



## Nootechinics of the Digital

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To cite this article: Anaïs Nony (2017) Nootechinics of the Digital, Parallax, 23:2, 129-146, DOI: [10.1080/13534645.2017.1299293](https://doi.org/10.1080/13534645.2017.1299293)

To link to this article: <http://dx.doi.org/10.1080/13534645.2017.1299293>



Published online: 08 May 2017.



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## Nootechinics of the Digital

Anaïs Nony

*We are no longer dealing with things, since there are no longer any things, there are no longer resilient objects: there are only networks of data evolving in real-time and that aggregate from time to time as profile, patterns and so on. But raw data seem to be speaking by themselves. We no longer distinguish what used to come under the sign or the signal and the thing. What is lost with this entanglement is the possibility of critique. The question worth asking today is: what is the significance of critique? What do we lose in this enclosure produced by the digital?*

Antoinette Rouvroy,  
*The Digital Regime of Truth*<sup>1</sup>

In today's digital societies, it can be difficult to grasp the political stakes of the technical. While the technical pushes us to face the past while backing up into the future, the digital is rushing up on us from behind, reminding us that we are late in our own present. This feeling of losing control of one's time is caused by the data-driven quality of digital devices that constantly implement new parameters into future actions. The digital has recently surpassed the technical realm due to the economy's use of highly addictive, yet intuitive, relations to digital platforms that are designed to function without the mastery of any user skills. While other technical revolutions that shaped knowledge production on a large scale – such as writing and printing – required years of effort and dedication, the digital tools produced by the market annihilate the very need to invest in apprenticeship. This gap between technological advancement and the cultural development of significant skillsets is the grounding basis from which to address the political stakes of today's digital condition.

A nootechnics of the digital takes the temporal gap created by the drastic acceleration of technological advancement seriously. It addresses the cultural delay that prevents us from developing meaningful relations to digital tools on a larger scale. Indeed, cultural practices fostered by our relation to technical objects are the operating forces that structure our relation to temporality. Being out of pace with the digital means being in a temporality that is no longer in sync with the technicity that fundamentally shapes processes of individuation today. Located at the heart of our technical modernity, processes of individuation take place in a drastically changing environment in which the digital now plays a fundamental role in shaping the relation between minds, bodies, and technics. Individuation, as described by Gilbert Simondon, is the becoming individual of an entity. It relies on a relational

operation that creates a multiphase mediation between beings, their milieu, and a myriad of objects, including technical ones. For this triad (beings, milieu, objects) to become an individualizing and individualized system, such an operation needs to be performed within a 'knot of informative communication'.<sup>2</sup> This informative communication leads the way of individuation as an organizational dimension of the system: it detects a problem, sustains a tension, and reaches a resolution that reorganizes the structure of the system. Inscribed in a cycle of phase shifts, such reorganization is grounded in an operative relation that produces change. In other words, information is the formula of individuation: its exigence as well as its primer.<sup>3</sup> For that matter, the digital offers the opportunity for a temporal revolution in the way we cultivate information in both space and time. Cultural agency refers to the ability to cultivate singularized forms of instrumental mediation, which are needed to foster individualizing relations within a milieu. Embedded in artefactual and technical practices, cultural agency relies on the possibility of reclaiming a relation to time in one's present. Today, the question of the possibility of cultural agency lies in the distinction between coding and the untaught skills required to relate to the digital. A myriad of unpredicted approaches to the digital have already been developed by imaginative users, thus demonstrating the openness of digital objects in adopting new purposes outside the use value directed by the market. These inventive initiatives are the indicators of a potential for finding new pathways to cultivate meaningful and fulfilling approaches to digital sensitivity, sociality, and to foster a digital ethics of care in today's political climate.

The guiding claim of this issue is that one grasps a politics of the technical through the study of the cultural practice of handling tools in society. This issue is devoted to a nootechnics of the digital, which defines the importance given to both life and thought in the technogenesis of objects (both artefactual and technical). If the ontogenesis once resided in the relation between form and matter, we are now moving toward the question of a nootechnogenesis that resides in the relation between *noos* and *techné*. Notechnogenesis does not separate the emergence of technics and life. Instead, it offers a mode for thinking about the genesis of both *noos* (intuition, intelligence, flair, intention) and *techné* (technique, craft, art) as the condition and the consequence of our cultural condition, of our ability to mediate and negotiate different realms of reality. Notechnics refers to the psycho-cultural practices of care and empowerment. It supposes the wiring of a transductive unity between beings and technical objects. This transductive unity is what allows *noos* and *techné* to operate in a relational mediation toward one another and to restructure the dynamic relations between elements within a system. For that matter, nootechnics refers to care and empowerment as structural operations; they promote a relational ontology of mediation needed to implement changes. Launched by members of the nootechnics collective, this issue debates the importance of such nootechnics in shaping various forms of life on a global scale.<sup>4</sup>

The digital, which encapsulates a series of operations such as automation, calculation, and preemption, has quickly become a central topic of research and activism in the humanities and the social sciences. While none of these operations are new, the historical framework marking the shift to the digital is important because of the magnitude of its scale. The digital functions according to a new paradigm that impacts all civilizations in a distinct way, namely, by imposing a synchronous system of time flows that infiltrate the fabric of everyday life. In this sense, the digital is not a theme, like in the so-called digital humanities, nor is it a field of specific inquiries. The digital is an operative and performative ground in which any relationality toward technology is transformed via a set of algorithmic rules that run outside of the sensori-motor faculty that defines human experience. To disrupt the imposition of a dominant experience of time and to invent a fruitful and collective relation to space, in the here-and-now of our actions on the political stage, is the task of the many of us who interrogate and use the digital on a daily basis. In today's political climate, the technical can no longer be dismissed as a political, as a mere means through which to assess human development. In other words, a major cultural misconception of the technical is to take it out of the political realm, as if technical practices – because of the uses that condition the mode of existence of technical objects – were not always already political practices. In this case, and if the technical is taken seriously and understood as a political question, the digital is also a political question that brings to the forefront the preemptive power of technologies within the infra-layers of sociality. The political implication of technical objects is a major factor of today's digital practices.

