
Machine Behavior?: A CHI-Perspective Panel on the Methodological Challenges Posed by Intelligent Machines

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Abstract

This panel brings together CHI perspectives on the recent *Nature* paper, "Machine Behavior," [8] to explore the methodological challenges posed by intelligent machines. We aim to discuss whether machine behavior should be examined empirically when it is treated as a phenomenon with its own intrinsic properties (including its own psychology, evolution, and ecology) or whether this approach might be what philosophers consider a category mistake: an ontological error in which things belonging to a particular category are presented as if they belong to a different category. This particular moment in the development of artificial intelligence (AI) is ripe for this investigation as we have yet to compile rich empirical accounts of intelligent machines. Our conversations are tinged with speculation. We need better constructs, tools and methodological approaches to account for the complexity, embeddedness, and dynamism of intelligent machines. The goal of this panel is to explore the gap between rhetoric and reality by discussing some of the methodological hurdles that make studying intelligent machines with increasing autonomy particularly challenging and generative from a CHI perspective.

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Background

Human-Computer Interaction (HCI) is the study of ways in which humans interact with computers (or machines) broadly speaking. Prior discussions on research methodologies within the CHI community may be condensed to what Bødker has called the first, second and third wave of HCI (2006). The first wave was model-driven and dedicated to the systematic study of human factors. The second wave represented a shift in methodology from studies of human factors to human actors in a more natural work setting ([3] *following* [1]). The third wave—where we currently sit—might be characterized by methodologies that acknowledge values as constitutive of design. Recently, the prominent journal *Nature* published a paper entitled, “Machine Behavior,” which proposed a new field of scientific study concerned with “machine behavior” [8]. We take this publication as a type of probe that will enable us to openly discuss the argument and ensuing implications of a potentially new way of human-computer interaction, speaking particularly from the vantage point of methodology.

It is by now obvious to state that technological advancements in artificial intelligence (AI) are becoming increasingly pervasive. Particularly within professional

environments, the pace of these developments not only pose important questions regarding the impacts of these changes—who will be affected, for instance, and how—but also how we will come to know these effects.

By “AI” we refer to “intelligent machines,” “autonomous agents,” or “automated systems,” which we denote as those systems that currently embed some form of machine learning (ML) as their driving engine. For example, machine learning has enabled computers to recognize images or speech with an ability that in certain situations is equally accurate to humans, with greater speed and at less cost [4]. By contrast, the human side of AI—the people, organizations, legal frameworks, social values, etc., affected by the influx of intelligent machines into professional worlds—is evolving at a different pace. The result is, among other things, an imminent mismatch between intelligent technologies and the organizational and individual contexts of their design and use. This mismatch risks unexpected or undesired consequences (e.g., deskilling, overly fragile systems, or automation surprises), giving rise to “automation anxiety” and a growing public concern that can only be addressed through engaged intellectual work [5].

This panel brings together scholars who work on AI or ML in some way and are interested in the effects of this potential mismatch. However, instead of focusing on this issue in the abstract, we aim to address it directly through an exploration of CHI perspectives on the methodological changes posed by intelligent machines—particularly, why there appears to be such a formidable gap between the rhetoric surrounding AI in professional contexts and the dearth of rich empirical studies of the same. We will center our conversation around the following questions:

- Why does it appear that studying AI and work, using any method but particularly using qualitative and/or practice-oriented methods, is so difficult?
- What are the common methodological challenges that arise across varying types of engagements with AI?

To catalyze this discussion, we use a recent article from the journal, *Nature*, entitled “Machine Behavior” [8], as a probe to explore whether there is a category error in applying “behavior” as a lens to understand intelligent machines, an error already brought to light by *Nature*’s own correspondence [7]. Many in the CHI community know this paper and we expect that using it as a prompt for each panelist will be an effective way to expose and engage many key perspectives on how we should go about studying AI in the future. Currently “behavior” is suggested as an appropriate way to understand the actions of intelligent machines, but we wonder whether or not this amounts to a category mistake, based as it is on a biological assessment of determination, with the foregrounding of a system’s “behavior” shifting accountability toward the system itself and away from the organizational and ideological decision-making that went into its development [10]. Even if not, we also think that it is imperative to question whether we as scholars are well equipped—conceptually, epistemologically, and methodologically—to observe, analyze and understand the emerging “behavior” of intelligent machines in our lives now and in the future. Are we? If so, why do we think that?

