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Complexity & Simplicity

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Architecture of Intermodal Complex

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This paper focuses on the conception and design of architecture as the work of producing media about buildings and other environmental artifacts. I approach the questions regarding simplicity and complexity through "interdependence" and "intermodality." I believe the two concepts offer more precise frames of relations and contexts involving simplicity and complexity. I will first discuss the complexity as a condition of interdependences and how today's interdependences may provide a framework to understand complexity. I will then propose that intermodality adds to interdependence a notion that specifically pertains to today's media-driven culture and its complexity. I will next discuss how dependences and modalities are interconnected at various levels and eventually producing a new kind of semiosis that results from the disjunction between the medium and the content. I will in conclusion propose a new concept "apparatization" driven by interdependence and intermodality and how it changes shape and remain fluid, rather than scaling between simplicity and complexity, without a specific physical locus.

Keywords: *apparatus, interdependence, intermodality, media, pervasive computing*

We may at first view the simplicity vs. complexity contrast as a matter of degree and progression: something starts as a simple, singular entity and progresses into a complex one, gaining multitude of qualifications and variations. We can also take for example the pace and scope of such progression and how fast and pervasive it may eventually become. As often, we break down a complex object or situation into simple constituents so that we can understand it clearly. In a reticulate formation, complexity in essence indicates a context of relationship and connectedness. Especially since the emergence of the Internet, not only the expanse but also the frequency at which the reticulate configuration operates has come to dominate human affairs. In short, the questions regarding simplicity and complexity hinge on how rapidly and pervasively the reticulate configuration operates.

Against the backdrop of reticulation, interdependence includes the *performance-critical*, contextual elements, the *prerequisites*, that are necessary for an object or an event to take place. Certain prerequisites bring about radical changes that propel the development of human culture at an astonishing rate. In the context of today's Internet-driven cultural milieu, Java, the W3 standards, fiber optic infrastructure and the *smart*, networked mobile devices for example stand out as such prerequisites. Each of them

in turn carries its own prerequisites. Such prerequisites - the so-called "general purpose technology" (Brynjolfsson and McAfee 2014: 75-76) regardless of simplicity or complexity in itself - brings about profound changes to a vast swath of human culture, thereby greatly increasing the complexity of artifacts and knowledge systems. A general purpose technology includes: previously existing technologies; activities and processes involved in the production and accumulation of artifacts; and contextual knowledge systems (Bijker et al. 2012: xli-xliii). Each event of general purpose technology indicates a critical milestone that substantially elevates the performance of human material culture. In this sense, it can also be called the *performance-critical* technology. Due to its transformative influence and near-universal deployment, performance-critical technologies - such as internal combustion engine, electricity, transistors, and so forth - have become *critical* to the ontology of human constructs. Without them, the human culture as we know it may cease to exist. We can add the digital algorithm and computer technology, especially in combination with the Internet and the W3 standards [1], to the performance-critical category.

Performance-critical technology prompts development and production of other technologies, and brings about tangible, very often fundamental and transformative, effects in the cultural production process. Computation exemplifies the performance-critical dimension. (For the purpose of this paper, I will sketch "computation" as the combined function of: the hardware as an instrumental assemblage; the software as aggregation of algorithmic encoding languages and expressions; and the activities and processes involved in making, distributing and connecting the hardware-software functionalities.) Such general purpose, performance-critical technologies always become pervasive and almost universal. In addition, they are almost always recombinant of the prerequisites. They indicate a creative way of understanding and combining existing technologies in order to tackle and solve problems and so as to engender subsequent technological innovations that

impact human living and its environment. The interdependencies among various performance critical technologies define the nature of complexity in human culture.

In the meantime, intermodality has come to mirror interdependence and consists of interchangeable modes of media and agency, for example, that may flow from a piece of paper to a computer screen, to a printer, and back to paper. It indicates the media-devices that can hold and present numerous types of contents, and are used to access them, ranging in scale from a wrist watch to a smartphone, to a tablet to a computer, to a billboard and to an entire building façade. Each media-device presents a particular modality because of its own distinctive mode of existence and operation in hardware (the machine) and software (the encoding) combination. Creating contents that can seamlessly traverse from a wrist watch to an electronic building façade, with all the intermediate scales of display and reception, represents the quintessential state of intermodality.