As a collective, we affirm that the digital has to become an amplifying structure of reticulation, meaning that it must develop processes in which new relational modalities toward technics are deployed. This reticulation defines the temporality of individuation and is based on the expansion, sharing, and care of transductive unities. As a vital operation of reticulation, transduction needs to be addressed from different points of view: metaphysics, logics, but also institutions, governments, and power dynamics of modulation. For that matter, the collective adds to Simondon's inquiry on the cultural importance of technical objects a focus on the digital. The latter, understood as an invention that drastically changes the social structure of everyday life, offers powerful grounds to question the synchronization of temporalities on a massive scale. In this context, the governance of memory, behaviours, and invention are key to understanding both our political and cultural condition in an era of digital technicity, i.e. a network of discrete entities. The discretization of space and time put forward by the digital challenges the very principle of individuation as it operates according to a time flow of processuality. However, it is this precise tension between different modalities of temporalities (the discrete and the processual) that creates the metastable milieu suitable for a new critique of our cultural and political condition. In this introduction, three categories (memory, behaviors, and invention) are deployed as a means to offer critical tools to question our digital culture from a nootechnics point of view. This issue addresses diverse nootechnical approaches to the

digital: noetic processes and the organology of sensibility (Sara Baranzoni), noology and modulative ideology (Benoît Dillet), noopolitics and the dividuation of the General Intellect (Paolo Vignola), the noosphere and the ecology of Big Data (Alexander Wilson), and the temporalities of digital materiality and the closure of politics (Ashley Scarlett).

### The Becoming Aphaeretic of Memory

Over the last decade, data storage has become a multi-million-dollar industry, with substantial investment going toward the development of backup power supplies that can support the overall explosion of digital information. The most significant one is the Digital Reality Trust, which owns the world's largest data center: the 1.1 million-square-foot Lakeside Technology Center in Chicago.<sup>5</sup> From within its walls, one would not see typical forms of recorded media such as photographs, cinematic moving images, or video files. Instead, one would see what seems to be an infinite number of shelves holding processors and networked machines that store bits of data. However, the content remains inaccessible, not because another machine is needed to translate it into a readable form, but because the Center does not hold data for people. Humans are not the main agents of Big Data's informational circuit. The Center operates by and in the service of other machines. Whereas traditional media gathers information directly drawn from the realm of human experiences, data storage centres are fed by machines that automatically extract and capture information. Mined from the technological operations that punctuate our daily life, data is produced by digital networks such as Google Maps, Facebook, and Amazon that represent an extensive databank of individual information, social associations, and consumerist behaviours.<sup>6</sup> As media theorist Mark Hansen puts it: 'Recordings now occur in the service of a myriad of small-scale technical processes to construct the connections that underlie contemporary media networks'.<sup>7</sup> In our digital age, humans are left out from the recorded traces they produce. With an Internet population that has grown nearly twenty-percent since 2013, and is now exceeding 3.3 billion people, the need for digital storage has not only increased, it has also drastically changed the way people relate to the past.<sup>8</sup> The Big Data industry has changed information processing practices in two major ways: a) data storage is intended for machine usage only, restricting humans from accessing the content; b) data storage functions by extracting information from operations that occur beyond the realm of human perception. These changes not only alter the human's relationship to information but also drastically modify memory formation.

Memory relies on input, storage, and processing. In this sense, memory offers a conception of time that is anchored in the layering and intermittence of these three concomitant functions. Central to input, storage, and processing is the retention of information by different means. As philosopher Bernard Stiegler stresses, expanding upon his reading of phenomenologist Edmund Husserl's theory of time consciousness, there are three different

types of retention. Primary retention defines the selection of information in the perceptive flux of consciousness. Primary retentions are thus anchored in the here and now of temporal experience.<sup>9</sup> Secondary retention defines that which is retained in memory from the first selection that constitutes the primary retentions. Secondary retentions are imaginative: they require an internal capacity to make us aware, in the present, of formerly retained information. In other words, secondary retention shapes the selection of primary retention based on information already collected and stored. Finally, tertiary retention, a notion developed in the work of Bernard Stiegler, defines a mode of retention specific to human beings: a *hypomnesic* sedimentation created through several generations and exteriorized in space and time via artifacts. In *Symbolic Misery II. The Catastrophe of the Sensible*, Stiegler emphasizes that tertiary retention is a condition for the emergence of primary and secondary retention: ‘Tertiary retention is not a mediation because it does not come after: it is not that which gives a mediated access to the immediate, but that which constitutes its possibility’.<sup>10</sup> Tertiary retentions are means through which to sustain the passage of time through technical means. Understanding tertiary retention as a condition of possibility for accessing the immediate flow of consciousness is crucial and urgent in a moment when our contemporary forms of tertiary retention are being produced at the speed of light. The sensible, which allows the selection in time (primary retention), is technically constituted by formerly exteriorized memory. For that matter, the notion of tertiary retention is crucial for understanding the remodeling of humans’ relation to memory in the age of the Big Data industry. Stiegler’s notion of tertiary retention – namely, the exteriorization of memory onto technical devices – is of particular importance here as it lays out the foundation for thinking of imagination as directly pertaining to the technical devices that surround us all. Stiegler’s conception of tertiary retention, imposes the notion of technical supplementation as the central link between retention and recollection, but also, between protection and perception imagination and invention. If Stiegler’s argument for the importance of tertiary retention is grounded in retentional finitude – namely, the fact that memory has more to do with forgetting than remembering – I am for my part interested in understanding two different things. First, how does the proliferation of moving images on various supports create an open-access memory, namely a memory carried through proliferating technical devices such as computers, laptops, tablets, and smartphones? Second, how does this proliferating apparatus of tertiary retention imply an ontological shift in memory formation, namely a shift that has to do with the internal re-structuration of schemes of thought.

