Rhizome as Depth-Model in The Era of Artificial Intelligence and Spatial Computing

*Never is a plateau separable from the cows that populate it, which are also the clouds in the sky (Deleuze and Guattari, 23).*

In media philosophy and cultural theory, the past decade has been marked by a struggle to name contemporary modes of power, sovereignty, and control as they continue to be formed and contextualized in the presence of the digital and the computational. Stricken by the global election of personae who embody and engender both violence and nonsense, scholars and practitioners have struggled to identify a common ground with which to effectuate a comprehensive critique. Between distributed and non-localizeable frameworks such as affect and assemblage theory, close reading frameworks such as media archaeology, and slightly older semiotic and psychoanalytic frameworks, there exists not a small degree of tension. In this landscape, a not insignificant degree of skepticism has been leveled towards Deleuze and Guattari’s conceptual avatar, the *rhizome*.

Contemporary scholars such as Katherine Hayles, Alexander Galloway, Luciana Parisi and Tziana Terranova, Antoinette Rouvroy and Thomas Berns, Orit Halpern, and others besides have gone lengths to identify the shortcomings of the *rhizome* as an emancipatory model. This critical trend, while certainly a crucial task for ongoing digital and cultural scholarship, is not without its own shortcomings. While seeking to decenter the Deleuzian paradigm, aspects of these scholars’ criticism have at times failed to account for or discourse with some of the more interesting areas of Deleuzian scholarship (such as that of the black feminist and postcolonial tradition, including
Jasbir Puar, Alexander Weheliye, and the late Édouard Glissant), elucidate a coherent or comprehensive model of temporal or historical logics that account for their philosophical criticisms, or successfully engage with the concept of depth in Deleuze’s larger project. Addressing most directly this last concern, I track the recurrent description of the rhizome as a “circulatory” model, claiming that this description tends to flatten the variable dimensionality of the Deleuzian method.

While the above interventions have made important advancements regarding the biopolitical and necropolitical characteristics of distributed and non-localizeable phenomena, they may not have the right aesthetic orientation that is necessary to inform a critique of new interface design practices that blend artificial intelligence and spatial computing. Using a recent new media work completed by students at Carnegie Mellon’s School of Design, Xoromancy (2019), I analyze what the work’s authors refer to as the “fluent latent-space exploration” of Generative Adversarial Networks as a case study into the confluence of aesthetics, dimensionality, and body. Using this piece, I ask explicitly whether our critical redress of the rhizome, and the methods of critique that it employs towards distributed and non-localizeable control, is capable of addressing the aesthetic, political economic, and bio-racial complexities of digital and high-dimensional interfaces as they couple smoothly with the body.

I offer a less polemical reading than is fashionable regarding Deleuze today, claiming that we should form an understanding of the rhizome that is more in line with Deleuze’s larger metaphysical project while also maintaining a critical skepticism towards the smoothness of power in order to prepare a critical method for the hyper-physical interfaces that will emerge from artificial intelligence and spatial computing. Intending to contribute to the aesthetic discourse regarding computational media and design, I hypothesize that the rhizome and its aesthetic
orientations in the new baroque (Plotnisky, 2005) has the potential to prompt the extrusion of monadologized relations (Rouvroy and Berns) into new brutalist structures (Parisi, 2017) for high-dimensional computational interfaces that have the capacity of an affective commons. Reading the *rhizome* as an aesthetic formulation of dimensional depth, I argue that it can be used in both a productive *and* diagnostic sense for the design and critique of spatial computing with AI.

The criticism of the rhizome often centers around an understanding of rhizome as a circulatory model. The authors almost ubiquitously emphasize Deleuze’s opposition of the actual and the virtual in such a way as to point out the circulatory character of rhizome as a connective diagram that chaotically distributes information between heterogeneous elements. This formulation risks a reductive framing of the relation between actual and virtual in Deleuze’s early work that flattens other commitments to idea, difference, return, and manifold. Every author certainly formulates their own context, situation, and intent, but it is my contention that the notion of circulation is a sort of haunting vector amongst the contemporary literature.

Katherine Hayles, in working to secure the philosophical validity and political economic stakes of “the forces of cohesion, encapsulation, and level-specific dynamics characteristic of living beings” (Hayles, 71) identifies Deleuze and Guattari’s lack of treatment of these forces with citation of the following quote from *A Thousand Plateaus*.

