proceedings

MDPI

Proceeding Paper

Informatics and Generative Aesthetics †

Quran Karriem

Computational Media, Arts & Cultures (CMAC), Duke University, Durham, NC 27708, USA; quran.karriem@duke.edu

† Presented at the Conference on Theoretical and Foundational Problems in Information Studies, IS4SI Summit 2021, Online, 12–19 September 2021.

Abstract: This paper argues that generative music and art techniques have much to tell us about the politics of operations in infrastructural and political contexts, that generative techniques are an unavoidable aspect of informatic operations, and that an artistic and materially-grounded sensibility toward the manipulation of the inherent biases of operations is necessary, if not sufficient, for creating high-stakes automated systems that take an ethics of care as foundational to their becoming. This paper does so through concepts from mid-twentieth century philosopher of technology Gilbert Simondon's *On the Mode of Existence of Technical Objects* alongside critical readings of a pair of software artifacts—namely the predictive policing platform Geolitica (formerly PredPol) and the procedurally-generated videogame *No Man's Sky*. The analysis is supplemented by the author's experience as an experimental electronic musician, media artist and software product developer.

Keywords: aesthetics; generativity; cybernetics; art; policing; governance; politics; technology; Simondon

1. Introduction

This paper argues that generative music and art techniques have much to tell us about the politics of operations in infrastructural and political contexts, that generative techniques are an unavoidable aspect of informatic operations, and that an artistic and materially grounded sensibility toward the manipulation of the inherent biases of operations is necessary, if not sufficient, for creating high-stakes automated systems that take an ethics of care as foundational to their becoming. This paper does so through a critical examination of concepts from mid-twentieth century philosopher of technology Gilbert Simondon's *On the Mode of Existence of Technical Objects* juxtaposed with analysis of a pair of software artifacts—namely the predictive policing platform Geolitica (formerly PredPol) and the procedurally generated videogame *No Man's Sky*. Through the common medium of computation, the paper traces an operational homology between the practices of art and governance. The underlying technicity of computer hardware and software—expressed in energetic voltage differences interpreted as binary code—tend toward particular operational patterns. This is true whether users, programmers and platform owners seek to create new media artworks, predictive policing models for use by municipal governments or anything in between. In the latter context, I argue, a pervasive veil of 'objectivity' precludes the understanding on the part of developers and users that all decisions, and thus the broader decision systems they comprise, are fundamentally aesthetic and contingent. To accept the premise of objectivity, or to misunderstand a system as 'open to all possible outcomes,' then, is to accept the recursivity of the status quo, which is merely the historical sediment of both accidents and decisions previously executed. While the media artist, in the ideal, is sensitive to the generativity of technical systems and consciously directing outcomes to some desired goal, the overarching political context of twenty-first century technologies is such that they are used, intentionally or otherwise, as means to evade responsibility for the effects of technically mediated actions, which remain human in origin.

Citation: Karriem, Q. Informatics and Generative Aesthetics. *Proceedings* **2022**, *81*, 134. https://doi.org/10.3390/proceedings2022081134

Academic Editor: Mark Burgin

Published: 29 April 2022

2. Technicity and Alienation

In *On the Mode of Existence of Technical Objects*, Simondon described the relation between culture and technics as one of destructive autoimmunity because technologies are ultimately physical and/or energetic instantiations of human relations with one another and the environment: "Culture has constituted itself as a defense system against technics; yet this presents itself as a defense of man, and presumes that technical objects do not contain a human reality within them". His critique of the alienation of technics and culture continued: the latter "banishes other objects (in particular technical objects) into a structureless world of things that have no signification but only a use, a utility function". This alienation, he noted, led to an oppositional overcorrection on the part of "men who have knowledge of technical objects and who appreciate their signification" [1] (p. 15). These technophiles "seek to justify their judgement by granting the technical object the only status currently valued besides that of the aesthetic object, namely that of the sacred object". He concluded that their "intemperate technicism . . . leads to a technocratic aspiration to unconditional power". In this article, I seek to examine this claim of an "aspiration to unconditional power" in terms of its relation to generative systems and technical obfuscation, carrying forward Simondon's call to "show, precisely, that the robot does not exist" [1] (p. 16) into the twenty-first century era of machine learning, autonomous drone strikes, predictive policing and self-driving cars.