While the externalization of memory onto technical supplements – such as writing a note, downloading a picture, and creating a file – was mainly performed by individuals for their individual uses, the digital introduces a drastic shift in the production and transmission of tertiary retention. Memory has become *aphaeretic* (from *apharein* in Greek; to *take away*): it is extracted by external and interconnected devices that run at an infra level, below human’s sensory-motor capacity. Not only do algorithms extract data from

us, but they also transform this data according to a set of instructions to which we lack any access. Here the figure of the programmer plays an important role both in creating a set of instructions and in developing a platform from which data can be accessed. In the age of Big Data, the figure of the programmer carries the weight of enabling a paradox: he or she is the person in charge of opening a set of instructions to be performed, and yet no one else should have access to the encoding structure he or she creates. With such a figure in mind, memory must be conceived as more than *prosthetic*, or exteriorized onto technical objects. Cellphones, tablets, and computers do not simply help us keep track of events that punctuate space and time: they algorithmically extract data from us and store it in 'ubiquitous networks and distributed digital storage devices'.<sup>11</sup> This algorithmic mode of extraction, i.e. data-mining, has created a global network of tertiary retentions that is in constant expansion. This expansion occurs at the speed of light, leaving no time for humans to catch up with the applied formulas that are producing data before and around them. Because the production of tertiary retention has become computational, the dynamic system of selection (primary retention) and recollection (secondary retention) is being remodeled. The speed at which algorithms track, capture, and stock information is superseding the enduring process of *mnesic* trace formation, its sedimentation and evolution over time. The moment of selection that defines primary retention is being overridden by a saturation of recollected information that now defines secondary retention. The overflowing amount of stored information in technical supports (tertiary retention) destabilizes both processes of selection and recollection, flooding the individual with data that he or she can no longer process on his or her own. The ever expanding horizon of tertiary retention disarms the individual by destroying his or her ability to make a decision based on his or her own data bank, i.e. organic memory. Decision-making has gone computational through the ongoing process of data-mining which produces a data bank that now leads and drives individuals' behaviours.

A decisive shift in temporal orientation thus takes place with the digital. Whereas memory was an act of commemoration – a means through which one could make sense of the past – computer storage looks toward the future, revealing the program-driven quality of daily operations. Media theorist Wendy Chun insists on the conflation of memory and storage in today's digital media, a conflation that is 'due to how everyday usage and parlance arrests memory and its degenerative possibilities in order to support dreams of superhuman digital programmability.'<sup>12</sup> Such programmability is a response to and a product of the continuing change in relations between objects and subjects that are brought about by computing as a neoliberal form of governmentality. For Wendy Chun, the programmability of social behaviour resuscitates dreams of sovereign power and depends upon the incorporation of 'historical programming hierarchies within the machine'.<sup>13</sup> In this context, computers structure individuals' behavior to determine the fulfillment of certain desires that imperceptibly and yet materially support a larger system, thus becoming the most powerful form of neoliberal

management. The algorithmic extraction of information not only shifts the regime of production of tertiary retention in the digital age, but also changes the way individuals perceptively select information in time and imaginatively recollect images through space.

The act of commemoration is based on the becoming-image of memory: the *souvenir-image* brings its potential to affect the present. With the digital, the potential modality of memory to infiltrate the present becoming of our action is reduced to a mechanism of extraction and implementation. The human organism, once understood as an auto-cinetic system that can recollect from the past and anticipate for the future is reduced to a linear system of temporal negotiation. There is still a distinction to be made between live organism and computer systems, but attention needs to be paid to the internal changes imposed by the exposure to program-driven performances. Indeed, media no longer functions for us. Instead, they have become thoroughly embedded in our environments, acting at an infrastructural level to shape the very ground of our perceptions and thus our experience. Media computers such as the cellphone, GPS and smart TV are generating data that anticipate our future choices, therefore implementing a new modality of relating to time in space that now serves the purpose of a wider network of digital platforms. In this context, a few concerns arise: How are digital platforms arranging relations to media time in a networked society? And how does the rise of Big Data reconfigure the selection, recollection, and retention dynamics at the core of human memory? A nootechnics of the digital pays particular attention to the data-driven dimension of today's media futurity. It does so to tackle the shift that tertiary retention faces in a world where media can no longer be conceptualized as mere prosthesis for expanding cognitive capacities. Tertiary retention includes artifacts that function as memory supplements, *hypomnemata*, that are essential in the process of both psychic and collective individuation.<sup>14</sup> As Foucault mentioned, these *hypomnemata* are supports such as notebooks, photographs, and recordings created and used to retain information. They function as exterior forms of memory, as prosthesis that supplement the finitude of our internal capacity.

