Algorithmic Authority: The Ethics, Politics, and Economics of Algorithms that Interpret, Decide, and Manage

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Abstract

This panel will explore algorithmic authority as it manifests and plays out across multiple domains. Algorithmic authority refers to the power of algorithms to manage human action and influence what information is accessible to users. Algorithms increasingly have the ability to affect everyday life, work practices, and economic systems through automated decision-making and interpretation of "big data". Cases of algorithmic authority include algorithmically curating news and social media feeds, evaluating job performance, matching dates, and hiring and firing employees. This panel will bring together researchers of quantified self, healthcare, digital labor, social media, and the sharing economy to deepen the emerging discourses on the ethics, politics, and economics of algorithmic authority in multiple domains.

Author Keywords

Algorithms; algorithmic authority; critical algorithm studies; algorithmic management; ethics; policy; quantified self; healthcare; crowdwork; sharing economy; digital labor; political economy of computing.

ACM Classification Keywords

K.4.0. Computers in Society: general.

Introduction

The growth of "big data" has led to the expectation that organizations will use the large, interlinked data sets at their disposal to make informed decisions in the markets or policy spheres in which they operate. But the scale of these datasets makes it impossible for such decisions to be made by humans alone. As a result, organizations increasingly rely on algorithms to interpret data and inform, mediate, and even automatically make decisions such as curating news, matching potential romantic partners, hiring and sanctioning (or even firing) employees, and stabilizing currency markets. Thus the proliferation of big data and the growing expectation that organizations will transform data into knowledge and informed decisions is a major driver of the apparently inexorable growth of algorithmic authority [7]. This growth has far-reaching consequences: algorithms are now poised to significantly shape both the lives of individuals and large-scale social, economic, and political processes.

A quickly growing body of work has begun to examine the social implications of algorithms. The ways that algorithms govern have sparked debates and excitement among researchers across many disciplines including HCI, law, anthropology, and computer science [14]. This research comes at a time when "algorithm" has gained a new meaning in academic discourses—no longer are algorithms viewed as mere code, they represent the authority of organizations in a variety of domains. Therefore, a key driving force behind this panel is the need to encourage dialogue between researchers in these domains. By understanding the manifestations and implications of algorithmic authority in multiple domains, we will advance the conversation about algorithms in the CHI community and beyond.

Themes

Debates about algorithmic authority encompass the ways that algorithms shape processes at different scales and in different domains. It examines the power of both algorithms that curate content and influence what information users see (e.g., Facebook's friend feed and Google's search algorithms) and algorithms that provide algorithmic management (e.g., Uber's algorithms and Amazon Mechanical Turk). These algorithms are often portrayed as black boxes, which are too difficult for any one person to fully understand [9]. Researchers have identified multiple themes and questions related to the authority of these "black boxes," four of which will be explored in this panel:

Accountability: Accountability—an expansive and elastic term for transparency, improved quality and decision making, and containment of bias [11]—is increasingly carried out through emerging IT applications that capture and analyze data on performance [10,12]. Research has shown that material shifts in accountability artifacts, such as the growing use of algorithmic ranking and rating systems, are powerfully reconfiguring the ways in which individuals and organizations are held accountable [12]. This comes with both risks (i.e., offloading accountability onto algorithms and away from people) and opportunities (i.e., increased reflexivity and opening up of accountability to new stakeholders, as in the case of TripAdvisor and Yelp) [5]. Further, algorithmic performance measurements are tied to institutional systems of reward and sanction (i.e., delineating a "failing school" or "productive workers")—they are a crucial site of regulation and governance of local practice. *What are the politics and ethics embedded in algorithms employed for accountability? How do we use*

the potential of algorithms to reveal helpful information about individual and organizational performance while managing the risks of automating accountability?

Visibility: Algorithms are largely invisible; for example, Eslami et al. [3] found that more than half of their participants did not know that their Facebook friend feed was algorithmically generated. But part of Facebook's power is that it can selectively make things visible—it can raise content up as "a reward for interaction" and use the "threat of invisibility" [1] as a means of governing users and advertisers, requiring users to participate more if they want their content to be seen. Algorithms can also make visible things that we did not even know about ourselves and determine sensitive information that we might rather keep hidden [13]. *How do we reconcile the asymmetry between algorithmic visibility and user visibility?*

Sense-making: Lee et al. found that Uber drivers must rely on sense-making activities to understand how to interact with an algorithmic system that assigns them to passengers, manages their fare rates, and evaluates their performances. Once drivers understood the algorithm they could attempt "workaround strategies that helped them maintain control that the automated assignment did not support as part of the existing system functionality" [6]. Sense-making can also be seen in the practices of the Quantified Self movement; members analyze their data alongside or instead of dominant big data algorithms [8]. *How can algorithms be designed to better support sense-making?*

Management: Amazon Mechanical Turk workers are generally recruited to perform tasks that cannot easily be performed by artificial intelligence. Amazon has

coined the term "artificial artificial intelligence" to refer to how human work is integrated "into existing data systems, artificial intelligence training algorithms, and interactive applications" [4]. Requesters use algorithms to manage workers by determining which tasks to show them and to help them select tasks for which they would be best suited. *What are the ethics of rendering humans as "bits of algorithmic function" [2]? How can we design systems that make workers more visible? What kinds of new practices and power relations are created as a result of algorithmic management?*

Through examining these issues, researchers have begun to "open the black box" and examine the role of humans in enabling and interpreting algorithmic decision-making. This panel will continue to open the black box through discussing empirical studies of a diversity of algorithmic systems.

Panelists and Moderators
The panelists all have conducted empirical research on topics related to algorithmic authority; below, we describe our presentation topics and qualifications.