> “One side of a machinic assemblage faces the strata, which doubtless make it a kind of organism, or signifying totality, or determination attributable to a subject; it also has a side facing a *body without organs*, which is continually dismantling the organism, causing asignifying particles or pure intensities to *circulate*, and attributing to itself subjects that it leaves with nothing more than a name as the trace of an intensity” (Hayles, 71).
In navigating this quote, Hayles seeks to critique what she sees as a recurring over-emphasis on the body without organs and the perceived metaphysical completeness of its circulatory action by contemporary scholars such as Jussi Parikka (Hayles, 71). Juxtaposing her own approach to this circulatory model, Hayles proposes a theory of the cognitive non-conscious that operates through its own philosophical system of relations between the “level-specific dynamics” referenced above.

Antoinette Rouvroy and Thomas Berns, writing most directly and intensively on the rhizome, with excellent expositions of Gilbert Simondon’s influence on the model, claim most clearly that it has lost its productive or emancipatory relevance. By studying the statistical apparatus of social organization introduced by big data and data mining, they claim specifically that the relational mode of subjectification carried out by data-informed profiling “monadologizes relations” and eradicates difference from individuation and subjectification by inverting the target of control from the hierarchical sorting of individuals to the relational limiting of ways of becoming “as if the relations were themselves individuals” (Rouvroy and Berns, XXV). They orient this critique in the following quotation from Deleuze and Guattari.

“In contrast to centered (even polycentric) systems with hierarchical modes of communication and preestablished paths, the rhizome is an acentered, nonhierarchical, non-signifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states” (Deleuze and Guattari, 2004: 23).

Through this criticism and quotation, Rouvroy and Berns worry quite interestingly about both the importance of the static and non-relational to group conceptualization of moral and ethical concepts – and moreover of the becoming of a people towards those concepts – and the inability of the rhizome model to successfully re-engage individuals with a shared ground – which they term “the common” – from which to stage intersubjective cuing that can prompt a diversity of individuating processes (Rouvroy and Berns, XXVIII).
Orit Halpern, working broadly on the history of cybernetics across cultural, scientific, and political divisions, engages with Deleuze most explicitly as his theories relate to those of cybernetics. Paying particular attention to temporality, she works through Deleuze and Guattari’s connections to Gregory Bateson to analyze the temporal homogeneity of circulation as it relates to a multiplicative theory of communication at the exclusion of ‘convergence’.

The productivity of a schizoid situation rested for Bateson on the discovery made by both communication theory and physics that different times could not communicate directly to one another. Only temporal differences resist circulation from within the definition of communication that was being put forward here... Bateson, Deleuze and Guattari all participate in the act of redefining the site of language. In their scenarios, particularly for Bateson, language, if understood as the act of translation... takes place between different times and communication structures. These translations are never complete and, rather, make evident the impossibility of directly converting or communicating between one temporal state and another; as a result the possibilities for action multiply, rather than converge. Hence, despite Deleuze and Guattari’s explicit antagonism to any discourse of representation, we can still witness the multiplications in *A Thousand Plateaus* (Halpern, 193-6).

While certainly a nuanced reading, Halpern bars Deleuze and Guattari’s formation of communication from the possibility of temporal co-location, or co-occurrence. This is a more complex problem, but still identifies rhizome via a circulation-model insofar as it defines communication as a ‘multiplication of possibilities for action’ upon the evental surface of a meeting of heterogeneous orders of time. In this model, possibilities swarm on an occurrence of temporal difference. The presence of the prefix *pli-* in *multiplication*, signaling fold, is certainly powerful in its connotations for a Deleuzian metaphysics, but in being many, the multiple folds of a multiplying communicational event are projected onto a homogenous surface. This diminishes the possibilities of becoming to a uni-dimensional process. While Halpern’s overall project is I think correct in its reading of temporality, design, and communication; the reliance on multiplication in her reading of Deleuze and Guattari evidences an affinity with the notion of circulation that never bears out the full philosophical implications of her genealogy.
Beatrice Fazi’s *Contingent Computation* text is an extraordinarily ambitious discourse of computation and aesthetics from a Deleuzian and Whiteheadian corner that hinges on the production and development of the concept of *ingression*. Playing with notions of projection, intelligibility, and extension, Fazi crafts a reading of the math behind computation that locates ontological productivity within the extension proper to logico-quantitative counting. In this work, she distances herself from a number of paradigms, including the Deleuzian paradigm and affect theorists. Developing a new reading of Turing’s theory of incomputability, Fazi opposes Deleuze’s concept of the virtual with the “unknown dimension” of the incomputable as it is expressed.