According to Mark Weiser, who proposed "ubiquitous computing" and "embedded virtuality" (Weiser 1991), computing should be as common as paper in order to achieve its full potential. Along the way, we have reached a point where simplicity in fact represents - or *symptomizes* - incredibly complex interdependent systems that are indeed pervasive. We have come quite close to Weiser's ubiquitous "tabs, pads and boards" (Weiser 1991:98). As a result, in order to make data available (almost) everywhere, intermodality has become absolutely crucial: it is no longer a matter of choice. No one any longer creates the kind of content dedicated to one medium (mode) of presentation and pragmatics. For example, Nokia's and subsequently Blackberry's demise demonstrates today's intermodal technological milieu. Both companies are no longer viable because they chose to ignore the wave of new intermodal apparatuses initiated by Apple with its iPhone. Around the time of the W3 standards, America Online (AOL) used to be the most dominant Internet service. It emulated a walled-in community where AOL controlled

the communication between its members as well as the media content and distribution according to its own codification. Now AOL is no longer viable because it was still modeled after the protected, closed model of television programs and movies. In today's pervasive intermodality model, Facebook is open to various modes of media ranging from text to video on demand with minimal control and enforcement of membership and participation. Facebook can very well monetize its thumbs-up icon (U+1F44D) or a birthday cake icon (U+1F382), intermodality *par excellence*, without the need to collect membership fees.

From a causal perspective, simplicity, beyond superficial appearance, almost always carries a complex matrix of dependences. For example, a simple-looking terracotta bowl implicates a series of prerequisites: the availability of clay in a reachable area; the tools and labor for collecting and transporting the clay; the knowledge of suitable sizes and shapes (e.g. a cup, a bowl or a jug); the knowledge and skills of tooling and shaping the mud into such a shape; the ability to generate and calibrate heat for baking; and the like (Hodder 2012: 17-18). In turn, each prerequisite also carries a series of requirements for it to take place. In this matrix of prerequisites, each element is crucial to the ontology of a given object, be it a bowl, a building, a computer or an airplane. To cite a more recent example, beneath the intermodalities of graphic user interface environment is a long series of interdependences that folds into itself in a web of disparate prerequisites ranging from encoding languages to lithium. The semiosis of technological codification arises from a complex of Babelian languages and material conditions. Through the codification of isolating, tagging and transposing individual elements, the encoding languages connect with one another and help propagate semiotic contents in highly affective, preferably alluring, form.

The matrix of prerequisites and dependences is derived from the *techné* in the classical sense of the term of Four Causalities in material, form, intent and purpose (Aristotle 1999). The question of simplic-

ity vs. complexity in the causal techné depends on how tightly or loosely the four causalities rely on one another. Each individual causality also embodies its own set of dependences that aggregate into an ever-increasing snowball that fluctuates in shape and structure. In today's context of computational technologies, interface exemplifies the complexity of intermodality that facilitates the transition between different sets of interdependences. While we may consider it simple enough to use a laptop computer or a smartphone, the seeming simplicity and the ease of use are made possible by the interface. The function of interface depends on the culturally accepted semiotic understanding of a given task in relation to the sign that represents it. However, the underlying causalities of simple - often culturally specific skeuomorphic - interface is nothing but simple from both iconographic and engineering points of view.

