed individuals, or what amounts to the same thing, to always *account for the genesis of individuals* via a specific individuation process, such as the developmental process which turns an embryo into an organism. This emphasis on the objective production of the spatiotemporal structure and boundaries of individuals stands in stark contrast with the complete lack of process mediating between the possible and the real in orthodox modal thinking. The category of the possible assumes a set of predefined forms which retain their identity despite their non-existence, and which already resemble the forms they will adopt once they become realized. In other words, unlike the individuation process linking virtual multiplicities and actual structures, realizing a possibility does not add anything to the pre-existing form but mere reality." Manual DeLanda, *Intensive Science & Virtual Philosophy* (New York: Continuum, 2002), 40.

[7] Benjamin, "Reproduction," 221.

form, with regard to a functional definition. So, one graduates from the magical utility of prehistoric art in terms of the ritual use-value attached to a physical object, toward the classification of the work *as* art and, thus, situated within a historical continuity of meaning and aesthetic execution. Here, its exhibition-value emerges as being able to produce an effect based on its treatment within a canon. That is, the value of a painted portrait of a known person for a family, shifts to the anonymous subject such as one finds during the Renaissance in Italy — not a mythical or religious figure, nor a relative of the viewer but a representation of a certain social position or identity that defines the role of the stranger. So, while Benjamin grounds the notion of documentation (that photographs present artifacts that tell a story) in the Parisian street photography of Eugène Atget (1857-1927), the Italian paintings Giorgione's *The Old Woman* (1506) and Domenico Ghirlandaio's *The Old Man and His Grandson* (1490) can be seen as forerunners to the kind of generalization of the public that one finds in contemporary street photography insofar as it is a dialogue about ways of life, in terms of naturalizing the human subject. The necessity of abstraction is found in the fact that, to a significant degree, street photography is only interesting as a collection of strangers, the observation of which can produce broad judgments — a series of inferences that license wider stereotypes (however innocuous and neutral) or contradict them. As Benjamin is right to indicate, the politicization occurs, when the images are arranged and labeled as a form of evidence to produce a narrative. One could say with modern art that the medium itself becomes the subject, which is more abstract than

depicting roles within society.[8] Obviously, in the hands of advertising and within the project of describing/producing a lifestyle of/for consumption he is right to be critical of the potential for propaganda although the word appears at the end of the essay. One challenge, it seems, is whether a specific form of art can inform its reception as art by altering the necessary conditions for canonical membership. Second, consider the abstract nature of both aesthetic appreciation and social commentary. If the social subjects depicted by the medium can take up the means of expression in order to redefine their identity through it, they are no longer simply passive objects to be organized as pieces of a narrative but active participants involved in the process of storytelling.

2.

Much of the preceding explication of Benjamin's point of view has been to prepare the ground to contradict this statement of his: "When the age of mechanical reproduction separated art from its basis in cult, the semblance of its autonomy disappeared forever."[9] Or, at least, to pose the question of whether this eternal damnation of the autonomy of art has been overcome by

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[8] See, for example, Jurgen Habermas, "Modernity Versus Postmodernity," *The New German Critique* 22, Special Issue on Modernism (Winter 1981), 9. "The category of 'beauty' and the domain of beautiful objects were first constituted in the Renaissance. In the course of the 18th century, literature, the fine arts and music were institutionalized as activities independent from sacred and courtly life. Finally, around the middle of the 19th century an aestheticist conception of art emerged, which encouraged the artist to produce his work according to the distinct consciousness of art for art's sake. The autonomy of the aesthetic sphere could then become a deliberate project: the talented artist could lend authentic expression to those experiences he had in encountering his own de-centered subjectivity, detached from the constraints of routinized cognition and every day action."

[9] Benjamin, "Reproduction," 226.

the presence of a technological medium for the production of music in the form of digital modular synthesis.[10]

The widespread retrieval of 'cult value' did not fully occur in the age of *analog* modular synthesis because the reproducibility (though technically possible by having an exact system with all of the modules present and connected in exactly the same way) requires copies at scale.[11] Records, tapes, CD's, mp3's and high quality digital recordings are reproducible at scale, so a modular analog synthesizer can be recorded and widely distributed. But this merely demonstrates the truth of Benjamin's elegy for the 'aura' of an artwork. The recording is a snapshot of an evolving system. Alternatively, what will be introduced in terms of evidence in the form of a digital modular patch here, is not. It is the copyable original that also encompasses its life as present in its current form, as (in Benjamin's words) the history it experienced.[12] So, while the patch "detaches the reproduced object from the domain of [its] tradition," when it replicates it includes the unique form prior to its split but then evolves on the basis of interactive modifications (and self-generative changes it undergoes) into its own individuated narrative structure — somewhat like cells dividing.