Eighteenth-century industrialization brought the advent of what Simondon called the 'technical individual,' typified by factory machinery, which he claimed was read as a competitor from the perspective of culture, precisely because it figuratively took tools and simple machines out of the hands of human labor. For Simondon, this posture of competition was the origin of the cultural antipathy toward machines he hoped his philosophy could resolve. In his periodization, this era was superseded by the emergence of the twentieth-century technical ensemble, which inaugurated a new era, where "thermodynamic energeticism is replaced by information theory". He believed that, because cultures viewed self-regulating technical ensembles as guarantors of stability rather than competitors, "the possibility of introducing the technical being into culture" was brought into being, potentially bridging the problem of the alienation of culture and technics. However, with twenty-first century hindsight, we can say that the age of informatics shares more of the "technophile and technocratic excesses" with the epoch of 18th-century thermodynamic energeticism than Simondon would have hoped, particularly insofar as it concerns "the rape of nature, the conquest of the world, and the exploitation of energies" [1] (p. 21).

For Simondon, the technical ensemble of the twentieth century was amenable to integration into culture because the two share operating principles. Each operates through the principles of information exchange and regulation—thus, ensemble technicity, he predicted, "will bring a unifying and stabilizing power, making culture adequate to the reality which it expresses and regulates". Again, with the benefit of hindsight, we can say that Simondon is simultaneously correct and incorrect. It seems computation is very close to what he had in mind as the ideal model of technicity, for he stated this: "Modern calculating machines are not pure automata; they are technical beings that, beyond their automatisms of addition (or of decision according to the operation of elementary switches), possess a great range of possibilities for the switching circuits, which allow for the coding of the machine's operation by reducing its margin of indeterminacy" [1] (p. 18). In describing calculating machines, Simondon invoked an ancestor to computing hardware and software as an ideal form of technicity: the hardware is indeterminate from the perspective of the software it constrains, and through this very constraint, the hardware always already contains every operational possibility of any future software that runs on it. However, what does the notion of technical perfection through indeterminacy achieve with regard to the amelioration of the alienation of culture and technics? Contemporary discourse often invokes machine ensembles and network effects, particularly social media, in discussions of twenty-first century political radicalization. In such cases, we can say that technics perhaps unify and stabilize cultures as Simondon imagined, but this is a plural stabilization and a

hardening toward the outside, particularly due to the general character of technicity that he advanced. Put another way, if a perfectly indeterminate machine, one with a high degree of technicity, can reconfigure itself to extend human gesture and affect, then it would follow that the disparate ethical qualities of human subjectivity would intensify through network effects, and cultural schisms would thereby deepen. Conceptually open machines that are seemingly open to all possibility perhaps bridge the gulf between technics and culture but also contribute to the fracturing and multiplication of culture itself.

Perhaps, then, changes in human knowledge can bring culture and technics into harmony. For Simondon, the various disciplines of his time were insufficient to this task. Labor, he reasoned, was unsuited because they were "attached to a single machine through work" and lacked the perspective of the whole, while management "create[d] abstract points of view regarding the machine" judging it only "according to its costs and the results of its operation". Science was also insufficient for this task because it only saw "in the technical object the practical application of a theoretical law". Thus, Simondon imagined a new discipline, a kind of "sociologist or psychologist of machines" he calls the mechanologist or technologist, "living in the midst of this society of technical beings as its responsible and inventive consciousness" [1] (p. 19). I am interested in comparing the role as Simondon imagines it to what would seem to be various twenty-first century manifestations of it in the domain of software and computation—namely, corporate software product managers, creative technologists, experimental electronic musicians, user interface and experience designers, and media artists. These, I would argue, are the contemporary disciplines most concerned with "awareness of the nature of machines, of their mutual relations and of their relations with man, and of the values implied in these relations". In short, I am arguing that something very close to the both the technical being (the computer) and the technologist (the aforementioned disciplines and roles) Simondon imagined exist. What is less certain, however, is whether this situation has restored "to culture the truly general character it has lost" and whether any discernable relation between technicity and human liberation exists, as Simondon imagined.