From a teleological perspective, any given design must conform to the way it is understood and used: the interface based on existing, widely recognized sign-systems becomes crucial. In architecture, we speak of the "duck" versus the "decorated shed" (Venturi et al. 1972: 88-91). A "duck" object is an icon in itself of which ontology is limited to its iconic role. It has no other modality beyond the iconic presentation of its uniqueness regardless of its functional purpose. A decorated shed is a building that carries a sign "Duck" but not necessarily unique in itself in relation to what the sign signifies. In this case, the functionality of the building assumes a new meaning by virtue of the sign, the interface, that is applied to the building. The building as a functional object becomes *recessive* and may underlie other modalities depending on the interface, the sign system, that is expressive. We can add the third category to the duck and the decorated shed. Since the advent of digital image making, the interface as sign-system has become and must be intermodal: one should be able to understand the cognitive assemblage in a consistent way regardless of the environmental context and its variables. Such intermodality requires simplicity in expressing the operative logic of a given construct in

order to facilitate efficient and effective semiosis. We may call this condition the "decorated ducks" (Foster 2001: 15). This category of objects includes not only the iconic semblance (e.g. a duck, a fish or some *thing* that looks like crumpled paper or a bundle of disheveled spaghetti), but also the embellishment that reinforces the icon.

The causal and teleological perspectives have diverged from each other: the medium is no longer the message and the message is no longer specific to the medium. More importantly, the medium and the content have become separate: they are no longer bound by the historical conventions of congruity we often summarily call "media." To paraphrase Friedrich Kittler, medium is irrelevant: the medium-specific expression neither exists nor appears viable any longer (Kittler 1999: 2).

The separation between content and its (re)presentation or (re)presence, the algorithm-driven media disjoin the content from its means of presentation, and even from presentability, thereby rendering the eventual pragmatics of media-content problematic. The development of encoding languages such as Java, HTML and XML augmented the pervasive deployment of the Internet and the W3 standards, as well as the kind of application software that runs on any hardware-system software combination. They explicitly emphasize intermodality by facilitating various types of information to appear in a consistent manner across various hardware and software environments. Today's digital media are distinctive in their capacity to span different types of devices, change shapes, and shift places, depending on how the content is encoded, codified and presented.

The new encoding languages makes it possible to assemble a large amount of information in a way that is not determined by temporal and geographical bounds. The encoded and codified database has led to a new construct of knowledge that is based on the values based on exchangeability. Thus, the digital media make the one-to-one correlation between the physical presence and its content highly problematic, even impossible. Yet, the systemic disjunctions and unforeseen slippages (or *bugs*) inherent in digital media also make it possible to work with and manipulate various kinds of content in ways that would have been impossible without the capability to separate content and presentation. Our daily interactions with and through digital devices consist of modulations between our explicit action and the contingencies that occupy the disjunctions of such modulations.

The pure form and the configuration of the formal and programmatic semiosis that can be transcribed and extrapolated endlessly on-demand reign supreme. The separation of the content and the medium has also brought about fragmentation, recontextualization and reconfiguration, which render the notions of originality and authenticity by and large moot and irrelevant. The separation in effect produces "organs without a body" (Zizek 2004: 172-173). Alluring *infonemes* (minimally *meaningful* units of distinctive sounds, images and texts) are harvested, embellished and hustled in a way not unlike the fetishized pornographic images of silicon-filled breasts, a glatt-depilated vagina or a bleached anus at the expense of the body as a whole. The aggregation of excessive infonemes reinforces and tribalizes authority and power, contrary to the idealism that technology usurps the status quo.

In the twentieth century industrial machines augmented and to a great degree replaced physical human labor. With the proliferation of computing, our cognitive capacities are also *apparatized*, out of our body. We are tethered to various cognitive apparatuses in order to augment our capacity to deal with complexities and to relieve our mind and body of labor. The extent of such extra-cognitive apparatization determines the degree of simplicity and complexity. The more extra-cognitive we become, the more complex our environment is. We have also come to equate extra-cognitive capabilities with empowerment and to a large extent freedom: the more extra-cognitive, the more power to freedom. In addition, the extra-cognitive capacities connect with

one another and have become pervasive, the mediated socialization. Here I adopt the archaeologist Lewis Binford's classification of "technomic" (direct extension and augmentation of human body; e.g. a hammer extending human arm and fist), "socio-technic" (a tool becomes common to a group of people; e.g. everyone has a hammer), and "ideo-technic" (a tool that loses its original function; represents a specific ideological or belief system; and is used to reinforce such a system; e.g. the hammer-and-sickle that represents Communism) (Binford 1962). The intermodal, extra-cognitive technology turns "socio-technic" and produce apparatus-regimes that empowers the "ideo-technic." In this case, the notion of simplicity and complexity depends on the degree to which a given knowledge system is apparatized by the dominant power; how the apparatus-regime fabricates semiosis through ideo-technics; and how such semiosis is embodied (or *actualized*) by the subject.