[Incomputability] expresses the indeterminacy of computation’s formal and axiomatic logic, as it discloses the unknown dimension of computation’s logico-quantitative character. Incomputability thus breaks with a Deleuzian ontology of the virtual (and also with related attempts, inspired by Deleuze’s work, to virtualize digital computation), insofar as it confirms that the maximally indeterminate does not uniquely pertain to sensibility or to the thinking that emerges from the affective plane. Indeterminacy is not uniquely tied to the virtual matter-flows of life, but also pertains to the rationalizing functions of counting (i.e., to formalization-as-discretisation) (Fazi, 127).

Fazi’s writing commands a certain degree of respect both in its syntax and in its grounding comprehensiveness. But while evidencing an impressive command of Deleuze’s corpus, I would argue that a similar mode of reduction to circulation is occurring here again. My critique here is not meant to discredit the validity or the complexity of Fazi’s concept of *ingression*. Rather, I’m pointing out that Fazi – like the above scholars – is placing an emphasis on a certain part of Deleuze’s metaphysics (a part personified by the conceptual avatar, *rhizome*) that aligns with a certain perception of control. By reducing Deleuze’s grasp on indeterminacy to the “virtual matter-flows of life”, I argue that Fazi both reproduces a circulatory reading of the virtual that restricts its ontological productivity to a Euclidean conceptualization of motion and over-determines Deleuze’s conceptual reliance on the concept of ‘life.’ Similar to much of this scholarship, such work totalizes certain resonances between Deleuze’s work, particular in *ATP*, with cybernetics and ecology at the expense of his particular formulation of dimensional depth and its requisite
philosophy of time, which are formulations that bare a much more complex relation to the mortal, immortal, eternal, and the cruel.

The overarching problem for these theorists is certainly not the rigor of their inquiries or the effectiveness of their investigations of particular case studies. The problem I’m speaking to is a more systemic set of issues surrounding Deleuzian scholarship and pedagogy that is expressed most directly around a reduction of earlier metaphysical concepts under the weight of a popular imaginary that has clustered around rhizome. In reducing the former to the latter, to varying degrees, our scholarship tends to miss-grasp the mode of movement proper to a depth-model of the rhizome, mistaking it for Euclidean motion and massively produced images and notions of particles, atoms, flocks, and organisms on the move. Elsewhere, as in Fazi, this image of life is displaced into a virtual realm where value is placed totally on emergence, effacing Deleuze’s afore mentioned commitments to the mortal and cruel, which extend possibly even to the evil. To reproduce the rhizome as a circulatory-model is to project the Euclidean image of motion, in all its semiotic saturation with cultural conceptualizations of life, onto the virtual.

If we return to several other moments from Deleuze and his work with Guattari, we can encounter some other ways of conceptualizing the rhizome that make a depth-model a bit more compelling. While the Rhizome plateau itself uses “circulation” as a descriptor of part of its composition, the surrounding quotes and paragraphs inform a different set of characteristics. As Deleuze and Guattari elaborate, the rhizome “is composed not of units but of dimensions, or rather directions in motion” (Deleuze and Guattari, 23). It is through Deleuze’s metaphysical project that the volume through which these “directions in motion” occur is built out. A line of flight through this particular conceptualization of volume is not a performance of geometric fluidity but is rather a change in fold that accords to Deleuze’s variation of the neo-platonic idea,
hence the recurrence of the *pli-* prefix throughout *Difference and Repetition* through phrases such as perplication, implication, complication, explication, and replication, which reference the “dramatisation” of the idea in transcendental empiricism (Plotnisky, 2005; Deleuze, 280). “An Idea”, as Deleuze puts it, “is an n-dimensional, continuous, defined multiplicity” (Deleuze, 183). Multiplicity, which references Bernhard Riemann’s manifold (Plotnisky, 2005), refers to the non-Euclidean “structure” of ideas. My argument here, most specifically, is that an overemphasis on the vitality of the emergence of the virtual into the actual reproduces Euclidean geometric images of motion, along with the meanings with which they are implicated. I’m contending that a reading of Deleuze which focuses on the *idea* generates an increasingly important set of variations on the Euclidean geometry that can generate a reading of the rhizome as depth-model that has important utility for aesthetic discourse around the confluence of artificial intelligence and spatial computing. Such a relation between the idea and the geometric that does not reflect the top down Platonic model is built through and as a sort of volumetric ideality accords to a cruel historical logic that puts Kant’s transcendental subject in sequence. To quote at length from Deleuze,

