Title

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Journal

Mind Culture and Activity, 28(3)

ISSN

1074-9039

Author

Irani, Lilly

Publication Date

2021-07-03

DOI

10.1080/10749039.2021.1974045

Mind, Culture, and Activity

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/hmca20

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Lilly Irani

To cite this article: Lilly Irani (2021) What is digital labor and how does it change us? Heteromation and other stories of computing and capitalism, Mind, Culture, and Activity, 28:3, 280-284, DOI: 10.1080/10749039.2021.1974045

To link to this article: https://doi.org/10.1080/10749039.2021.1974045

MIND, CULTURE, AND ACTIVITY
2021, VOL. 28, NO. 3, 280–284

Routledge
Taylor & Francis Group

BOOK REVIEW

What is digital labor and how does it change us? Heteromation and other stories of computing and capitalism, by Hamid Ekbia and Bonnie Nardi, Cambridge, MA, MIT Press, 2017, 280 pp., $35 (hardcover), ISBN 9780262036252

Heteromation is an analysis of how industries use computing and networks to harvest financial value from life. These industries create devices, interfaces, and machines to extract from the fecundity of social and cultural life processes, while minimally contributing to their reproduction. Industries as wide-ranging as tech, media, and finance use techniques such as crowdsourcing, social media, mobile phones, and online community forums to bring practices of culture, care, and cognition into their orbits for extraction and value accumulation. In the process of doing so, they reorganize work and everyday life.

The process Hamid Ekbia and Bonnie Nardi call heteromation is, I would argue, an example of a wider set of processes that extend well beyond the cases from digital cultures on which they focus. Studying matsutake mushroom supply chains, anthropologist Tsing (2015) observes that capitalists and those who work for them can extract value from that which they neither understand nor replenish. She traces how mushrooms move through a value chain, processed, sorted, narrated, and assigned economic value at each step. Hobbyists and small-scale entrepreneurs harvest the mushrooms from burnt forests, moved by a desire for the forest and sometimes money. They bring the mushrooms to markets where brokers sort the mushrooms, sending a portion on to merchants who package them for expensive Japanese retail. Tsing calls this process "salvage accumulation," the process by which capital accumulation relies on moving material and transforming its meanings as "pericapitalist sites are brought into capitalist supply lines" (p. 301). Tsing's account explains how global value chains generate value by moving materials across linked social worlds despite the different languages, desires, and associations that constitute each world along the chain. Merchants might rely on hobbyists weekends' or sporadic forest fires to turn a profit. They need not build factories or enclose the commons to tap into these processes for profits.

Worlds apart from mushroomed forests, Hamid Ekbia and Bonnie Nardi's *Heteromation* offers us a picture of global computing value chains similarly diverse and, arguably, under more intense pressure from the venture capitalists and tech companies which make value out of digitizing our life processes. While the title evokes the idea that that automation is always a human-machine hybrid, the book's more expansive contribution is to show how companies accumulate value by linking themselves to people's creative, cognitive, communicative, and emotional processes – processes they do not fully understand or sustain. While experts debate the merits and prevalence of automation, *Heteromation* argues that we should instead expand our criticism to wholesale attempts to enroll our life processes in circuits of digital accumulation.

The case of financial kiosks – "correspondent banking" – in Chapter 8 illustrates how hype and anxiety around automation obscure larger transformations of labor enabled by networked computing. Ekbia and Nardi detail the growth of Brazilian "self-service" kiosks placed in shops and offices, promise those far from cities access to banking and state services. Such "fintech," or financial technology, projects make similar promises across the postcolonial world. But the kiosks, Ekbia and Nardi note, are hardly self-serve at all. "Correspondent bankers" – shop owners, internet cafe workers, and other local actors – help kiosk users interact with the system. They translate the account holder's intentions into computer operations, make repairs, and, in the process, offer advice or support on a wider set of life matters (p. 140). Like managers' secretaries, correspondent bankers make sure the intended work happens when the system and manager's instructions are not fully up to the job (see L. A. Suchman, 1987). To narrate secretaries' or correspondent bankers' agencies as mere rule-

following or machinic magic is to erase creative articulation work (L. Suchman, 1996; see also Irani, 2015). Although correspondent bankers perform emotional and cognitive labor that benefits banks, they receive no portion of the value generated by the bank that enlists them in their operations across Brazil (p. 141). They report participating because of their civic sensibilities and the value they place on social relationships with others. In this sense, they are like the moral neoliberals described by anthropologist Andrea Muehlebach – aging citizens mobilized as unpaid social service labor by a neoliberalizing Italian state (Muehlebach, 2012). The labor processes exemplified by correspondent banking are not unique to computing. Instead, computing networks offer one way to connect the social labors of everyday life to value-accumulating mediations. Correspondent banking is not about the usual topics of digital labor scholarship – surveillance, Google ad targeting, or gig work. However, it represents a kind of labor multiplied across the world to sustain and profit tech companies as they digitize finance, government services, and social relationships.