3. Generativity and the Myth of "All Possibility"

Programmers often apply pseudorandom techniques to simulate phenomena that are poorly understood or are difficult to model computationally. In generative and experimental aesthetics, we use them when we do not quite know what it is we are designing, but perhaps feel confident that "we'll know it when we hear or see it"—meaning we approach it with the knowledge that it can be controlled and modified after the initial iteration; some outputs are accepted, others rejected, and the total system will be attuned to our personal decisions insofar as it has a sufficient degree of indeterminacy to be reconfigured in such a way. As an example, let us take the 2016 videogame *No Man's Sky*, which to that point in time was at the technical leading edge in procedurally-generated aesthetic works. The game is set in a deterministic, procedurally generated open universe containing some 18.4 quintillion planets players can potentially travel to. Upon starting the game, the avatar lands a spaceship on one of these, apparently a pseudorandom selection. The climate, terrain, flora and fauna of each world is deterministically generated. The planet, terrain and artificial life techniques, which include L-systems, fractal equations and the Superformula algorithm, construct a virtual universe so vast that the developers admit it "is essentially as unknown to the people who made it as it is to the people who play in it" [2]. Despite this scale of this virtual universe, it is not 'open to all possibility;' rather, there are concrete design patterns the developers chose to constrain the system to the generation of a culturally coherent diegesis. For example, *NMS* is constrained by the essential gameplay loop that plagues many big budget games as part of a broader societal subject position of settler-colonialism: many of the creatures you encounter are 'out to get you,' and the mechanics either allow or necessitate that you shoot them and loot their corpses in order to craft better gear that enables more efficient shooting and looting. In *NMS*, it is equally clear that procedural determinism, the basis of 'generative technique' as a whole, does not equate to a lack

of authorship. Many creatures bear at least a passing resemblance to familiar cinematic renditions of dinosaurs, and much of the plant life has the kind of 'alien' aesthetic we have seen before: recognizable as flora yet radically 'not of Earth' in a way that conforms to science-fiction tropes, vaguely tropical with exaggerated 'teardrop' shaped leaves, bright blues and yellows in favor of Earthly greens and browns. For game designers, as for media artists, then, it is clear this is no attempt to deal in a realm of objectivity or of a transcendent openness to all possibility. Crucially, the developers guided a system toward outcomes they explicitly desired and took responsibility for. The software product itself is a gesture with meaning, presented to a specific audience of survival gamers and science-fiction fans.

A functionally identical production process occurs outside of artmaking contexts—that is, systems and apparatuses, whether entertainment or infrastructural in application are, to a greater or lesser degree, tuned to the preferences of one or more human individuals, and whether they accept or reject the outcomes of these processes is ultimately both aesthetic and conditioned by the performative presentation to some audience. Around the same time *No Man's Sky* released in the mid 2010s, the firm PredPol—short for 'predictive policing'—received journalistic and scholarly critiques for its misapplication of a machine learning algorithm. The firm's business model revolved around selling crime prediction and prevention solutions to municipal governments and police departments, encouraging the expenditure of public funds on private and proprietary software deeply imbricated in the operations of governance. The predictive models PredPol used were trained on earthquake data—naturalizing the concept of crime with the following premise: if there is an 'earthquake' or 'crime' in an area, there are also likely to be 'aftershocks' or 'follow-up crimes' in that same area of a city. A PredPol presentation obtained by journalists revealed a sales strategy involving decontextualized machine learning algorithms—complexity wielded as proof of objectivity [3]. Kristian Lum and William Isaac analyzed PredPol's models at the time and concluded that, in terms of results, the solution was no more effective than if officers had simply chosen patrol routes based on a moving average [4]. The software was operating on datasets about where crimes had already occurred and indicating that police should increase patrols in those areas. Due to the resultant increase in police presence, crimes reduce in those areas, and PredPol could present that as evidence of their own efficacy. Certain neighborhoods were thus recursively encoded as 'hotspots' by the machine learning model, largely because they had previously been designated as such by previous technical and bureaucratic systems. With each iteration, the accepted definitions of 'crime', both technically and culturally, are reified along racial and geographic borders drawn centuries ago. 'Crime' in this case, is just something that occurs or instantiates—the purpose of the modeling is not to question how crime is defined, the historical becoming of 'crime' as a concept, or to identify address any root causes behind crime. 'Criminals' are just another black box where we can reduce the output (crime) by increasing the input (police patrols). The purpose of the modeling is to increase the efficiency by which the dominant order is maintained; it must presume that the current definitions of and approaches to 'crime' are correct. In 2020, PredPol changed its name to Geolitica—presumably a portmanteau of geographic analytics. Their new mission is to "run operations for public safety teams to be more transparent, accountable and effective" [5]. Of course, most of the critiques of PredPol from activists, scholars and journalists centered around their own lack of transparency, accountability, and effectiveness. The name and messaging change have essentially co-opted the language of grassroots public safety and wellness activists that have critiqued them, and which are grounded in the idea of shifting police resources to other municipal needs—particularly underfunded mental health and affordable housing initiatives. While they adopt the language of their critics, Geolitica's model stays within the horizon of crime deterrent undergirded by the sovereign threat of force, still ultimately diverting resources away from investigations into the underlying causes of crime that those critics advocate. Of particular interest here is the idea of 'missions' in the Geolitica interface itself, where public safety teams designate a specific category of crime incident they will focus on