This introduction focuses on the changing formation of memory in relation to cultural agency within today's ever-expanding network of Big Data. By agency, I refer to the media object's capacity to operate by rejecting or certainly bypassing the realm of our sensory-experience. Keeping in mind the shift from a prosthetic form of memory externalization toward a more *aphaeretic* modality of memory capture, the ongoing expansion of a global network of tertiary retention is fed by the constant upload of data by individuals onto platforms such as clouds and social networks. In this digital environment the *subject* is more of a *reject* (in the sense of rejection), rather than an agent, of the digital milieu in which he or she evolves. The open-ended environment of media objects is linked to the material agency of the object, and therefore is constituted by the characteristics of a generative, as opposed to representative, process of sensory experience. This generative perspective allows us, on the one hand, to question how the technoscape of media

objects actually operates at the level of memory formation from the point of view of a multi-dynamic encounter between digital image objects and operations of preemption performed by the platforms. On the other hand, the often-participatory aspect of such platforms leads to thinking of the users as a disturbing force, a parasitic presence in relation to an operative, rather than representative, media environment. In this context, a nootechnics of the digital investigates the relationship between memory and digital platforms to reevaluate the psychic milieu in which human and machine co-evolve. In questioning memory in relation to media futurity – that is, media's tendency toward programmability – a nootechnical approach to digital studies considers the performative agency of digital objects as operating in a proliferating techno-scape of memory retentions. While much attention has been paid to the question of privacy and security concerning the use and misuse of such data by third parties, an important challenge remains untackled. This challenge concerns the increase of data-mining processes that operate below humans' sensory capacities while drastically remodeling their inner abilities to perceive, retain, and recollect information.

### Digital Behaviours: On Our Techno-Tragic Condition

In recent years, the market economy of digital devices has witnessed the proliferation of a new form of commodity: software. Created in 1968 by IBM, software designates a splitting off from hardware and the creation of programs that are commonly understood as tools put in a computer, or other tele-communicative devices, to make it *do* things. Software enables the user to interact with the machine, whereas hardware constitutes the physical components of the device (screen, keyboard, mouse, audio speakers, and printers). Word processors (Word, Open Office), movie players (VLC, Windows Media Player), and Internet browsers (Firefox, Google Chrome) are all types of software you need to complete certain tasks on a computer. The explosion of the private software sector in the 1980s was concomitant with the introduction of personal computers. At that time, software quickly became to the computer what Internet is now to the tablet: an indispensable commodity that renders the device useless when not accessible. The network-dependency of today's digital devices reveals the chain-like aspect of humans' relation to technology. In fact, and as Gilbert Simondon points out as early as 1958, what counts is the transfer of energy and information in the object and between the object and its milieu.<sup>15</sup> With the software, the relational dependency to a network-type of milieu questions the scheme of command and auto-regulation from the point of view of the systematic automatization of operations.

The app, i.e. the application, which formerly defined the action of putting something into operation, has become part of the software industry that boomed in the mid-1970s with the rise of the personal computer. The software, a term coined as early as 1953, is defined by the constant upgrades and fast-growing potential of the commodity. The app presents itself as an

activity to be consumed by a user who needs to be connected to the temporality of a network. Among the wide range of services offered by online applications are those that foster mental activities, organization skills, and gaming abilities. Usually based on cognitive psychology, these apps are sold to stimulate memory, provoke thinking, inspire creativity, and unleash business strategy. According to advertising rhetoric, the simple handling of this stimuli-response type of applications seems to be sufficient for creativity to be fostered and deployed. Brain fitness, memory training exercises, resilience building, and conquering negative thoughts are only a few of the outcomes the software commodity aims to promote. According to the market strategy of the software industry, apps have become enabling tools to regulate emotion, promote memory, foster attention, and increase imagination. Apps, more often than not, remind you when it is time to train, it tracks your effort, and may post your score online so your online community can become the award-winning structure of your inner challenges. Usually combined with a device that tracks your progress, or your lack of it, the app is designed to stock information about your activity, to draw a profile of your digital self and to push you to match the competence and achievement of your digital double. In this era of wearable technology, employees, students, and government representatives alike are all tracking their health via the algorithmically designed apps that tell them when to sleep, when to wake up, how likely they are to lose weight, and how stress is affecting their sex life.<sup>16</sup> This new regime of calculation that gives access to what used to be incalculable and unnamable has found a label: the quantified self. The latter is self-monitored and self-sensed by wearable computing technologies, also known as lifelogging.<sup>17</sup> The main function of the quantified self is to analyze the discrete aspects of daily life, to extract data, and to draw patterns. Movements in space and time are not only regulated by technologies operating within the social layers of intimacy, health, profession, and leisure, but they are now optimized by interrelated objects that weave the threads of multiple experiences into a calculable one.