While interest in exploring the intersection of AI and work has risen recently, we do not yet have a wealth of

empirical studies that can help us make nuanced predictions about how we might engage “machine behavior” in the capacity of a collaborator, a partner, or even as a manager. The lack of empirical studies of AI integrations has already been noted in our field [9], as have the limitations presented by such vacuum, especially those presented by ignoring non-Western perspectives and contexts [6]. In addition to our primary emphasis on machine behavior, panelists will also aim to address the cause of this lacunae, ideally surfacing implications for the future design of systems in the process. Throughout the panelists’ brief talks and the ensuing Q&A period, we hope to incite a spirited discussion that surfaces not only methodological best practices, but also nurtures the beginnings of a new conceptual framework regarding AI that may help us all move forward as researchers interested in this important area.

Panelists

In the spirit of embarking on an interdisciplinary dialogue, the panel speakers come from several different cultural and disciplinary backgrounds, as well as different moments in a career arc (from a doctoral student to the head of a center) and expertise (anthropology, communication, computer science, cognitive science, organizational studies). We draw on this diversity to not only develop an inclusive and compelling panel discussion, but also to represent, inclusively, a wide range of colleagues, researchers, and practitioners whose research would be impacted by the panel discussion. As intelligent systems permeate the daily lives of people all over the globe, such inclusivity is critical to building machines that are safe, secure, and usable for all.

Hamid Ekbia is Director for the Center for Research on Mediated Interaction, and is Professor of Informatics, Cognitive Science, and International Studies at Indiana University Bloomington. His work focuses on mediation, that is, on the processes through which objects and meanings are transformed in hybrid networks of interaction. In particular, he wants to understand how technologies mediate interactions among individuals, organizations, and collectives. Trained as an engineer, he initially approached this topic by studying Artificial Intelligence (AI). That attempt led to many useful ideas but also to many questions, which are recounted in his book *Artificial Dreams: The Quest for Nonbiological Intelligence*. He is also the co-author, with Bonnie Nardi, of the book, *Heteromation, and Other Stories of Computing and Capitalism*.

Ingrid Erickson is an Assistant Professor at the School of Information Studies at Syracuse University. An ethnographer and organizational scholar by training, her research centers on the way that mobile devices, ubiquitous digital infrastructures, and artificial intelligence are influencing how we work and communicate with one another, navigate and inhabit spaces, and engage in new types of sociotechnical practices. Together with colleagues, she is responsible for overseeing the NSF- sponsored WAIM research collaboration network, which focuses on generating intellectual convergence amongst a wide range of disciplinary scholars on the broad topic of 'work in the age of the intelligent machine.' She has been on the program committees for CHI, CSCW and GROUP and is the past organizer of several workshops at CSCW.

Kevin Crowston is a Distinguished Professor of Information Science at the Syracuse University School of

Information Studies. His research examines new ways of organizing made possible by the use of information technology. He approaches this issue in several ways: empirical studies of coordination-intensive processes in human organizations (especially virtual organization); theoretical characterizations of coordination problems and alternative methods for managing them; and design and empirical evaluation of systems to support people working together. With colleagues, he heads a Research Coordination Network to develop a socio-technical perspective on work in the age of intelligent machines.

Elizabeth Anne Watkins is a doctoral student at Columbia University and a member of the Columbia Center on Organizational Innovation. Trained as an organizational ethnographer, she studies how workers interact with and talk about tools of cybersecurity. Taking a mental-models approach, her dissertation examines how workers in the ride-hailing industry interpret and strategize around facial recognition technologies. She holds a Master of Science from MIT, works as a Research Analyst with the AI on the Ground Initiative at Data & Society, and previously worked as a case writer and researcher at Harvard Business School.

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