Within the apparatization process, while certain individuals may (appear to) exercise certain freedom of various personal choices, such freedom is defined in diagrammatic, combinational, and configurational ways. It depends entirely on the potentialities and more importantly on the exclusionary processes that an apparatus-regime chooses to exercise and enforce. The apparatization process has caused a disruptive shift in architecture as a discipline in the culture of pervasive algorithm and computing.

First, the disciplinary apparatization indicates that autonomy and authenticity become irrelevant. An apparatus-regime by way of its codification system define the apparatus-centricity and its generative capabilities. The codification system molds and shapes the functioning of procedures and protocols, and thus determines the operativity of a given discipline's constituent agents and contingencies.

Second, apparatization assumes incremental development, in which variation and combination emerge as its primary operative modes. This in turn intensifies the decentralization and fragmentation of parts and production, and makes the re-combination and re-versioning the most crucial aspects of composition. This is primarily represented as the *flexibility* of design and renewal, the "flexible accumulation" (Harvey 1989: 147).

Third, the apparatization neutralizes media specificity by means of underlying codification systems (algorithms+hardware+networks), and therefore becomes fluid, more horizontally distributed, and intermodal. What used to be known as medium in the historical sense, the substrate, no longer requires, or at least no longer assumes, material, physical actualization. One kind of content may - is in fact required to - be easily transcribed and transformed into another kind.

Apparatization superimposes its own operative logic and discipline, affecting the work regardless of the authorial intent. Such apparatization anticipates particular functions or tasks within certain means in order to address a need and serve a purpose. In architecture for centuries, the operative logic has been projective geometry: drawings are constructed by projection as plans, sections, elevations, and perspectives. With the advent and proliferation of digital algorithmic apparatuses, architecture has become a thoroughly apparatized, extra-cognitive practice. Its disciplinary field has come to include an increasingly expansive array of elements, modalities, and attributes to the extent that the historical autonomist view of the discipline appears no longer viable. Architects have become a new class of ideo-technical professionals whose work involves dealing with the complexities of the extra-cognitive apparatuses and the types of content that algorithmic apparatuses help produce and promote. Architecture is also increasingly regarded as an apparatus-driven image-making practice on behalf of the dominant regime of one kind or another.

Architects' excessive optimism and reliance on extra-cognitive, intermodal apparatuses often result in a bipolar disorder: the simplex of formal euphoria mated with the complex of overt techno-optimism. One the one hand, the complexity and density of apparatuses have increased exponentially, ranging

from robotic construction to turning lights on and off. On the other, the very same apparatuses require and are limited to efficient simplicity in cultural and economic semiosis. No one knows for sure what lies behind the kind of simple, almost reflexive use of our apparatuses. The excessive enthusiasm for and over-reliance on the apparatus disregard the technological apparatuses' complex automaticity and codification. The necessity of generative, formal rationality depends largely on the exclusive codification by means of software-hardware-network applications and systems. Such codification is designed to perform and produce a specific set of affects implemented by yet another kind of author, the programmers, and what they choose to address and make visible. The apparatization has come to determine the fate of the actual performance, be it music or architecture. The emphasis is on fluency in specific skills, vis-à-vis specific apparatus-centric rationality and knowledge. Additionally, in the conception and production of architecture today we see a new class of experts whose central role is dedicated to the codification and operation of the apparatus. If we reflect on recent tendencies of both architecture and music, specifically since the appearance of the first purely electronic sound generation in the 1950s, we also see a process of codification, in the sense that the environment in which the sound occurs is constructed on the basis of rigorous technical operations. But the performance is detached from the presupposition of substantive narratives, or from mundane and serendipitous moments.