The tragic characteristic of the quantified-self is that the app consumes the user with a new type of fantasy: the ability to have power. As a commodity, the app is sold to promote enhancement. It does so by selling improvement in performance, management, and behavioural mindfulness. The ability to have power over oneself is contained in the time spent browsing enhancement. Whereas in Emanuel Levinas' *Totality and Infinity*, the ability for power (*le pouvoir de pouvoir*) was suspended by the face of the Other, such encounters have been replaced by the proliferation of avatars of the face: selfies, emojis, and emoticons are now the helpless characters of our contemporary tragedy.<sup>18</sup> These apps are made to enhance users' inner capacities by fostering technically supported activities. Like the device used in Greek theatre to lift an actor from above or to bring gods onto the stage, the app is marketed as an empowering machine offering the individual the possibility of surpassing human-related ability. Becoming bigger than oneself through the tracking of data has become the industry's motor. Such power is nonetheless relative. Because of the artificiality of such activities and the thin ties it makes

to daily activities, the enhancement does not seem to be so effective outside of the time frame it consumes. There is no need to act out the instructions outside the realm proposed by the application, there is only the need to spend time browsing the idea of enhancement. This ability to have power sold by the digital economy of the software industry has replaced the will to decide and to cultivate one's singular practice. The myriad of ready-made technics of the self – launched by the software industry of application – produces the collapse of a distinction between *power* as a logic modality in the sense of the probable, and *power* as an ontological modality in the sense of what is possible. Whereas power used to define the capacity to act efficiently according to a goal, a project, a desire, these apps foster only the power to remain constantly in *puissance*, in a time spent browsing enhancement without having to act out.

The fantasy of power sold by smart machines demands a reassessment of the ethics of relationality toward the Other and of our relation to the operative systems of such technologies. Whereas the splitting of the hardware and the software was crucial in the latter's transformation into an open-ended commodity, the distinction relies too simplistically on an opposition between mind and body. As David Bates suggests through a careful reading of Descartes' theory of the nervous system and the physiological foundations of cognition and emotion, the challenge of scholars of the digital is to rethink the activity of the soul as that which disrupts the cognitive processes of the body. Software programs are malleable (soft) entities that can evolve through time. The software designates, at least, two conceptions of the algorithm: 1) a set of finite and determined instructions, 2) an evolving system able to adapt and vary. In this sense, and as Luciana Parisi points out, 'algorithms are not simply instructions to be performed, but have become performing entities'.<sup>19</sup> The doubling of performance implies a double understanding of programmability: programmability as that which responds to an input by the completion of a task, and programmability as that which learns how to program the task to respond according to input to come. The plasticity of the software is analogous to the plasticity of the brain, an organ granted with the ability to reprogram itself in response to external circumstances. As cognitive neuroscientist Maryanne Wolf puts it, the open architecture of our brain and its plasticity are the conditions of knowledge production in the form of writing, and knowledge reception in the forms of language use. The reading brain, Wolf argues, is constantly negotiating the creation of new circuits of signification by building connections between the visual, language, and conceptual areas that are part of one's genetic heritage. Understood as a decoding process, reading is thus that which constantly reprograms the brain through its capacity to build new knowledge pathways. But, what can a digital brain do? Digital readers, confronted with an overwhelming amount of flowing information that requires and receives less and less care and effort may no longer have the time nor the motivation to dig into rich layers of meaning brought about by the intellectual work of interpretation.

Additionally, the wiring of the brain to a computing machine questions the relative *smartification* of the tools and devices that now proliferate and constitute our daily environment. Smart technology, i.e. a technology that learns from its users, reports the data it collects onto a network in order to adjust its operation according to a wider set of parameters. More precisely, smart devices are ‘objects equipped with, using, or containing control devices’.<sup>20</sup> In other words, smart phones, smart tablets, smart missiles, smart drones, smart bombs, smart houses, and smart cars are provided with systems that incorporate functions of sensing, actuation, and control.<sup>21</sup> These devices perform smart actions in the sense that they have analyzed and responded according to a set of parameters. They can be both predictive and adaptive, meaning that they are granted the use of data already stored in a system to generate prediction on the future needs of operation. The increase of smart functionality onto daily objects drastically changes the relation between subject and object. The digital thus implements a major shift in our understanding of performance: 1) individual performance becomes calculable and enhanced in *puissance* via tracking apps; 2) the performances of the rejected agents of big data informational circuits are creating a global network of tertiary retention that preempts future behaviors.

The fact that objects can learn from the environment in which they evolve is not new. What is new is that the users no longer need to learn how to use the devices that operate for them. The intuitive dimension of the algorithmically-run medium is not a mere ornament: this intuitive component has been wired to the intuition of the user who is now driven by the programmability of the machine that operates before him or her. The spatio-temporal object, which constitutes the app, interrogates the becoming consciously technological of our daily operations. With the app, the three different categories of knowledge, awareness, and reasoning (*savoir, connaissance, entendement*) are collapsed into a single one that is performance: the apps become psycho-affective transplants that regulate the artificial relation between perception and consciousness. These affective transplants perform before us, requiring us to match the digital double that holds the promise of becoming bigger than oneself through technological enhancement. The social, professional, but also mental and physical are categories used to track our activities on digital platforms, the latter forming a virtual plan of performance that systematically ranks people’s potential. This virtual plan of performance creates a milieu of constant need to upgrade, to hold on to numbers, to match the preset goals imposed by our doubles. Within the realm of the digital, the self has become a nomenclature, a list of mathematical formula that empties out possibilities to act otherwise, the break of the flow of dictated behavioral practices. In other words, the techno-tragic aspects of our digital performance are deployed in the elemental realm of our relation to platforms.<sup>22</sup> This newly digital plan of performance not only regulates the virtual realm of potentialities, but also drastically modulates the actual realm of the possible.