The second intervention I would like to make into Benjamin's theory has to do with his apt description of the change in status of an actor in film compared to theatre. Namely, with film

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[10] For, so it would seem, just as art freed itself from its instrumentalization it encountered the danger of loosing its authenticity by being put to use for the political purpose of galvanizing a wide narrative rather than questioning it.

[11] There is, however, a significant innovation here in the sense that an analog modular synthesizer can be thought of as a complete orchestra in all its complex form, but as an eternal (non-biological) machine.

[12] At this point it can get technical, since each 'copy' will live a life of its own.

production he explains how actors became props. It is beyond the purview of this article to explore this observation in detail; however, the claim being made here is that this loss of direct interaction with the audience in the form of live performance modifications (as it relates to the transition from the stage to the screen which Benjamin uses to illustrate the loss of an artwork's aura) is regained in the music space under digital modular synthesis. Specifically, this is true of the program Audulus.[13] In fact, the argument is simple to make.

In the case of opera, insofar as one attends a performance where Mozart is the conductor, the aura is fully present in a way it is not when performed without the original composer, or in the form of a recording. In the realm of dance music a DJ is 'conducting' various pre-recorded performed pieces of music, enjoining them into an emotionally cohesive presentation by putting them into a particular order, only introducing certain sections, and altering the levels and tonality to suit the occasion by responding to the audience in real time. However, the elements (pre-recorded songs) have a finite limit.[14] A DJ cannot modify the performance of a string performer

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[13] Audulus is modular synthesizer visual programming environment originally created by W. Taylor Holliday in 2011. Audulus is not just an app, it is more of a (small) community because the basic software merely comprises a set of tools with some examples. However, it requires builders to utilize the basic nodes to create robust components that can be wired together to form systems. Such open source visual programming environments were already present and included similar vibrant communities, such as MAX/MSP and Native Instruments Reaktor. What is crucial to the argument of this paper is that Audulus could run on an iPhone which was in mass production and owned by a significant enough proportion of the population that Audulus patches had the theoretical potential for wide distribution and playability like MP3's. It was also free to download and play the patches. For an image of a patch see the Appendix.

[14] Obviously instruments have finite limits. However, in the same way that Noam Chomsky's work in linguistics pointed to the infinite generation of novel sentences possible from a finite alphabet, all of the components of an orchestra have similar generative potential. When brought together, combined with operatic language and set design, live music of this sort contains a broad enough set of tools for direct engagement with musical form in the midst of an audience experience.

or piano player, for example, during a set because the element has been captured in a static form. The potential to introduce this modifiability has certainly driven innovations in the tools used in the dance music community. For instance, originally two turntables and a mixer were the standard which, as the dominant storage object for music changed, the technology developed the ability to 'jog' CD's, effectively imitating records, as well as having pure digital copies where a record platter can be used to control the digital files on a computer, in the case of Serato. Also, the introduction in the 1970's, growing viability in the 1980's and coming into their own in the 1990's the Digital Audio Workstations (DAWs) that mimic a physical recording studio in software form eventually had the benefit of being supported by enough computing power that an artist could bring the studio to the stage, in order to regain control as a form of live production. In principle, digital synthesizers can be used within such a program as plugins so that something of an orchestral arrangement can be made fully available. However, one still needs all of the equipment to host the arrangement as well as the computing power to support it. With the advent of Audulus 2 and the iPhone in the 2010's, it became possible to offer the wide distribution at scale that records and mp3's for example enjoyed, but with the modifiability of a DAW, available on a device that much of the public already owned. Further, the design of the software itself is based around the creation of music tools, out of the confluence of logical expressions of music theory (white papers) and practical computer language programming. In a sense, it is deeper than the opera in its expressive potential in terms of the Benjaminian aura because the 'instruments' themselves can not only be made to play differently in all their sonic aspects, but they can be refashioned entirely or built from scratch while the program is running. As the

documentation says, “with Audulus, you can build synthesizers from first principles, design new sounds, or process audio with real-time, low-latency processing suitable for live performance.”[15]

The wide possession of iPhones, the processing power and software design that affords low-latency, and the electronic music genre combine to provide a shift in medium that, for the first time (in human history),[16] to some significant degree manages to store the aura of the artwork within its reproducible form. Again, the technological innovation of the digital modular synthesis patch combined with the prevalence of devices owned by the public, offer infrastructure at scale where the art object retains its aura within its reproductions.