Schematism possesses an immense power: it can divide a concept and specify it according to a typology. A concept alone is completely incapable of specifying or dividing itself; the agents of differenciation are the spatio-temporal dynamisms which act within or beneath it, like a hidden art. Without these, we would still confront the questions which Aristotle raised with regard to Platonic division: where do the halves come from? However, the schema does not account for the power *with which* it acts. Everything changes when the dynamisms are posited no longer as schemata of concepts but as dramas of Ideas. For if the dynamism is external to concepts - and, as such, a schema - it is internal to Ideas - and, as such, a drama or dream. Species are divided into lineages, Linnaeons into Jordanons, concepts into types, but these divisions do not have the same criteria as the divided, they are not homogeneous with the divided, and they are established in a domain external to that of concepts but internal to that of the Ideas which preside over division itself. Dynamism thus comprises its own power of determining space and time, since it immediately incarnates the differential relations, the singularities and the progressivities immanent in the Idea .. The 'type hill' is no more than a stream along parallel lines, the 'type slope' an outcrop of hard layers along which the rocks are buried in a direction perpendicular to that of the hills; but on the scale of millions of years which constitutes the time of their actualisation, the hardest rocks in turn are fluid matters which flow under the weak constraints exercised on their singularities. Every typology is dramatic, every dynamism a catastrophe. There is necessarily something cruel in this birth of a world which is a chaosmos, in these worlds of movements without subjects, roles without actors (Deleuze, 218-9).
Cruelty is perhaps *the* critical notion in this passage, insofar as it expresses the extent to which the idea becomes geometric through a dramatisation which “incarnates” the actuality proper to their structure. This incarnation is itself not a vital image of emergent motion but is instead the cruelty proper to a subjectless chaosmos. Deleuze’s method is both poetic and philosophical and is incredibly difficult to distill or communicate in a way that can claim fidelity towards his performance. However, in focusing on the relation of the idea to the geometric, rather than the virtual to the actual, it may become a bit easier to work out the core historical logic that discerns the univocity of the two.

Deleuze’s historical logic, which is basically the repetition of difference, is also a kind of volume that is a refusal of existence. The “directions in motion” that compose the *rhizome* happen in this volume and thus constitute a sort of motion through ideas. As a literary and aesthetic theory corresponding to the new baroque, the rhizome – when read as a dimensional depth-model – is also a theory of how changes in dimensionality can be aesthetic and without a subject. The n-1 dogma proper to the rhizome is the way in which motion through different Idea-manifolds can happen without an indexical presence, where the direction in motion changes the variability of its own directionality. The rhizome theory was extremely useful in theorizing literature due to the staggering magnitude of conceptual bridges that were achieved by the new baroque authors (Plotnisky). While contemporary scholars have been right in critiquing its utility as a political economic instrument during the last decade or so, it may be useful again in crafting an aesthetic discourse around artificial intelligence and spatial computing, particularly when informed and in discourse with the critique of topological control.

As spatial interfaces extrude into three (and higher) dimensions of space, we need a clear aesthetic formulation that both maintains the critique of topological culture and retains the
aesthetic knowledge of the rhizome qua depth-model. Aesthetically, we might seek a chaomotic rendering rather than a geometrical or topological rendering of self in the n-dimensions of computational space. Xoromancy (2019), a new media artwork built by interface designers Aman Tiwari & Gray Crawford at Carnegie Mellon’s School of Design, takes up a set of related questions within the specific domain of interaction design. The project uses a Leap Motion hand sensor to map the motion of the user’s hands to the input vectors of a Generative Adversarial Network trained on a public image database containing hundreds of thousands of generic images. The user’s hand gestures control the tuning of the GAN in real-time in order to continuously shift through various visual outputs within the vast space of possible images that the model can come up with.

**Xoromancy** maps the user’s hand positions using x, y, and z vectors and their hand rotations using i, j, k, and l quaternion to the components of a preset category vector that defines the vector space of possible imagery, which is in part defined as the GAN’s latent space. User input via hand motion thus changes the location of the model’s output vector within its preset vector space, thus allowing the user to experience a “fluent traversal of latent-space” in big GAN imagery. The authors offer further that Xoromancy intends to allow users to “move [their] body through 14 dimensions simultaneously” (Crawford, 2019) as an embodied method of learning how generative adversarial networks work.

