International Journal of Communication 18(2024), Book Review 3281-3283 1932–8036/2024BKR0009

James E. Dobson, **The Birth of Computer Vision,** Minneapolis: University of Minnesota Press, 2023, 215 pp., $27.00 (paperback).

Reviewed by
Maia Nichols
Bennington College

Our interactions extend beyond human perception to include sensors, images, and diagrams. Digital images pose challenges for art and the theory of technology, including those of its materiality and its mutability. Computer vision, initially made to develop our understanding of human perception, alters our way of seeing. What is computer vision? How does it differ from human vision? In ***The Birth of Computer Vision***, James E. Dobson, who at the time of publication was an assistant professor in the Department of English and Creative Writing at Dartmouth University, considers how governance and regimes of visuality shift with the advent of computer vision, altering modern life from automotive technology to social media and defense systems. This book delves into the ontological shifts stemming from the transformations in the organization of digital space within computation in the United States, mostly in the second half of the 20th century.

Dobson's interdisciplinary approach underscores how social and technological factors shape the development of computer vision as they develop in the present, emphasizing the pivotal role of perception. His analysis includes the operators and inventors of such vision. Technological developments rely on the human perceptual subject: prior perceptions and knowledge encoded from human perspective. This encompasses not only design goals but also prejudices retained in code and discourse.

Computer vision generates perspectives that are impossible for humans. The book deals with these vantage points, from blob detection to the philosophical implications of differentiating between seeing and perceiving. Dobson draws on Haraway's (1988) feminist interventions in science studies and contributes to the discourse on ideological assumptions within critical algorithm studies. He considers technology in its materiality, embedded within larger systems. He mobilizes Brian Massumi's (2015) "ontopower," or the operationalization of the logics of preemption that takes as its target human perception itself (p. 12). The book overlaps with the work of Harun Farocki (2004) and is well-suited for a media studies or military history course. Beyond its relevance for historians of technology, it is a book for scholars and practitioners in digital culture, new media, and computer science.

Dobson traces the development of computer vision algorithms through context, critical theory, and cultural studies. The United States Department of Defense funding agencies supported the creation of command-and-control systems and automated object recognition systems, leading to the development of algorithms, devices, and methods from 1950s to the 1970s. This period marked a crucial transformation in computer usage and laid the groundwork for significant algorithms within the military-industrial complex. Dobson's book shows that computer vision depends on human descriptions of the environment, from object

categorization to identifying meaningful objects. By considering the historicity of algorithms and their organization based on previous media, he portrays them as fluid, utilized by different parties, entangled with data collection, testing, and the local.

Dobson discusses Frank Rosenblatt's Perceptron, an early neural network and specialized computing machine invented in 1957 that could create a linear classification between two categories. The author devotes further study to this in a forthcoming coauthored book with Rena J. Mosteirin titled *Perceptron* (Dobson & Mosteirin, 2024). Computer vision is a development that started with automatic photointerpretation. Within research dedicated to military applications, mapping features in aerial photography is a method that continues to be used in facial-recognition algorithms. Dobson looks at the Shakey Project, a Defense Advanced Research Projects Agency of the United States Department of Defense (DARPA) funded research project (1966–1972) in computer driven robotic automatons that could be used as reconnaissance devices by the U.S. military, which developed things like the lines separating cars on freeways (p. 135). He examines the influence of the Shakey Project, which had to detect and map the environment, updating its stored map through a movable camera.

The book examines methods still in use today, such as pattern matching, pictorial structures, and the Hough transform, initially designed for military purposes. By employing a Foucauldian genealogical approach, Dobson reveals the social, psychic, and everyday dimension of cultural and technological objects.

In dialogue with Paul Virilio's (1994) "sightless seeing," Harun Farocki's (2004) "operative image," and Luciana Parisi's (2021) "machine-human infrastructure," which foregrounds the human surrogate labor involved in labeling images for computer vision algorithms and technology training, Dobson provides a methodology for historically informed critical algorithm studies. He engages with shots taken from positions that humans cannot occupy, "phantom images," impossible sites present in the context of OpenCV, and real-time displays of what the machine "sees" in the simulation of a military warhead locating a target. These images are not representative of objects; they are part of an operation, "operative images," intermediate data in the workflow, and a reminder that computer vision's functions are made from the detritus of system training exposing its construction. Visual detritus, layers, weights, and coefficients exist for computers rather than human vision, even if computer vision is informed by prior human perception research and cannot be interpreted as images.

Various computational models involve extracting information from real-time representations of the world, blurring the lines between simulated and representational images and data. The book explores scenarios from binary decision-making models to theories of computer graphics and other boundary-crossing scenarios in which simulated and representational, images, and image-like data, are blurred, including deep-learning techniques, image filters, and other neural network approaches. The coda discusses OpenCV and its capacities, which is especially interesting for readers familiar with neural networks or programming.

The book connects with adjacent fields, discussing photographic realism and an image's status as found objects (Sontag, 2008) and the mechanical aspects of photography (Bazin, 1960), shedding light on the digital image as inheriting cultural logics and technological shifts. The book also engages with Lev Manovich's (2020) *Cultural Analytics*, as well as work by Wendy Hui Kyong Chun (2021), *Discriminating Data: Correlation,*

Neighborhoods and the New Politics of Recognition, offering insights for students and scholars in history of technology, design studies, or computer science history.

This book about the implications of computer vision as a composite system of contradictory reference points makes sense of our past interactions with images in ways that reframe our contemporary moment. Histories and applications of military technology, machine learning, and computer vision are interwoven. Models such as the McCulloch and Pitts model and the analysis of frog vision are explained in relation to other important developments in computation, neuroscience, and machine learning as related to perception. The book provides references on the history of sensory and visual perception, including biological and neuroscientific approaches and their impact on pattern recognition and military applications of photointerpretation. It is useful in understanding how images are processed and analyzed, as well as the process of examining image features and patterns. In some cases, the descriptions may be technical—such as the section on the Hough transform—historical or scientific, but most of this attention to detail rests on the premise that images or technological systems designed earlier remain in some form in use today. The book's relevance is heightened by the fact that computer vision was produced through interdisciplinary work, thus a range of thinkers would benefit from this book, from visual arts to linguistics to information theory.

References

Bazin, A. (1960). The ontology of the photographic image (H. Gray, Trans.). *Film Quarterly, 13*(4), 4–9.

Chun, W. H. K. (2021). *Discriminating data: Correlation, neighborhoods, and the new politics of recognition*. Cambridge, MA: MIT Press.

Dobson, J., & Mosteirin, R. J. (2024). *Perceptron*. Santa Barbara, CA*:* Punctum.

Farocki, H. (2004). Phantom images. *Public, 29*, 12–22.

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies, 14*(3), 575–599.

Manovich, L. (2020). *Cultural analytics*. Cambridge, MA: MIT Press.

Massumi, B. (2015). *Ontopower: War, powers and the state of perception*. Durham, NC: Duke University Press.

Parisi, L. (2021). Negative optics in vision machines. *AI and Society, 36*, 1281–1293.

Sontag, S. (2008). *On photography*. London, UK: Penguin.

Virilio, P. (1994). *The vision machine* (J. Rose, Trans.). Bloomington: Indiana University Press.