The roles of extra-somatic augmentation and extension of human sensory capacities define the modes of mediatized cultural formation. We may also consider the extra-somatic formation of aura. In Walter Benjamin's notion of mechanical reproducibility (*Reproduzierbarkeit*), the machine overshadows the artist (Benjamin 2010). Ultimately, the kind of machines involved in the (re)production of the works of art determines and embodies the aura. Such a mechanical aura represents the industrial-capitalist culture that consists of identical, mass-produced, and flawless objects that are inexpensive and available to everyone at an appropriate price. We endow machine-made objects with an aura of seeming perfection and equity. Whether they are reproductions or original work does not matter much: machines made them, and the machines cannot waver. The sense of enchantment and magic of technology and machines still puts us under a spell. If we were to suppose what an aura may indicate in the digital age, the question is not only whether or not it is present in the extra-somatic digital apparatus. But it pertains more crucially to how it displaces and replaces the existing codification of cultural discourse and formation. We find comfort in the cultural discourse of the digital apparatus and codification in the way it masks the messiness of reality. The aura of artistic work valorized by today's cultural dispositif stems from the pervasive and ubiquitous presence of the digital apparatus. We can paraphrase Benjamin that today the aura surrounds the sense of a cult that is so intimate, yet remains distant and invisible. If the machine age was thought to have rid art of cultic and ritualistic valorization, the digital age has resurrected it with vengeance.

The cult of the digital may also celebrate dissonance and alterity by capturing and making them visible, lifting them to the surface of perception. The celebration of dissonance and alterity is embedded in the tradition of technological avant-garde that hails novel inventions as the progenitors of creative aggression. But as soon as they are captured, the cult-novelty withers away as quickly as it was fabricated. The mediatization process no longer involves physical heft. It is no longer a question of *vor-* or *zuhanden*, to borrow from Heidegger. Encoding and codifying a given work determines its viability and eventual ontology. Regardless of the content, the surface appearance determines the cult-value of a given work, and whether or not the work may be allowed to fit in the striations of the virtual space.

Whether or not any new codification system may afford yet another promise of liberation, empowerment and freedom is highly questionable and re-

mains to be seen. At the same time, such technological automaticity provides architecture with the potential that is unprecedented in terms of its vast heterogeneous spectrum that now touches almost all aspects of human culture. Inserting the idea of various local contingencies and *noise* into computational aesthetic work process will help overcome hollow manifestos and naïve panacea that often result only in the thoroughly forgettable images of pornographic contrivances or chewed-up bubble gums. Counteracting the *dispositif*, contingency, dissonance and alterity should form intrinsic part of any apparatus-centric aesthetic work.

We may find it assuring and comfortable to be able to mold our imagination into tangible shape. Along with the new form of empowerment leading imagination directly to factory, the combination of technologically encoded aesthetics and algorithmic conception and composition dematerializes works of architecture as their conception, design and appreciation are apparatized in an extra-cognitive way. In this process, engrossed by the seeming simplicity at the receiving end, architecture loses the political, social and cultural potency and criticality it is expected to embody. What remains is the *impression* of experience that turns into yet another agent for commoditizing excesses. The algorithmic media afford the new capability possible only through apparatization and codification. We may criticize and accuse apparatization of pulverizing the inviolable subjectivity of the architect-as-author, or even of the *author* at large. We may also mourn the demise of such author and attribute it to the new apparatus and codification regime, of which purpose is thoroughly captured by the economic and programmatic maximization of what may be viewed as "cognitive capitalism" (Moulier-Boutang 2011: 50-59). However, the potential for dissonant, unsettling alterity to rise above the surface of our pervasively augmented and sanitized consciousness is also as compelling as the power-authority to capture and objectify it. The capabilities gained from the assemblage of new apparatuses and codifications should be liberating in its very potential

to expand and intensify alterity, in resistance to the ideo-technic of power-authority that is deluding and oppressive.

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