Consider Benjamin’s footnote quoting Leonardo Divici in his essay,

> Painting is superior to music because, unlike unfortunate music, it does not have to die as soon as it is born…Music which is consumed in the very act of its birth is inferior to painting which the use of varnish has rendered eternal.[17]

As might be obvious, this has to do with the ephemeral nature of music. We remember and expect sounds, which allows each note to land with meaning. The whole is understood in terms of the parts and vice versa.[18] Whereas with painting one encounters the canvas all at once, music

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[15] See Mark Boyd, Welcome to Audulus, Audulus. Accessed April 24, 2025. http://docs.audulus.com/.

[16] This is obviously a grand claim. It is also not a pronouncement from a specialist, but an observation from an artist currently working in this medium. It may be incorrect, but I cannot presently see that it is.

[17] Leonardo DiVinci (Trattato I, 29) in Benjamin, “Reproduction,” 249, fn. 15.

[18] See, for example, Jan Zwicky, “Music” *The Experience of Meaning* (Montreal: McGill-Queen’s UP, 2019), 109-146. Zwicky is interested in the gestalt nature of music, in terms of the idea that notes in isolation loose their meaning.

is typically presented in a vanishing linear form. In the case of a generative Audulus patch it is eternally present like a painting, but it also musically evolves.[19]

This fits with Benjamin's differentiation between contemplation and distraction, where he claims that the former is a counterweight to the latter in terms of its anticlerical value "in being alone with one's God."[20] He juxtaposes the Dadaist intervention of contemplative immersion with mass consumption, by noticing how they embrace the "relentless destruction of the aura of their creations."[21] Further, of interest in the present analysis is Benjamin's illustration of the structure of time in film, where the audience experience itself is choreographed because the pacing does not allow for contemplation whereas Audulus does. One has full control over the clock and all of the elements that make up the art object not just as the producer but as a consumer of the piece. It meets the requirements of this complaint:

> Distraction and concentration form polar opposites which may be stated as follows: A man who concentrates before a work of art is absorbed by it. He enters into this work of art the way legend tells of the Chinese painter when he viewed his finished painting. In contrast, the distracted mass absorbs the work of art.[22]

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[19] Generative modular synthesis works somewhat like a windup, self-playing, music box; however, Audulus patches play infinitely and the raw material that can be quantized into familiar scales can be derived from a random source, producing continual novelty. For an historical consideration of this form of composition as it relates to computer music from the 1970's through to the early 2000's, see Edo Paulus, *The Use of Generative Music Systems for Interactive Media,* Student Audio Design. Faculty of Art, Media and Technology. School of Art, Utrecht (November 2001) https://eude.nl/projects/paper-gmsim/paper-GMSIM.pdf.

[20] Benjamin, "Reproduction," 250, fn. 18.

[21] *Ibid.,* 237-238.

[22] *Ibid.,* 239.

I would like to end by claiming that the digital modular synthesis exhibited by a generative Audulus patch has the affect that anyone *who concentrates before it is absorbed by it.* In fact, one of the challenges in constructing a patch is to build it so that the music begins in such a way that is conducive to absorption by introducing elements in a particular order. From the perspective of the creator this can be challenging to achieve in the midst of creating since one is already fully absorbed in a meditative way situated at the centre, often entranced by the form for hours. What seems aesthetically complete can become abrupt and jarring once the creation has had a chance to 'cool', offering some critical distance, closer to the perspective of the potential uninitiated listener.

Finally, in terms of the aspect of Benjamin's article that has to do with his Marxist claim that "the masses have a right to change property relations [and that] Fascism seeks to give them an expression while preserving property," he thinks that the "production of ritual values," is at stake.[23] What Audulus offers is a structure of expression in which intervention is built into the medium itself, offering what appears to be an active relation to the intuition that modifies from the position of the whole. It speaks to a multiplicity of canons by including the means to create art within the very artistic creation itself where the tools are baked into the work. Perhaps the reason why Audulus is active in this way is that, following Benjamin's line of thought about the aura of a piece of art, one can own an Audulus patch where access to a 'complete orchestra' and all of the instruments in their accessible constructions is fully available to the listener in the very format of its distribution, just as creative absorption with the eternal patch itself in the form of gestalt consciousness invites spontaneous interaction. What is most distinctive is the