Ekbia and Nardi gather a wide range of cases, drawn from their own and others' studies, to conceptualize heteromation as a "logic of accumulation" made possible by the digital and networked mediation of labor. Throughout the book, the authors apply this concept to explain what is common across seemingly disparate, if digital, practices. They analyze online gaming, product reviews, elder care, banking, citizen science, data processing work, and "creative" design work all as heteromated forms of work that generate value for tech capital. Scholars often subject these varied activities to more siloed forms of analysis, coining concepts like "playbor" (Kücklich, 2005) to describe gaming and Facebook use alike, "prosumer" (Ritzer & Jurgenson, 2010) to highlight the digital consumer as a producer, "cognitive capitalism" (Moulier-Boutang, 2011) to link forms of work understood as creative, inventive, or knowledge-based, or "ghost work" (Gray & Suri, 2019) to highlight the invisibilized human labor that powers machine learning. Ekbia and Nardi link these practices by showing how they entice or coerce people to participate in digital practices, but only sometimes distribute the value generated to participants in return. This analytic move allows them to draw attention to important phenomena, like correspondent banking, which has often been ignored by scholars of digital labor and capitalism.

Some cases are familiar. For example, they synthesize research on social media companies that design software interfaces to package up "user engagement" – time on screen – for advertisers (p. 95). While many study the microcelebrity labor of performers (Baym, 2015; Duffy, 2017; Kenney & Zysman, 2019), Ekbia and Nardi rearticulate the participation of livestream audiences as itself labor, identifying how diverse audience motivations are channeled to extract value (p. 106). Scholars of "platforms" have analyzed such digital labor relations (Gillespie, 2010; Srnicek, 2017). The concept of heteromation, however, allows Ekbia and Nardi to subject citizen science – the enrollment of people in scientific data collection and processing – to a similar analysis. They show how citizen science projects organize the visibility of project goals and data collection interfaces to entice participants motivated by socialization or learning. They also show that designers of these work processes choreograph the meanings of work to "give the impression that participants volunteer and are not working for free" (p. 151).

The case that seems most distant from familiar objects of digital labor scholarship was that of Paro, the fuzzy, doe-eyed robotic seal marketed as a companion for elder care. Turkle (2011) famously held up the Paro as an example of how digital technologies substitute and isolate us from authentic, mutual social connections. Ekbia and Nardi present a less dyadic picture than the portrait of an elder and robotic seal presented by marketers and Turkle alike. They describe how caregivers and elderly people interact with the robot in elder care facilities, noting that elderly people engage with the automated creature only at the prodding of caregivers. The caregivers, in turn, facilitate the robotic interaction as a respite from the labor of interacting with those under their care (p. 139). Paro only works because of the very subtle forms of communication, gesture, and emotional engagement accomplished by users and their caregivers. These human capacities are critical to the success of Paro – like they are critical to the success of platforms and correspondent banking – and, in all cases, they are uncompensated. Automation narratives naturalize and erase these subtle forms of human coordination – what

sociologists have called articulation work (L. Suchman, 1996) – favoring stories of technological (see also Irani, 2015). L. A. Suchman (2007) described these erasures as a kind of technological enchantment in her volume *Human machine reconfigurations*, and called on scholars to also disenchant and demystify claims about the automatic is autonomous. Claims about automation are always also claims about what it ought to mean to be human now. *Heteromation* does similar work but links enchantment to accumulation processes that exploit human capacities of language, joint action, and repair developed over what Vygotsky, quoted on page 143, called the "intricate, lifelong project" of developing "higher psychological functions."

Heteromation also intervenes in debates about surveillance capitalism, a term coined by Zuboff (2019). Zuboff argues we are in a phase of capitalism uniquely characterized by companies profiting from behavioral tracking and control, extending techniques with military histories into domains of consumption, education, health, and information seeking. While *Surveillance Capitalism* and *Heteromation* place some overlapping technologies such as ad targeting and FitBits in their crosshairs, *Heteromation*'s analysis of the problem does not stop at the effects on individual freedom or agency. The book offers a much wider spectrum of ways technology-enabled companies extract value from participants and the social fabric writ large. This reorganizes work, reproduction, and sociality, Ekbia and Nardi argue, around and through machines. Heteromation works through "an inclusionary logic, active engagement, and invisible control" (p. 39).

