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Doing Fieldwork in Robotland: Combining *Longue Durée* with Rapid Ethnography

Robotics and embodied AI, also called machine learning, are fields characterized by rapid development cycles and by innovations and transformations in materials, designs, coding, and applications. Over the past twenty-five years of conducting multi-sited fieldwork in "Robotland," a term I use to conceptually name or frame a place/time such as a factory, hospital, city, or even country where robots are employed and operating in everyday life, and are taken for granted, I have found that the combination of a *longue durée* perspective and "rapid ethnography" offers a practical and effective method for the anthropology of robotics. Few anthropologists, whether newly minted or seasoned, acknowledge the difficulty and time required to gain some degree of professional competence in emerging and hitherto unfamiliar fields like robotics and embodied AI. How should one proceed?

Longue durée literally means "long duration." The concept was introduced by French historian Fernand Braudel (1902–1985) in the late 1950s in response to a "general crisis in the human sciences," which for Braudel referred to the narrow focus of conventional, elitist, event-based narratives.[1] Today, from the vantage point of Robotland, the crisis in the human sciences can be perceived as a confluence of three key developments: a rapid proliferation of data, especially "big data" supporting embodied AI and robotics; a general anxiety about disciplinary boundaries and confusion about concepts like "interdisciplinarity" and "global perspectives"; and a tendency to employ terms like "robots," "AI," "algorithms," and "data" as if they were self-evident.

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1. *Longue durée* is associated with the Annales School of historiography, founded in France in the late 1920s and led by Braudel after World War II.

Historical Studies in the Natural Sciences, Vol. 54, Number 5, pps. 630–635. ISSN 1939-1811, electronic ISSN 1939-182X. DOI: https://doi.org/10.1525/hsns.2024.54.5.630.

For Braudel, the *longue durée* spanned millennia of human history and even longer spans of archaeological and geologic time. I use *longue durée* in a more truncated way in consideration of how a decade (or less!) in robotics R&D is arguably the equivalent of a century or more in Braudelian time! Because of the rapid rate of innovations and transformations in materials, designs, coding, and applications of robots, I have found it necessary in my own research to "bookend" both the temporal frame and the spatial or locational referents. My term "Robotland" itself both evokes and references a place or places with spatiotemporal coordinates and trajectories.

Thus, in my 2018 book, *Robo Sapiens Japanicus: Robots, Gender, Family, and the Japanese Nation*, my main temporal focus on robot R&D is the period from 2007 through 2016. It was in early 2007 that former PM Abe Shinzō launched a program to robotize Japanese social institutions, including the home, schools, offices, hospitals, and others. And it was in 2016 that construction of the Tokyo Olympic/Paralympic stadium began—without the help of robots, as originally envisioned.

The spatial referents mark the different places where I conducted fieldwork and archival research during that period. These include several robot laboratories, science museums, exoskeleton-based physical therapy clinics, brick-and-mortar libraries, and the online resources in English and Japanese, where a specialist robotics literature has ballooned rapidly. Government proposals for robotization are also crucial as they are constantly updated. In Japan, the robotization of society was first proposed as Innovation 25, soon renamed Robot Revolution, followed by Society 5.0, and since 2020, the Moonshot Program. Also, it is crucial to compare the Japanese and the English versions of government proposals and policies as they can differ significantly in rhetoric, rationale, and imagery.

Further, I cannot emphasize enough that Institute of Electrical and Electronics Engineers (IEEE) publications are an indispensable but underutilized resource among anthropologists (and those in cultural studies) who have suddenly jumped on the robot bandwagon. It is critical for ethnographers to read articles on robotics engineering with algorithm-filled pages and to understand robotics terminology. The specialist robotics literature is not easy to navigate, and in too many cases of ethnographic writing, science fiction images of robots are blended with real-world machines. It is also the case that roboticists pursuing research on gender and emotions too often resort to binaristic and reductive stereotypes instead of acknowledging, as anthropologists do, the spectrum of human physical and mental diversity.[2]

2. Aaron Powers, Adam Kramer, Shirlene Lim, Jean Kuo, Sau-lai Lee, Sara Kiesler, 2005, "Common Ground in Dialogue with a Gendered Humanoid Robot." *Proceedings of the IEEE Int.*