## Ontological Impact of Digital Invention

Invention is a cultural intervention that has an ontological impact: it reorganizes the structure of the real by shaping relations between individuals. Inventions (the wheel, railway system, the telegraph, radio, etc.) punctuate the advancement of knowledge in time and space while superseding the potential for new modalities of becoming to emerge. Invention is a temporal line of flight, a move forward that projects into the present what the future may unfold. In this context, invention characterizes an openness that poses how a technical specificity takes part in the order of reality. The constitutive understanding of invention as that which reorganizes the structure of the real, introduces the internal essence of the technical object as a reality that has an intrinsic homogeneity composed by auto-correlation.<sup>23</sup> This auto-correlation is based on a coherence principle that conditions the emergence of a technical realization.<sup>24</sup> In other words, invention is both an adaptation to ambient conditions, and a coherent development by auto-correlation. Invention co-depends on an inventor, i.e. a living being that anticipates a problem and simulates its resolution, and an object that reaches a new phase of development in the genesis of its technical realization. For an invention to emerge, the technical object has to reach the phase of concretization, which is the last phase of a cycle. Invention is inherently tied to both the milieu and the genesis of the object. Such emergence that induces change in the structural foundation of the milieu is caused by the concretization of a phase in the genesis of the object that reshapes the causal relation within the associated milieu. In this case, the associated milieu is the condition of existence of the invented technical object, and the technical object is the condition of itself. In other words, there is a genetic relation between the mental scheme of a creative imagination and the material function of the object. This genetic unity takes place in the order of the real to restructure spatio-temporalities pertaining to the newly engendered technical realization.

For technical progress to exist, each epoch should give to the next the result of its technical effort. However, if changes happen too quickly it impedes technical progress, i.e. the transmission of assets from a temporal era to other technical elements.<sup>25</sup> Progress is an onward movement toward cultural emancipation. For Simondon – who expands André-Leroi’s reflection on the process of hominization by addressing the genesis of technical objects in industrial civilizations – there is a cultural misunderstanding that considers the technical object as being either ‘pure assemblage of matter’ or doted of ‘hostile intentions’.<sup>26</sup> This cultural contradiction that either villainizes or utilizes technical objects is fundamental to unpacking the cultural importance of the technical as intermediary entities that foster transformative changes in society. While invention defines a moment of concretization, a climax that reshapes the relational modality that takes part in the order of reality, culture is understood as a consequence of the closure of technical objects. For Simondon, culture arises from a reduction of potential of the object, when the user of a technical object interrupts its openness and directs it toward a specific end. In other words, the technical realm is domesticated by culture

as a means through which goals are achieved.<sup>27</sup> However, each technical object is the result of an openness toward a higher level of progress. It holds the promise of an expanding of possibility that only an alternative cultural agency can foster, explore, and sustain. It is precisely the cultural use, and misuse of an object, that results in the foreclosure of the potential of this object to reach new phases of concretization. Simondon states that a civilization is out of phase with its culture when the modification of phenomena constitutive of that culture doesn't match the speed at which technical objects are modified and expanded.<sup>28</sup> He names this crisis a *déphasage*, a phase difference, that is constitutive of Culture in a broader sense:

The temporal phase difference and the qualitative differentiation that intervene between culture and civilization within Culture are crisis phenomena caused by the rapid change of techniques; this change temporally breaks the homogeneous characteristic and organic-like totality of Culture.<sup>29</sup>

The *déphasage*, or phase difference, constitutive of Culture, sheds light on to the temporal gap that takes place between invention and cultural practices developed in relation to technical progress. There is a tension between the foreclosed potential of an object imposed by a specific use, and the delay of a culture to relate to new forms of technical realization. The more a Culture is in *déphasage*, the less likely it is to foster cultural agency, i.e. the ability to cultivate singularized forms of instrumental mediation. In other words, the bigger the technical change is, the longer the cultural *déphasage* will be maintained. In this context, cultural agency would then define the ability to investigate the margins of possibility left by such crises to foster alternative relations to technical realization. The temporal gap or phase difference announces a crisis, but it also announces the opportunity to temporally bifurcate toward the cultivation of other forms of technical relation. For a cultural agency to balance the order of reality in our techno-digital world, the skill set of users needs to be rethought. A nootechnics of the digital is about the development of an alternative relation to structural operations through the expansion of skill sets. Only the nurturing of such skills can promote cultural agency toward technics. It is precisely this cultural agency that can help us not only catch up with the speed at which technologies are implementing new modes of relating to technicity, but that can also promote imaginative relation to technical operations so that the openness of an object can deploy its potential to be invented anew.

Critical to debates around the digital is the importance given to a potential gap between the development of objects and the effective use of those objects. This gap is thus defined as producing a crisis that disrupts the organic totality between culture and civilization. In the context of our digital realm, one cannot but witness the speed at which cultural practices have been changing, affecting the very fabric of social bonds and our tendencies toward different forms of relationalities. Like a frenetic response of the constant technical development induced by the digital, culture seems to be

deployed in multi-phasic ways. To consider the digital as a technical progress that fosters emancipatory practices of cultural significance, one would have to address culture as a process of phase shifts (as opposed to a meta-historical constant), and locate our contemporary situation as one that is drastically shifting toward new operations and functions of cultural production. In this context, the digital culture put forward for debate in this special issue is one that addresses the cultural significance of our relation to today's digital devices, apparatuses, platforms, and networks of technicity. While in 1936 Walter Benjamin questioned the industrial mechanization of artefacts and analyzed the reproducibility fostered by the culture industry, in the digital age such reproducibility has drastically changed. Electronic processing tracks, captures, and selects at the speed of light, synchronically generating both the proliferation and the preemption of digital objects to come. In this sense, the cultural question is no longer inscribed in a paradigm between original and copy *à la* Benjamin, nor in the production of simulacra *à la* Baudrillard. The existence of digital objects is anchored in a relational process of a different scale.<sup>30</sup> The newly engendered digital paradigm is the one of datamining, programming, and preempting the very grounds of our cultural relationality toward a network of technicity.