Lilly Irani is an Assistant Professor of Communication & Science Studies at University of California, San Diego. Her work examines and intervenes in the cultural politics of high tech work. She is a co-founder of Turkopticon and mentor on Dynamo. She publishes at CHI, CSCW, *New Media & Society,* and *Science, Technology & Human Values* and other venues. Her work on crowdsourcing has been covered in *The Nation*, *The Huffington Post*, and *NPR*. On this panel, she will argue that HCI's liberal ideals of empowerment, freedom, and creativity are compromised by shifts to algorithmic management that do not offer workers

substantive accountability, transparency, and socialization of risk.

Min Kyung Lee is a research scientist in human-computer interaction at the Center for Machine Learning and Health at Carnegie Mellon University. Her research examines the social and decision-making implications of intelligent systems and supports the development of more human-centered machine learning applications. In a recent study, she explored how "algorithmic management" influences Uber and Lyft drivers' satisfaction and cooperation. Following up on this work, her current studies include investigating lay people's perceptions of algorithmic managerial decisions through a series of experiments, and designing algorithmic management for a smart city community service and machine learning-based healthcare decision aids. Drawing from these studies, she will discuss design principles and an interdisciplinary development process for human-centered algorithmic systems.

Caitlin Lustig (co-moderator) is a PhD candidate in the Informatics department at University of California, Irvine. Her research broadly explores how power is distributed among actors in algorithmic systems. Her current work uses an empirical study of Bitcoin to explore the politics of decentralized algorithms. She is co-author, with Bonnie Nardi, of the paper that inspired this panel, "Algorithmic Authority: the Case of Bitcoin".

Dawn Nafus is an anthropologist at Intel Labs, where she conducts research to inform new products and services. Her research focuses on self-tracking, data literacy and socio-technical formations that resist dominant modalities of biomedical and algorithmic

control. Her current project is Data Sense, a tool for self-trackers without extensive data science backgrounds to explore data both "by hand" and through interacting with machine learning algorithms. She is the editor of *Quantified: Biosensing Technologies in Everyday Life* and coauthor of *Self-Tracking*. In this panel she will argue that there are indeed design strategies that can tame the supposed authority of algorithms, but this taming or "domestication of data" is only likely to take place alongside certain broader social changes.

Bonnie Nardi (co-moderator) is a Professor in the Department of Informatics at the University of California, Irvine. An anthropologist, she has conducted many studies of the use of digital technology in varied venues. She is currently working on issues of labor and inequality. Bonnie is a member of the CHI Academy. She is co-author, with Professor Hamid Ekbia, of *Heteromation and Other Stories of Computing and Capitalism*, which MIT Press will publish later this year.

Kathleen Pine is a research scientist in the Department of Informatics at UC Irvine. Her work examines how data practices play into the relationship between formal organizational structures and informal agency. Her current ethnographic research focuses on the design and development of infrastructure for accountability of healthcare organizations and resultant impacts for work and workers. She will present research on the institutional logics embedded in Electronic Health Records (EHR) as they impinge on nurse's situated agency to carry out work routines. She will discuss the affective dimension of automated accountability through describing the authority accorded to work process descriptions rendered in the EHR.

Christian Sandvig is an Associate Professor of Communication Studies and Information at the University of Michigan, where he specializes in computing and public policy. His prior work has received CHI best papers and the NSF CAREER award in human-centered computing. His current research investigates the negative consequences of algorithmic decision-making in media systems. He recently proposed a system for auditing algorithms that has been discussed in *Slate* and *The Washington Post*. His book on this topic is under advance contract to Yale University Press. In his introductory remarks he will discuss the human desire to assign motive to algorithmic actions and the challenge that motive poses to both interaction design and public policy.

Panel Structure

The panel is structured in order to give the CHI community ways to become involved through social media and through an extended discussion during the panel. We plan to disseminate the findings from this panel to the larger CHI community.

Before the panel
We will promote the panel through relevant mailing lists and online groups in order to reach HCI researchers who study the usability of algorithmic systems, researchers in the emerging field of "critical algorithm studies", and algorithm designers. We will also invite the public to ask questions before the panel via Twitter.

During the panel
The panel will be divided into three parts: a brief introduction by the panelists, presentations from the panelists, and a moderated open discussion.

INTRODUCTION (10 MINUTES)
The panel will begin each panelist taking two minutes to introduce themselves and describe how they conceptualize algorithmic authority.

SHORT PRESENTATIONS (25 MINUTES)
The panelists will spend five minutes each describing their research on algorithms and the design and ethical challenges facing algorithms in their domain. Panelists will focus on presenting one key insight, finding, or provocation about algorithmic authority drawn from their empirical research. The presentations of the panelists' field sites (quantified self, healthcare, digital labor, social media, and the sharing economy) will provide a basis for discussion about how algorithmic authority is playing out in different domains.

DISCUSSION (45 MINUTES)
The panelists will discuss the questions generated from submissions prior to the panel and take audience questions during the panel. Panelists will also have the opportunity to ask each other questions about their research. Moderators will use the questions posed in the introduction section in the event that we do not receive enough questions from the audience. To ensure that this panel produces a *conversation* rather than a one-way interaction in which the only role of the audience is to ask panelists questions, the moderators will also invite audience members to discuss how they view these questions in the context of their research.

After the panel
We hope to continue the conversation about algorithmic authority beyond the duration of the panel; therefore, we will first provide a summary of the panel which will be posted online and disseminate the link to the mailing

lists and online groups where we originally promoted the panel. Next, we will use the issues identified in this panel to design a workshop for CHI 2017. This panel will provide the opportunity to begin the conversation on algorithmic authority with a focus on audience engagement, and will in turn, help us to frame the workshop. Lastly, we will use the discussions from the panel and workshop to produce a proposal for a special issue of a journal or an edited volume.

Acknowledgements

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