From Technical to Technological: Interpreting Technology Through Composition

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Abstract

This paper traces the development of technology as a discourse and as a way of understanding human activity. In our everyday activity, the notion of technology is often *consumed* by its purely practical, *equipmental*, interpretation. Such an interpretation assumes the cultural neutrality of technical things, fully justifying the equivocation of the technical with the technological. Since the 1950s, art has increasingly come to concern the social, cultural, and historical frame in which artworks obtain meaning. It is proposed that computer-assisted composition be understood as a means for generating interpretive frames, one that questions the positivist framework normally associated with so-called "technological art."

1 Technique

Philosopher Arthur Danto used the term "post-historical" to refer to a period in art—roughly from the late 1950s to the present—in which "art was no longer possible in terms of a progressive historical narrative"[1]. For Danto, Andy Warhol's *Brillo Box*—a large packing box for then-ubiquitous brillo pad cleaning items—best captured that moment when art became "philosophical" [1]. In order to even begin to *see* a work like *Brillo Box*, one had to understand it within the context of its social and historical framework; the work *was* in fact this very framework. Such a notion of visual art challenged the traditionally held idea that visual artworks present "significant forms" predicated primarily upon "retinal experience" [2]. Since then (1966), the "content" of visual artworks increasingly concern the means by which they are made, both in terms of the social and historical context in which they obtain meaning (their epistemological framework) and of the technical means by which they are produced.

A similar dialectic propels music composition. From at least the early 1950s, composers have engaged an originary hermeneutics in which the particularity of a technology and the means by which musical structures are conceived and realized is understood to be mutually determinative. Though in many respects this approach to composition occurred across the musical spectrum, it has been most readily apparent with electroacoustic music. Agostino Di Scipio observes that "as a form of art, electroacoustic music emphasizes that the artist's work includes the making of the object as well as the invention of the techniques suitable for its making" [3]. Far from simplifying compositional tasks, the technical difficulties encountered within the studio focused composers' attention toward the dialectical nature of their compositional process, empowering them to see the object of their musical activity as contingent upon the particular manner in which problems are articulated and framed. Here, appropriation of technical devices both infused and were infused by compositional criteria (which was not the case, for example, with the Theremin).

This situation carried over into the use of the computer in which, again, musical problems were coupled with technical ones [4] [5] [6]. The problems of experimental music composition came to include problems in representation, where data structures and algorithms reflected experimental musical premises for defining compositional processes and models of materials.

2 Regression of Technique

In more recent years, compositional technique has faced the challenge of the transformation of the computer from an agent for the design of experimental musical representations into a framework for the production of musical and, more recently, multimedia artifacts. Several factors are at work here. One is that the increasing complexity of software development has made it more difficult for artists to balance serious compositional work with the necessary computer system development work. As a consequence, composers tend to be less involved during the formative stages of system design. This becomes a problem: important design decisions are made at this level. When experimental compositional concerns are not taken into account at this stage, the resulting tools tend to reflect normative interpretations of compositional technique and musical dramaturgy. Moreover, it is often the case that composers learn a great deal about compositional design through exposure to various forms of system design (as born out in the practice of composers like I. Xenakis, H. Brün, and G. M. Koenig).

The resulting tools that are handed down to composers carry huge ideological and epistemological payloads to which the composer must accede, if s/he wishes to include computer tools in her/his compositional activity. Under such a model of interaction, the composer's ability to construct the representations according to which compositional technique might be imagined and realized is undermined. More significant, however, is the fact that it may no longer even occur to the composer that

technology, more generally, may be *permeable* to particular human mediation and that, more specifically, the computer may be a tool, not merely for composing musical artifacts, but for composing the very means by which musical artifacts might be produced. Under this rubric, *technique* becomes a form, not of experimental proposition, but of commodity production and ideological propagation.

3 Technological Determinism

Contributing to this normative appropriation of technique is the commonly-held idea that technology is ideologically *neutral*—that its problems are determined in isolation from those within other domains of human activity. In computer science curricula, for instance, we study things like algorithms and data structures, under the more general assumption of the autonomy of their development. It is assumed that, as theorist Andrew Feenberg puts it, "technologies have an autonomous functional logic that can be explained without reference to society" [10]—a form of "technological determinism." Technological determinism rests on the bipartite premise (1) that technology progresses from lower to higher levels of achievement (i.e. it *improves* over time), and (2) that technological development follows a single unified sequence of necessary stages.

Under the assumption of technological determinism, blatantly anti-humanistic practices—ranging from exclusion of popular participation in the framing of technological decisions to educational systems which teach students that technology is impervious to human desire—are justified, when and if they are even acknowledged.