In a world that is monitored via automatic procedures of exchange and production, the problem of invention needs to be addressed from the point of view of digital preemptive platforms that structure anticipatory and projective behaviors toward the future. Digital platforms are driving forces that shape relational temporalities: they have preempted our faculty to anticipate by superseding the elemental realm of informative communication. The possibility of anticipating problems and simulating alternative, inventive, and operative modalities is hijacked by the data-driven characteristics of such platforms. To develop a nootechnics of the digital is to develop a cultural agency that fosters anticipation and simulation: a cultural agency that helps investigate the time-gap that takes place when technical changes are implemented at a speed that leaves culture in a state of shock. To do so, both mental object and technical object have to be thought through a genetic unity. We approach nootechnogenesis from the point of view of both images and objects to make an argument about the importance of this genetic unity. In this context, the image holds a status of quasi-organism that inhabits the subject. As we have seen, invention does not arise from the work of a subject alone, nor is it linked to the technical determination of an object. Such work takes place in a cycle, each element co-influencing the emergence of the invention within a system. Here, Simondon's theory of the allagmatic, i.e. a theory of relation as operation, is fundamental to unpacking the restructuring of the relational mediation between a subject and its milieu. For him, invention is the fourth phase of the becoming of an image: the first is anticipation, the second perception, the third symbolization, and the last is invention. These four phases create a cycle that is inherently tied to the image as an activity that functions as an intermediary reality which takes place both *prior* to and *a posteriori* of the experience of an object.<sup>31</sup> As lived organisms, images have their own genesis and continue to evolve while captured by

mental and technical processes. It is not so much a life-image understood as a capitulation of life's productive forces, but an image that *is* alive and inscribed in a genesis that endures a becoming in time. Such imago-genesis shares the essential lacunar dimension of the image both as a mental perception or a mental recollection. The semi-concrete characteristic of the image includes aspects of anticipation such as projects and visions for the future; cognitive contents such as representations of the real; and affective-emotional contents. The image operates a synthesis that allows the subject to compare the weight and impact of certain semi-concrete images. The synthetic operation of the image allows the subject to make decisions based on the comparison of the power of images. For Simondon, everything that intervenes as an intermediary between the subject and the object can serve as an image whose value can play a prosthetic role both adaptive and restrictive.<sup>32</sup> In this sense, the image as an intermediary between abstract and concrete, between the subject and the world is not only mental. The object-image is almost like an organism: it carries latent significations capable of developing inside the subject. Outside the subject, the image-object grows and multiplies itself through the exchange of activities until it finds an opportunity to be deployed and incorporated by a new invention. Simondon's notion that images hold a quasi-organismic status has particular relevance for a nootechnics of the digital.<sup>33</sup> By perceiving them as organisms, the imagination of the subject provokes the imaginal fullness of invented and produced reality.

The ontological impact of digital invention is linked to the quasi-organismic status of images (both mental-image and object-image). As we have seen, mental image is part of an internal process relatively independent from the subject. It appears first as a prism of motor tendencies that anticipate the experience with the object. Then, it becomes a system of signal reception and allows the motor-perception activity to gradually be activated by the interaction between the organism and its milieu. Next, the image integrates the affective and emotional resonances as developed during the experience with the object, and becomes a symbol. It is from the symbolization phase that invention can arise. The last phase of the cycle of invention is understood as a universe of symbols that tend to saturate its milieu, involving the development of a stronger dimensional system able to integrate more complete images.<sup>34</sup> The ontological dimension of invention resides in the internal consistency of a technical object that emerges out of this process of invention, which takes both life and thought as contributors to the emergence of technicity. In this context, invention is only possible if a technical object is the product of an interplay of causalities between life and thought. This nootechnics poses a fundamental distinction between users and inventors, the latter being the ones who, while facing a defect of individuation in the technical realm, will transform this negativity into a motive for change in the milieu. In this case, the desire for change operates in the dynamic encounter between a technical being and an inventing soul.

Finally, and given the importance of cultural agency in structuring the metastable balance between technics, beings, and organisms, the digital offers the

highest degree of risk and opportunity in becoming in sync with technical realizations. The ambivalent power of the digital revolution, i.e. its pharmacological dimension, is granting us an invaluable opportunity to foster new relations to technics and technology in order to, and in hopes of cultivating significant alternatives in today's societies. In this context, the cultural agency at the core of a nootechnics of the digital provides insights into today's time-gap in order to imagine future relations to technologies. The cultural agency that helps invent new relational modes of being nootechnically in sync with the digital is one of the most pressing political issues of our time. To unpack the question of what the digital can do, one must remember that the digital is the division of time in space occurring at the speed of light. This division is named a discretization and has to do with a form of separation that recalls the many forms of compliance toward modalities of domination by partition and appropriation. The link between division and temporality operates according to a process of machinic accumulation, i.e. the digital is not about the implementation of a linear scheme, but the constant adaptation of dividual modalities as a means to both separate and aggregate temporalities. The value of thinking about the digital from a nootechnical point of view lies in the opportunity to interrogate the implementation of structures of dispossession, extraction, and partition.<sup>35</sup> In other words, the political value of the digital as a ground for newly engendered cultural practices based on operations of temporal division resides in the consideration of a wider, longer, and more complex framework to question the becoming-dividual of social relations, and to assess how division and its dividuality principle resonate with the temporality of revolutionary actions today.