In this connection, there is also a marked tendency to equate robots with humanoids, and to avoid providing a working definition of "robot." Many working definitions of robots are in circulation today, and I have assembled one that is comprehensive yet concise: a robot is an assemblage of separate technologies—sensors, optics, software (including some level of artificial intelligence), telecommunication tools, actuators, batteries, polymers, even biological cells—that make it capable of navigating, responding to, and interacting with its environment with some human supervision or through teleoperation. Some robots are usefully perceived as "embodied AI" in the sense they are equipped with software algorithms that facilitate their ability to interact with their surroundings, recognize patterns, and complete given tasks. Robots are made from many materials—aluminum, stainless steel, thermoplastic polymers, polycarbonates, acrylics, silicone, even biological cells—and exist in many shapes and sizes. The vast majority (90+ percent) of robots are industrial robots installed in automobile and other factories. Other robots have been designed as animals, rice cookers, bathtubs, wheelchairs, vacuum cleaners, drones, and commodes. Humanoid robots have a body that resembles a human being in the sense of having something like a head, arms, torso, and legs. I distinguish the literary origins of the term "robot" (*robota*) in Czech playwright Karel Capek's 1920 book, *R.U.R.* or *Rossum's Universal Robots*, from a working definition of actual, tangible robots, only a tiny fraction of which are humanoid—even though they get all the media attention![3]

Most humanoid robots are not *end products* but rather *platforms* for the research and development of new materials and applications. Cloud-based entertainment robots, such as SoftBank's humanoid Pepper (2014–2021), also collect and transmit biometric data, which is the new gold in the digital era. Humanoids are expensive machines and challenging to build. The innovations in optics, haptics, balance, and locomotion that go into their production are applied in many lucrative new industries, both civilian and military. Weaponized robots, including drones, are a rapidly growing industry.

Conf. on Robot and Human Interaction. www.semanticscholar.org/paper/Common-Ground-in-Dialogue-with-a-Gendered-Humanoid-Powers-Kramer/4a5bc947d976dec9f0f5105e0abac3372bb38e5e. Jasmine Bernotat, Friederike Eyssel, and Janik Sachse, "The (Fe)male Robot: How Robot Body Shape Impacts First Impressions and Trust Towards Robots," *International Journal of Social Robotics* 13, no. 3 (2021): 477–89.

3. *R.U.R.* was staged in Tokyo in 1924 after which *robotto* became a perennial buzzword. See Jennifer Robertson, "Robot Theatre (*robotto engeki*) in Japan: Staging Science Fiction Futures," *Mechademia: Second Arc* 14, no. 1 (2021): 93–112.

Books and articles about robots that focus solely on highlighting the newest models and prototypes quickly become out of date although they serve as a useful archive. There is a chronic lack of follow-up in print and online media stories of gee-whiz technologies. By the same token, simply inserting "robot" as an abstract, singular agent into a theoretical scaffolding is misleading—one of the troubling aspects, in my view, of some research in "robot ethics" and "robot philosophy."

Returning to *longue durée*, I realized early on that fieldwork in Robotland required the integration of many seemingly disparate but actually unifying backstories that shaped the rhetorical climate sustaining visionary scenarios of human–robot interaction. The integration of these "time-deepening" backstories into an ethnographic narrative enables a more thickly descriptive, and historically grounded, account of multi-sited actual human–robot interactions.[4]

In short, a *longue durée* approach to research in Robotland offers a practical corrective to the short-term horizons of ethnographies that situate engineers, consumers, and robots in a static, continuous present as if they were and are unaffected by the vicissitudes of cultural, historical, socioeconomic, and political forces.

The short lives of humanoids and other robots, and the rapid rate of innovations and transformations in robotics and AI, call for "rapid ethnography." Rapid ethnography emerged over the past twenty years as a viable alternative to "classic" ethnographic fieldwork, which involves long-term, immersive field research. The Japan International Cooperation Agency (JICA) published "Handbook for Rapid Project Ethnography" in 2018.[5]

David Millen, a Human Computer Interaction (HCI) research scientist affiliated with Tufts University, has published widely on the benefits of rapid ethnography. His HCI work is relevant to Human Robot Interaction (HRI). Millen points out that "one of the biggest challenges facing HCI (and HRI) ethnographers is the demand to spend time in the field while matching the pace of ever-quickening product development cycles."[6] He presents three key rapid ethnography strategies, which I summarize here:

4. An example of such time-deepening backstories can be found in chapter 3 ("Families of Future Past") in Jennifer Robertson, *Robo Sapiens Japanicus: Robots, Gender, Family, and the Japanese Nation* (Berkeley: University of California Press, 2018), 50–79.

5. JICA, www.jica.go.jp/english/search/index.html?q=handbook+rapid+ethnography. See also Cecilia Vindrola-Padros, *Rapid Ethnographies: A Practical Guide* (Cambridge: Cambridge University Press, 2021).

