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Lev Manovich, **Software Takes Command**, New York: Bloomsbury Academic, 2013, 357 pp., $29.95 (paperback).

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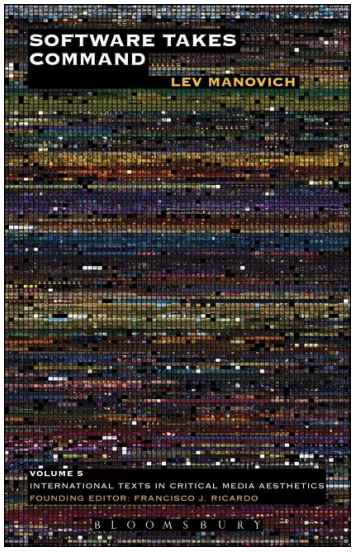

In the conclusion to ***Software Takes Command***, Manovich writes "any summary of a 100,000-word book of theoretical arguments can't cover all important points" (p. 335). He is correct, of course, but this review will still collect as many important points as is feasible. Despite the range of topics addressed, *Software Takes Command* pursues two main goals: (1) *generally,* it reconsiders, refines, and extends the work of "software studies" called for by Manovich (2001) himself in *The Language of New Media*, and (2) *specifically,* the book tackles the question "what is media after software?" (p. 4). This central question is frequently restated, expanding into "what happens to the idea of a 'medium' after previously media-specific tools have been simulated and extended in software?" (p. 4), or becoming an examination of "what it means to create media with software" (p. 340). These specific formulations reinforce the book's concern with a humanist reading of media rather than a purely formal description. While there is much formalism in *Software Takes Command*, and Manovich approaches many of his case studies by first proposing a conceptual taxonomy, this formalism is always intended to resolve out to what people do with and think about software. As Manovich puts it:

> I am interested in how *software appears to users*—i.e. what *functions* it offers to create, share, reuse, mix, create, manage, share and communicate content, *the interfaces* used to present these functions, and *assumptions and models about a user, her/his needs, and society* encoded in these functions and their interface design. (p. 29, emphasis in original)

Thus, the "cultural software" (p. 21) programs that are the focus of this book, like Adobe's Photoshop and After Effects, or Google Earth, are the ones that are "directly used by hundreds of millions of people" and that "[carry] 'atoms' of culture" (p. 7).

Manovich draws from both Marshall McLuhan's influential 1964 book, *Understanding Media* and Jay Bolter and Richard Grusin's (2000) book *Remediation* to establish a sense of how different media interrelate and how existing mediums become embodied in newer ones. Instead of asking what separates "old" and "new" media, Manovich seeks to understand what happens when the computer dissolves those categories altogether. This follows from Alan Kay and Adele Goldberg's claim in the 1970s that their computer platform qualified as a new "metamedium" (p. 65) whose content was "*a wide range of already-existing and not-yet-invented media*" (p. 105). While the majority of the book treats the transition from

medium to metamedium as if it were complete, Manovich does explain that the "media" concept should not be discarded.

Compared to historical figures in other veins of art and science, Manovich believes the individuals responsible for molding computers into media machines have been largely ignored. He begins his book by assembling the "secret history" of work during the 1960s, 1970s, and 1980s by figures like J. C. R. Licklider, Ivan Sutherland, Ted Nelson, Douglas Engelbart, Alan Kay, and Nicholas Negroponte and argues that they were not just computer scientists, but media theorists. Of these, none have influenced Manovich more than Alan Kay, who worked at Xerox PARC between 1970 and 1981 and "systematically articulated the paradigm and the technologies of *vernacular media computing*, as it exists today" (p. 56, emphasis in original). As Manovich moves from Kay's work to that of the others in this field, he notably avoids a chronological presentation. He moves backward to examine the precedents set by Douglas Englebart's team, jumps to Ted Nelson, follows hypermedia from the 1960s to the 1980s, and then moves back to 1963 to discuss Ivan Sutherland's *Sketchpad* program for computer-aided design. Perhaps it is this diversity of computing forms that prompts Manovich to conclude, along with Kay and Goldberg, that the computer is an exception to the historical progression of media technologies—not a medium but a metamedium.[1]