Technological determinism has been countered within the constructivist sociology of technology, observing that "theories and technologies are underdetermined by scientific and technical criteria" and that any valid consideration of technology must include social, political, and economic parameters as well as purely scientific and technical ones [8]. The constructivist strategy means that (1) "there is generally a surplus of workable solutions to any given problem" and (2) "problem definitions often change in the course of solution" [8]. Such a notional relation to the technological leaves room for considerable interpretive activity.

4 Technology as *Poiesis*

A more fully developed hermeneutic model would conclude that "technology ought to be a subject of interpretation like any other cultural artifact" [8]. Rather than something that is separate from social and interpretive concerns, the very essence of technology lies in its hermeneutic interpretability. As a consequence it is not at all strange to suggest that technology become an object of humanistic study, not simply the purview of "technical" study.

Along these lines, Agostino Di Scipio proposes a *heretical* interpretation of technology, according to which technology is a means for challenging historically determined patterns of problem formulation and problem solving [9]. Heretical interpretation understands technology as stemming from the particularity of human involvement *vis* specific problem domains and activities: "it assumes that technology is the process of consolidating knowledge into workable tools."

Di Scipio buttresses his argument through Heidegger's development of the notion of technology, specifically with respect to Heidegger's interpretation of technology as *a form of human activity*. According to this interpretation, technology *unconceals* that which is otherwise concealed within our everyday patterns of activity. Technology is, in its essence, a form of *poiesis*, of *bringing forth*, or a way of *revealing* [10]. As a form of human activity, technology pervades all aspects of our lives and of our utterances: we can no more "opt out" from it than we can "opt in" [10] As a form of revealing and bringing forth, it is a vehicle for human self-reflection (in the dialectical rather than the psychological sense of the term)—for revealing the presuppositions that determine our thinking and action, but which are normally invisible and thus not available for interpretive interaction.

Such an understanding of technology views technical objects as subject to interpretive activity. Accordingly it is understood that technical things are not bound by the cultural interpretative frame that led to their original formation. One can witness that throughout history, artists, scientists, and inventors have taken already existing tools and, through a shift in context, transformed them into something else, demonstrating the non-deterministic and interpretable nature of technology.

5 "User-centered" Interface Design

A more common view, however, understands technical objects as tools whose use-function is fixed and non-negotiable. A pragmatic concern predominates: one is primarily interested in executing well-understood tasks as effortlessly, and as unobtrusively, as possible. Such a view projects a more general attitude of technological neutrality inasmuch as it prefers efficacy of production over the interpretability of process.

Though there have been many philosophies espoused regarding the design of human/machine interaction, none has captured the market so thoroughly as that which is referred to as "user-centered" interface design [12][7]. According to user-centered interface design, technical devices are viewed as "goal-oriented"—they exist in human environments in order to help us accomplish tasks. Well-designed devices should leverage personal and cultural experience in order to facilitate execution of particular tasks in a manner in which conscious involvement is minimized. We should not, when passing through a doorway, have to think about using the door: its structure and shape should tell us immediately of its use.

Underlying the principles of user-centered interface design is the idea that between two participants in an interaction ("user" and "system" as the two are often termed) there are a number of gulfs separating the

goals and knowledge encapsulated within one system (the "user") and the presentation of available services and resources of another system (the "system"). The purpose of an interface is to bridge these gulfs in order to make it easier for the "user" to interface with the "system." Rather than having to think in terms of the system s/he is using, the user can remain focused on domain-related concepts, thus freeing attention for domain-centered activities.

6 Thing as "Equipment"

Such normalization of task environments has the effect of attenuating the materiality of the objects and things that populate a task environment. Those things, and the structure by which they are organized, quite literally *disappear* in the use-function to which they are consigned.

Heidegger coined the term "equipment" to describe this consignment of thing to use-function [14]. When hammering a nail, the skilled carpenter appropriates the hammer purely in terms of that which drives the nail. The hammer, as thing—as indeterminate object—succumbs to its appropriated use-function: it becomes a useful piece of equipment. In their appropriation as equipment, things quite literally *disappear*: "in the indifferent imperturbability of our customary commerce with them, they become accessible *precisely with regard to their unobtrusive presence*" (my emphasis) [15].

The piece of equipment cannot exist in isolation: it is what it is "only insofar as it refers to other equipment and so fits in a certain way into an 'equipment whole'" [14]. The equipmental appropriation of things thus includes a wide circle of cultural use-practices with which a single piece of equipment ontologically resonates [15]. Hammering exists only with reference to a larger use practice collectively referred to as "carpentry."

Just as things disappear, so too do conscious humans; rather than active participants, humans become "users." Heidegger coined the term 'circumspection' to describe this manner of being in which conscious, voluntary involvement succumbs to unobtrusive *absorption*. As Dewey notes, "it is a commonplace that the more suavely efficient a habit the more unconsciously it operates" [14].