preventing or reducing, and which bears an unsettling conceptual resemblance to quest structures in *No Man's Sky* or any number of location and objective-based videogames.

Ultimately, I am suggesting that the tuning of models for high stakes political contexts such as policing is not an operationally distinct activity when compared with the creation of generative artworks. Generativity is a fundamental condition of computation. The proliferation of interior 'creative technologists' at the 'big four' firms that push these technologies forward and the drive to automate the techniques of artistic production itself through platforms such as Google Magenta and Amazon Deep Composer attest to this truth. The domains manipulate data in the same ways, using a shared set of algorithms and operations because they are united by an oppositional ethics inherited from wartime cybernetics and game theory. However, outside the disciplines and vocations dedicated to the materiality of computation and its effects on human experience, a pervasive operational blindness to historical contingency and the operativity of the proliferation of cultural meanings reproduced by forms results in a limited ethical framework because computational generativity can only reproduce combinations of what is already there.

4. Conclusions

Generative algorithms are currently our best techniques for modeling irrationality and opacity. Paradoxically, they are the manifestation of our continual attempt to arrive at the irrationality of transcendence through the complexification of rationality. We trust that the rational forms we can implement through machinery exceeds our own, but this is an impossibility. Computation exceeds our sense perception, but not our capacity for reason; it is an extension of that latter capacity. If, as Simondon said, automated machinery is the crystallization of human gesture, then computation is the crystallization of a historically contingent mode of human thought and aesthetics that might have been—and might still be—imagined otherwise. When we apply a generative technique to a problem, whether of design, aesthetics or governance, we make decisions on whether to accept or 'tweak' the output or the variational capacity of the system itself because certain outcomes appeal to our aesthetics and ethics, not because operationality in and of itself has a transcendent value of objectivity. Reason is invariably conditioned by the material interest and embodiment of the reasoner. If, as Simondon argued, technics contain an aspect of human reality, then automated reason is a manifestation of human interest. Given this, the goal of ethics as it relates to technology should not be 'objectivity', which is unattainable. Rather, it should be to cultivate *in humans* a greater sensitivity to *human* intersubjectivities and capacities for the analysis of technically mediated relational ethics. Only then can sociotechnics move toward a universally pro-human aesthetics.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Simondon, G. *On the Mode of Existence of Technical Objects*, 1st ed.; Univocal Publishing: Minneapolis, MN, USA, 2017.
2. Morin, R. Inside the Artificial Universe That Creates Itself. The Atlantic. Available online: https://www.theatlantic.com/technology/archive/2016/02/artificial-universe-no-mans-sky/463308/ (accessed on 1 December 2021).
3. Haskins, C. Dozens of Cities Have Secretly Experimented with Predictive Policing Software. Available online: https://www.vice.com/en/article/d3m7jq/dozens-of-cities-have-secretly-experimented-with-predictive-policing-software (accessed on 1 December 2021).
4. Lum, K.; Isaac, W. To predict and serve? *Significance* **2016**, *13*, 14–19. [CrossRef]
5. Geolitica Website. Available online: https://geolitica.com/public-safety/ (accessed on 1 December 2021).