Crawford, who self identifies as a “spatial interface designer researching embodiment and UI in spatial computing” has written fairly extensively on his philosophical commitments through thoroughly written and cited blog posts. Referencing computer scientist and graphics pioneer, Ivan Sutherland (who studied under Claude Shannon at MIT in the 1960s), Crawford quotes, “there is no reason why the objects displayed by a computer have to follow the ordinary rules of physical
reality with which we are familiar”. He continues on to define such a design space as that of a ‘hyperphysics’.

With the advent of computer-rendered dynamic media, phenomena could be represented that diverged from the phenomena driven by physical laws classically confining designed artifacts. This larger space of possible physical dynamics, of which the physics of our universe is but a subset, I refer to as hyperphysics (Crawford, 2018).

This passage evidences a remarkable degree of metaphysical or cosmological intention imbued in the concept or craft of spatial interface design. Xoromancy certainly reflects the ambition of a metaphysical or cosmological proposition, given the claim towards the coupling of the biological body with a both non-human and relatively high-dimensional space. I have no real intention towards an ethical or aesthetic critique of this project, although perhaps I will try to write such a piece at some point. Instead, I’m interested in proposing here that the field of spatial interface design, engaged with its own metaphysical and cosmological perspectives, is very much working within the space proper to the notions raised above in relation to Deleuze such as volume, idea, manifold, dimensionality, depth, etc.

The smooth interfacial coupling of bodily gesture to movement in an idea space is an actuality that cannot be effectively contended with in its entirety via a circulatory critique of rhizomic relationality. Luciana Parisi’s text Contagious Architecture has offered some important grounds for a critique of the topological aesthetics proper to postmodern architecture and interactive computing that evidence this shortcoming. In the workflow of algorithmic architecture, she writes,

The matrix of binary digits [is turned] into a fold of approximate calculations of the infinitesimal points that join two coordinates at a tangent: the derivatives of the x and y coordinates turn parallel lines into the infinities of a potential curve. A topological surface thus rises above the digital matrix of sequential coding, and is ceaselessly reproduced in the digital design of facades, buildings, and urban planning. This computational
aesthetic of the curve is now the dominant expression of postcybernetic [topological] control (Parisi 2013, xvii).

This complex passage forms an explicit critique of the computational performance of geometric fluidity and contextualizes the critique of interactive aesthetics, where the smoothness of the user’s biophysical input is performatively processed as a strictly-topological aesthetic form (Goodman and Parisi, 2009). Xoromancy, in designing explicitly and with no small fanfare for the Leap Motion hand sensor, is without doubt engaged in a topological aesthetics that seeks to transduce the users’ biophysical input into a topological performance of fluidity, continuity, etc. However, its visual expression and formal concept functions not so much to abstract a set of spatial coordinates into “the infinities of a potential curve” as described by Parisi regarding topological control, but rather to locate a high-dimensional vector coordinate within a preset vector space, or volume.

The passage of the interactive computing paradigm, with all the biopolitical and necropolitical stakes inherent in its interface with the body, is passing into an era of spatial interfaces whose spaces are themselves conditioned and constructed by artificial intelligences. We need a critique that can conceptualize the continuation of topological control in these interfaces, the mode of the relation between ‘matrices of binary digits’ and their seamless displays and that can discern the modes of motion and volume proper to their structure. Lastly, we need an aesthetic discourse and practical ground from which to formulate a mode of computational art beyond new media design.

By intervening on the circulation-model of contemporary critiques of Deleuze and Guattari’s conceptual avatar, rhizome, I’ve offered a depth-model for the rhizome based on the exposition of idea and chaosmos, in Difference and Repetition, as a volume of Idea-manifolds.
I’ve offered further that the n-1 dogma of the rhizome is itself a model of traversal of this volume without indexical presence. The rhizome’s relation to the new baroque could be used to rethink the relation-monads critiqued by Rouvroy and Berns, particularly in relation to the new brutalism envisioned by Parisi (Parisi, 2017) and the high-dimensional extrusions proper to the spatial interface.

This essay posits ultimately that an intervention on the monadologization of relations must take the rhizome as an aesthetic theory of dimensional depth in order to produce an aesthetic discourse and practical ground from which to effectuate critique and praxis for the confluence of artificial intelligence and spatial computing. The localization of coordinates in the vector space of bigGAN imagery retain and augment the performance of geometric fluidity via latent space transformations without relying on the “infinites of a potential curve”. We need to think through notions of volume in Deleuze’s neo-platonic structures that have been effaced by circulation-focused critiques of the rhizome. In doing so, we may formulate an aesthetic critique of geometric fluidity from the Deleuzian perspective of cruelty; thinking through a volumetric ideality that is a refusal of existence.
Bibliography of Works Consulted