## Acknowledgements

The author would like to thank John Mowitt, Jane Blocker, Caroline and Bernard Stiegler, Anna Rosensweig, Jeannine Murray-Román, and Corbin Treacy. Special thanks to Charlotte Taubel, Rita Kompelmakher, and Cole Pulice for their care throughout the years.

## Disclosure statement

No potential conflict of interest was reported by the author.

## Notes

<sup>1</sup> Rouvroy, "The Digital Regime of Truth," 7.

<sup>2</sup> Simondon, *L'Individuation psychique et collective*, 18.

<sup>3</sup> *Ibid.*, 22.

<sup>4</sup> Co-founded in 2012 by Paul Willemark, Paolo Vignola, Alexander Wilson, Benoît Dillet and myself, the nootechnics collective has organized international events in Kent, London, Rome, and Nijmegen to promote

discussion and foster debates on the importance of technics and technology in shaping processes of individuation. Website: [www.nootechnics.org](http://www.nootechnics.org).

<sup>5</sup> <http://www.datacenterknowledge.com/special-report-the-worlds-largest-data-centers/worlds-largest-data-center-350-e-cer-mak/>. 30 September 2015.

<sup>6</sup> Thayne, "Friends Like Mine: The Production of Socialized Subjectivity in the Attention Economy."

<sup>7</sup> Hansen, *Feed-Forward*, 40.

<sup>8</sup> <http://www.internetlivestats.com/internet-users/>. 2 April 2016.

<sup>9</sup> Edmond Husserl points to the distinction between momentary grasping and enduring act. While the duration of the act of selection is crucial to thinking about notions of attention, we will focus for now on a notion of primary retention as a non-differentiated act.

<sup>10</sup> Stiegler, *De la misère symbolique*, 189.

<sup>11</sup> Goodman and Parisi, "Machines of Memory," 343.

<sup>12</sup> Chun, *Programmed Visions*, 149.

<sup>13</sup> *Ibid.*, 34.

<sup>14</sup> Concerning the notion of *hypomnemata*, see Foucault, "L'écriture de soi."

<sup>15</sup> Simondon, *Du mode d'existence des objets techniques*, 59.

<sup>16</sup> In "How employers tracking your health can cross the line and become Big Brother" financial journalist Suzanne McGee questions the possible intrusion into one's personal life when companies seek to use the data collected by the wearable to measure financial rather than health benefits from their employees. *The Guardian*, Friday 1 May 2015. Important here, and not mentioned in the article, is the competition fostered by companies to have their employees enrolled in contest: who walks the most, who sleeps enough, who has the healthiest heartbeat, who has regular intercourse. Not only the best employee of the week is elected based on the tracking and extraction of data but such bio-regulation takes place in a wider system of endless labor.

<sup>17</sup> Lifeloggers are people who use wearable technologies to capture a large portion of their life. The lifelog information captured via devices are usually deposited into other devices, such as a computer, to digitally document one's life.

<sup>18</sup> "The expression the face introduces into the world does not defy the feebleness of my powers, but my ability for power. The face, still a thing among things, breaks through the form that nevertheless delimits it. This means concretely: the face speaks to me and thereby invites me to a relation incommensurate with a power exercised, be it enjoyment or knowledge." Levinas, *Totality and Infinity*, 198.

<sup>19</sup> Parisi, *Contagious Architecture*, IX.

<sup>20</sup> See definition of smart, <http://www.wordreference.com/definition/smart>.

<sup>21</sup> See definition of smart systems, [https://en.wikipedia.org/wiki/Smart\\_system](https://en.wikipedia.org/wiki/Smart_system). Actuation means the operation that is responsible for moving and controlling the mechanism of a system.

<sup>22</sup> The elemental designates the dynamics through which networks operate above or below the human subject. The elemental aspect of media network, its ambient characteristic, thus points to the lack of human control regarding the operations that constitute twenty-first-century media. See Hansen, *Feed-forward*.

<sup>23</sup> Simondon, *L'Invention dans les techniques*, 85.

<sup>24</sup> *Ibid.*, 230.

<sup>25</sup> *Ibid.*, 87.

<sup>26</sup> Simondon, *Du mode d'existence des objets techniques*, 2.

<sup>27</sup> Simondon, *Sur la technique*, 317.

<sup>28</sup> *Ibid.*, 35.

<sup>29</sup> *Ibid.*, 35-36.

<sup>30</sup> See, Yuk Hui, *On the Existence of Digital Objects*.

<sup>31</sup> Simondon, *Imagination et invention*, 4.

<sup>32</sup> *Ibid.*, 12.

<sup>33</sup> *Ibid.*, 9.

<sup>34</sup> *Ibid.*, 3.

<sup>35</sup> Nony, "Revolution in Tragic Times, or What Can a Philosophy of Dividuality Do Today?"

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