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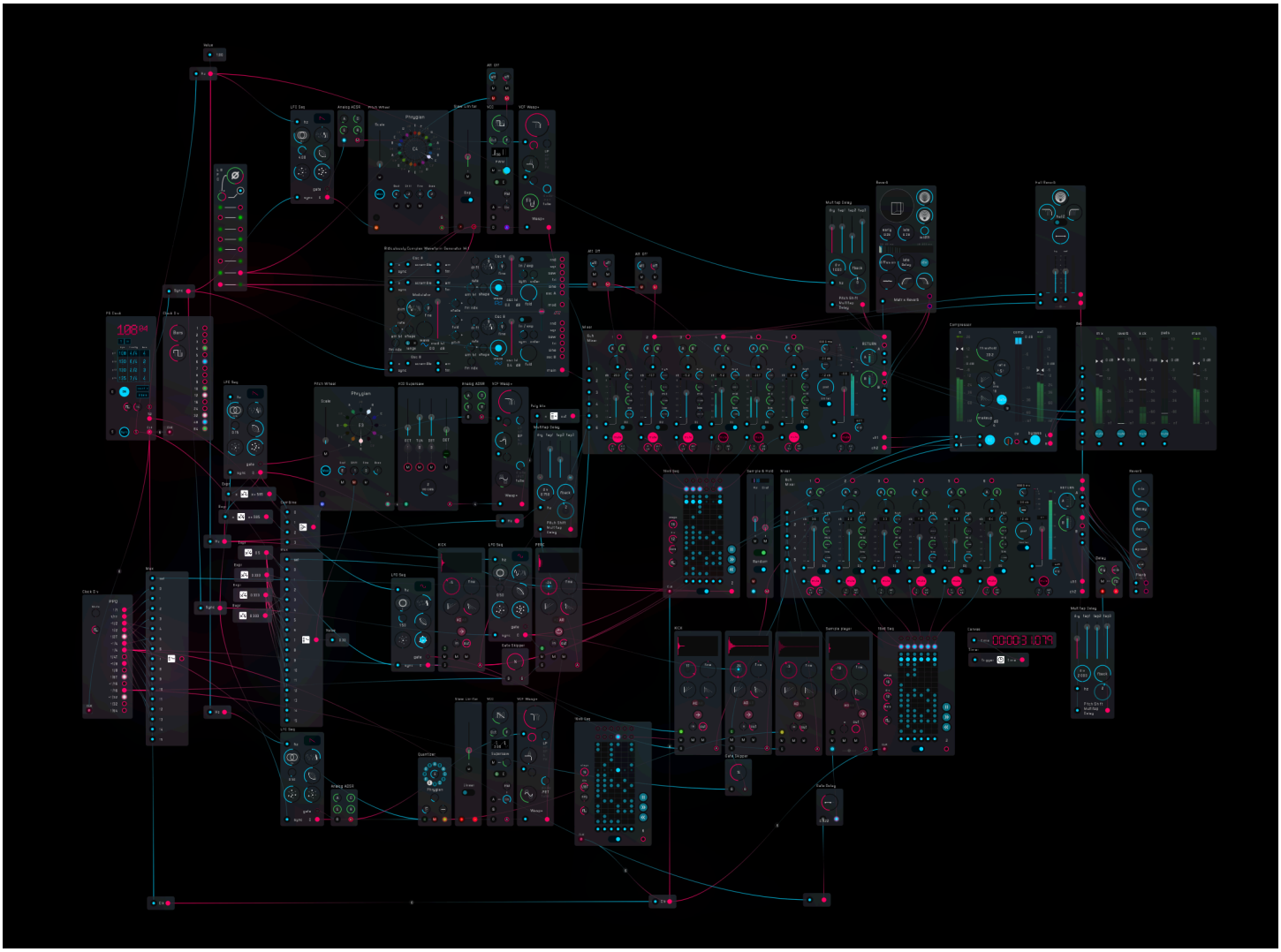
[23] *Ibid.,* 241.

convergence of software sophistication; wide distribution of the device that hosts the media format which itself contains the processing power to support the software; and the specific nature of generative modular synthesis that results in an interactive evolving object. The claim is that Audulus succeeds in preserving "the authority of the object" that protects "the aura of the work of art" since the reproductions do not substitute "a plurality of copies for a unique existence," but instead contain its "domain of tradition," as the current structure of the patch.[24]

[24] Benjamin, "Reproduction," 221.

Appendix



City Zone 1604 - RM FAM X 2.2 C (recent production work)
https://futureaztec.bandcamp.com/album/tenochtitlan-2