To the Kay and Goldberg–inspired distinction between "simulations of prior physical media" and "new computational media that have no physical precedents" (p. 110), Manovich adds another: All software actions can be categorized as either "specific to particular types of data" or able to "work with digital data in general" (p. 111). "Blur" commands only make sense in the context of digital images, while "copy" commands can be applied to data regardless of its "medium." A subsequent close look at Photoshop reveals that the properties associated with different digital formats are not "in" the objects themselves, but rather in the interface to those objects provided by particular software (p. 149). Thus can Manovich can arrive at his claim that "there is no such thing as 'digital media.' There is only software—as applied to media (or 'content')" (p. 152). For Manovich, this ability to project new properties onto existing data is a condition of "permanent extendability" (p. 157) that means software-based media will always be "new."

In part two of the book, Manovich argues that if the 1960s and 1970s were primarily concerned with computer simulation of predigital media, then the 1980s progressed to the next "stage" by introducing hybridity. Where multimedia involves the *content* of different media put alongside one another in the same composition, hybridity relies on the processes and techniques of different media being applied to one another. This hybridity can be seen in numerous works of digital art as well as the structure of Google Earth. Such a varied application of techniques is made possible because once introduced in software, a "medium" is transformed into a combination of data structure and a set of algorithms, thus enabling the separation of content and techniques.

Manovich brings these various threads together in his chapter on "soft evolution." The combination of algorithms and data structures, the simulation of procedures over materials, the question

[1] Manovich does wrestle a bit with software's supposed exceptionality. See pages 101–102 for his thought process.

of what software does to media, and the distinction between media-specific and media-independent techniques combine to reframe the question of media after software. In order to accommodate this change, Manovich turns to evolutionary biology's ability to describe "large numbers," "genetic links," and "constant development . . . and gradually increasing diversity" (p. 235). And yet, even as he articulates the dissolution of "media" Manovich reasserts that the concept should not be abandoned. Media are still "part of distinct cultural histories" (p. 226), descriptive of "presentational interaction [platforms]" (p. 228), and "related to human sensory systems" (p. 231).

The final part of *Software Takes Command* is organized around a time period (the 1990s), a form of moving image (motion graphics), and a piece of software (After Effects). These three are linked in what Manovich dubs the "Velvet Revolution": A period of change that saw the development of a "new cultural language that by now has become practically universal" (p. 254). An analysis of After Effects is used to illustrate the changes produced by the move from time-based to composition-based environments (p. 282), the introduction of 3-D compositing (p. 289), and the import and export of data (p. 296). Manovich dubs After Effects subject to "deep remixability" (p. 267) in that it remixes "not only content from different media but also their fundamental techniques, working methods, and ways of representation and expression" (p. 268).

From beginning to end, *Software Takes Command* is a personal book based on firsthand experience. This personal character could produce an ambivalence for some. Manovich's frequent citation of Wikipedia articles, for instance, might seem at times a forward-thinking embrace of digital resources, while coming off as less than rigorous at other times. Similarly, references to Google searches or the built-in dictionary of Microsoft Word can be both refreshingly frank and frustratingly anecdotal. Manovich uses case studies, such as the music video "Go!" by Common, that he is personally familiar with, but the variety of these examples and the difficulty of reproducing video in print make this a book best read with a computer nearby.

If there is a criticism I could offer, it would be that the text could have been condensed. For instance, Manovich introduces the concept of "hybridity" and "deep remix" and I personally did not feel capable of meaningfully distinguishing between the two—as both seem premised on the mixture of media techniques instead of media content. That said, the book is still a valuable resource for anyone interested in contemporary media theory or the humanist study of software. It collects both the history of media's softwarization in the 1960s and 1970s and the cultural development of a metalanguage of motion graphics in the 1990s. In addition, it provides the theoretical framework necessary for a discussion of these histories and for future developments in media software. If it does not provide a single, final answer to its catalyzing question, it is only because the use of "media after software" is a cultural phenomenon in which we are still neck deep.

References

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