User-centered interface design methods yield interactions that in their promotion of the principle of "ease-of-use" are intended to invoke states of circumspection. It advocates the idea that computers should be as unobtrusive as possible; they should contribute to the task environment without significantly changing our understanding and interpretation of the task domain it embodies. The interface, in other words, should enhance the task environment while neutralizing its own presence.

7 Engineering a Breakdown

What is gained through such an approach to interface design is increased facility and efficacy in production, which, under certain circumstances and with certain kinds of tasks, is indeed a good thing. What is lost, however, is the power of *mediation*, of interpretive participation. Such foreclosure of subjective involvement signals a non-negotiable and non-interpretable technological framework. Thought and action become narrowly circumscribed according to normative interpretations of the particular domain.

According to Heidegger, this circumspective "absorption" can be disrupted only when something "breaks down." If the hammer breaks, or the nail bends, one is no longer a mere "user"—one is quite suddenly thrust to the fore into an interpretive context. The hammer suddenly becomes "unfamiliar"—it becomes *other* to that with which one normally comports oneself circumspectively. Such breakdowns foreground subjective and, as such, volitional involvement with ones environment. For this reason, "breakdowns" often lead to "breakthroughs."

Art concerns *engineering* precisely such a breakdown in circumspective being—its function is to elicit subjective (and therefore interpretive and voluntary) cognitive involvement in an environment. This is as true at the *technical* level (the making of artworks) as it is at the *esthesic* level (observing artworks). Pollock did this when he laid the canvas on the ground and applied paint by dripping and flinging it—a technique of application that occasioned a very different interpretation of materiality and through which the very physicality of that technique constituted the presentational "aura" of the resulting canvases. Similarly, when composers appropriated radio broadcast and recording equipment and reinterpreted its use for purposes of composition research, they formulated new approaches to compositional activity and composition theory, while the musical works produced constituted a sonic and epistemic *trace* of the particularity of that activity.

To engineer such a breakdown in the equipmental appropriation of technical devices is to intentionally bring about the conditions under which the mediating agency of the subject can appear [11]. The resulting indeterminacy of the materials at hand gives a key to an indeterminate interpretation of technology. This allows for explicitly mediated human involvement in the shaping of artifacts, be they social, epistemological, musical, or computational.

8 Countering Pragmatics Through Negation

After acknowledging the possibility of interpretive activity in framing the technological, we want to ask: what are the conditions for its appearance? This is an important question for a technological art that seeks to leverage full interpretive engagement. It is often the case that within the technological arts aesthetic and technical criteria are subordinated to the imperative of a scientific pragmatics (cf. for instance [16]). At the same time—and often through the very same activity—those criteria are constrained by the expected role of art as legitimizer of the totalizing cultural framework from which it obtains its institutional and monetary support. The

function of technological art is to validate the dominant forms of discourse, particularly those that reflect a positivist appreciation of technology and science. This often leads to garish technological spectacles, whose expense alone guarantees filtration of anything unexpected or novel—of anything *idiosyncratic*.

Adorno articulated quite a different relation of art to the cultural whole which it reflects. He saw the function of art not as that which affirms the cultural whole but as that which *negates* it. Here I understand Adorno's use of the term "negation" as a dialectical encounter in which the formation of the object is conditioned by the particularity of its subjective treatment [17]. Such a dialectical treatment of the object (be it cultural discourse, or artifact) understands the object as that which comes about solely under the *labor* of the subject. There is no *thing* prior to and independent of subjective involvement: the appearance of the object is predicated on the particularity of subjective activity. As such, negation is really a form of *mediation*—voluntary subjective involvement in bringing about the appearance of things *vis* a specific domain of activity.

To stand for the heretical interpretability of technology is to understand human engagement with technical things as a form of negation, of mediation. Technical objects—and the various discourses which accompany their use—are to be interrogated, analyzed, and examined through precisely those media in which their application is reflected. In other words, those things are themselves subject to compositional mediation and interpretation.

Understood as such, composition becomes a form of "system design" and musical artifacts become *traces* of that design [18]. The musical work, *per se*, includes the acoustical trace (the acoustical "artifact") plus the technical means by which that artifact is imagined, realized, and conceived. A musical work, so construed, can no longer be accounted for purely through examination of the acoustical experience it engenders or the formal structure it exhibits. This means that its worth—as a work of art—can no longer be determined purely on the basis of its existence as artifact—i.e. its formal or acoustical existence—because its actual presentational format constitutes more than can be so accounted for.

9 Conclusion

As a tool for compositional research and production, the computer presents a framework for the practice of *heretical* technological interpretation. To consign the computer to the role of a mere apparatus is to overlook the larger cultural environment in which its design and use is envisaged and denies in it the possibility for the interpretability of the task environments which its appropriation can enhance. Such an understanding of computer technology can lay the groundwork for serious technological research and a context for the formulation of new forms of technological art and its discourses.

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