In total, Ekbia and Nardi offer a more robust account of technology as a dynamic process rather than a static object. They draw on the long history of activity theoretic approaches that see technology as a product of historical-cultural processes, emerging out of contradictions and provoking contradictions anew (see Kaptelinin & Nardi, 2006). Technology, they explain, is never simply a "tool" extending human agency. Thus, we cannot simply return it to the service of humans through better or more humane design. We must confront the political-economic processes that produced a particular version of technological relation in the first place. This also challenges accounts of technology as "exogenous" – an outside force that transforms economic productivity. This longstanding approach to technology in economics has led policy makers to treat technology as an input to an economy, leading to investment in science and technology research and technology transfer with insufficient thought as to how to regulate and cultivate locally relevant or democratically governed technologies. Most recently, this line of thought leads books like *The second machine age* (Brynjolfsson & McAfee, 2014) to affirm technology's autonomy, placing the burden of adaptation on individuals, institutions, and the human actors in societies. Technology, for Nardi and Ekbia, is neither "tool" or "driver" but rather "a response to drivers of social change" responsive to "historical developments, socioeconomic systems, the division of labor, legal and regulatory frameworks, and large-scale government policies and agendas" (p. 8–9).

Though there is much to like here, I point out two limitations to guide the reader. First, *Heteromation* does not engage with contemporary scholarship that examines digital labor through feminist and race theory lenses. *Heteromation* usefully points to how certain human capacities are naturalized as free for the taking, but the work of scholars such as Kalindi Vora (2015) and Nakamura (2015) shows how this naturalization extends legacies of colonialism, slavery, gendered social relations, and contemporary racisms. The qualities of work or life that are cast as machinic, automated, tedious, and menial are those tasks assigned to racialized or gendered others. For example, Amazon Mechanical Turk – the focus of my own work – does more than heteromate: it also extends and revamps early computing's divisions of labor between scientists and human "computers," with the former credited as national treasures and the latter mere translators in the gendered and racialized theater of technoscientific heroism (Irani, 2015). Regulations and even immigration policies enact hierarchies between more and less valuable citizens, workers, and people manifest in these technological systems (see also Greene, 2016; Irani, 2019, 2018). Racializing ideologies about creativity underpin the myths of automation – particularly regarding whose labor and skill seem amenable to automation, whose do not, and to whom those claims are believable (Atanasoski & Vora, 2015; Irani, 2018). Nakamura has also argued that technology companies have pulled cultural and affective

capacities into value accumulation earlier than this heteromated moment (Nakamura, 2014). This literature also complicates *Heteromation's* contention that people participate in extractive systems in pursuit of emotional satisfaction. Nakamura has described how Black women on Twitter contribute their unpaid labor to the platform's content moderation processes when they report on their own bullying and harassment (Nakamura, 2015). Research building on *Heteromation* would do well to also engage this vibrant line of feminist work on digital labor which has documented both the gendered, racialized, and class impacts of semi-automated processes, as well as the ways automation discourses pose gendered and racialized human activities as desirable to displace or automate.

The second limitation of *Heteromation* is the chapter "Utopias," which commendably calls for removing social reproduction – food, caretaking, and housing, for example – out of the markets so they can be stabilized and distributed more fairly. As they imagine specifics, however, they emphasize reforms like Universal Basic Income, agricultural datafication, repair culture, and automation. They rightly critique those reformers who cede control of these advanced production techniques to capitalists. What can feel unsatisfying, however, is that the arguments primarily engage economists and business technology writers, but not the social movements already actively struggling for democratic control over these technologies and programs. The book dismisses and mischaracterizes indigenous movements as "disconnected" and "doomed" resistance to modernity and capitalism (p. 208). To the contrary, movements like Standing Rock mobilize media, community, environmental reports, organizing strategy, and solidarity with a range of social movements to control the path of an oil pipeline on behalf not only of native people but all who need water. Other projects, such as the Tribal Digital Village, demonstrate how indigenous communities create technology infrastructures that sustain tribal sovereignty (Duarte, 2017; Rantanen, 2008; Sandvig, 2012). Perhaps the genius we need for a more just and gratifying engagement with the technological world can be found in decolonial and anti-capitalist movements charting the path for a heteromated future that can respect all of us.

Acknowledgments

Thank you to Davide Carpano, Mike Cole, Manuel Schvartzberg Carrió, Dorothy Howard, Kate Metcalf, Antti Rajala, and Veronica Uribe for comments that greatly improved the manuscript. Thank you to the people of Feminist Labor Lab for ongoing discussions over years that inform this work. Thank you to Hamid Ekbia and Bonnie Nardi for their contribution to a robust debate about the role of technology in a sustainable and just world.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Lilly Irani
UC San Diego
lirani@ucsd.edu http://orcid.org/0000-0001-8990-2411

https://doi.org/10.1080/10749039.2021.1974045