6. All references to Millen's recipe for rapid ethnography are from David Millen, "Rapid Ethnography: Time Deepening Strategies for HCI Field Research," in A. Boyarski and W. A.

- First, narrow the focus of the field research appropriately before entering the field. Zoom in on the important activities. Use key informants such as community guides or liminal group members.
- Second, use multiple interactive observation techniques to increase the likelihood of discovering exceptional and useful user behavior.
- Third, use collaborative and computerized iterative data analysis methods.

Intriguingly, Millen suggests that rapid ethnography is also a "time-deepening" strategy in the sense—different from mine noted earlier—that it allows a researcher to do more with a smaller unit of field time. As I see it, from my twinned training as an anthropologist and historian, combining *longue durée* with rapid ethnography produces a synergistic praxis, namely, an analytical process whose combined effects yield a more thickly textured narrative or nexus than either method alone.[7] Transient events needing rapid analysis all have histories that also need to be tracked and plotted.

The combination of a *longue durée* trajectory and a rapid ethnography method helps to ensure the crafting of a well-rounded *and* well-bounded artifact, be it an article, a book, or a presentation. Moreover, this combined approach would help to bridge the tenacious academic divide between *ri* 理, or the "hard" or physical sciences and engineering, and *bun* 文, or the arts, humanities, and social sciences. This divide is especially prominent in Japanese universities but also exists in American and European universities.

Drawing from my own work, I wish to propose in closing a corrective both to the disciplinary divide and to the spurious stereotyping of gender and emotion perpetuated in robotics labs and literature. I have already written extensively on the problematic gendering of robots and the persistent conflation of sex (biology) and gender (social constructions), as well as the reductive gender stereotyping in much of the robotics lab-based literature.[8]

Recently, I interrogated and critiqued the self-evident use of emotion to describe a much-hyped attribute of SoftBank's Pepper, trumpeted as an

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Kellog, eds., Proceedings of the 3rd Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques (New York: ACM, 2000), 280–81.

7. Praxis is the blending of theory and practice and can also be understood as the process through which theory is embodied and enacted.

8. See Robertson, *Robo Sapiens Japanicus* (n.4), including its bibliography. For a robotics laboratory-based example, see Bernotat, Eyssel, and Sachse, "The (Fe)male Robot" (n.2).

"emotional robot."[9] Researchers across many disciplines acknowledge there is no generally accepted definition of emotion. Algorithms for Pepper's so-called "emotion engine" were created by Mitsuyoshi Shunji, an unconventional Buddhist priest, artist, and widely published engineer. Long story short, Mitsuyoshi adapted psychologist Robert Plutchik's psycho-evolutionary theory of emotion as having, like the graduated color wheel illustrating his theory, the character of complementarity and opposition. Mitsuyoshi also adapted psychologist Paul Ekman's claim that six basic human emotions, and facial expressions thereof, are shared across cultures: sadness, happiness, fear, anger, surprise, and disgust.

Anthropologists and cross-cultural psychologists have criticized and debunked such reductive stereotypes of humans' emotions and facial expressions, but roboticists continue to use them in creating algorithms for so-called emotional robots.

Likewise, the gendering of robots, both in terms of hardware design and software, is premised on rigidly binary constructions of femininity and masculinity. Why? Because as neuroscientist and roboticist Yukie Nagai of the University of Tokyo has stated, software algorithms require quantifiably calculable processes, and both digital and digitalized data constitute a binary format of information. As she has noted, whether in reference to gender or emotions, "diversity is something we roboticists cannot do."[10] Not to be overlooked are the presupposed and unquestioned images of gender held by roboticists and programmers that inform their work.

In addition to the integration of *longue durée* and rapid ethnography, the *ri-bun* divide can be bridged provided that anthropologists and roboticists read more of, and engage more carefully and critically with, each other's research publications, and make good faith efforts to propose truly collaborative projects.

9. Jennifer Robertson, "Technologies of *kokoro* (heartmind): Imagineering Human–Robot Coexistence. Perspectives from Japan," *ICON: Journal of the International Committee on the History of Technology* 27, no. 1 (2022): 53–80.

10. Dr. Nagai is cited in my webinar, "Affective Robotics: Designing and Programming Gender in Humanoid Robots. Perspectives from Japan." Public lecture sponsored by Tokyo College, University of Tokyo, 20 February (Webinar). www.youtube.com/watch?v=d1OdCTaFjGo. She served as a commentator.