

Human-Machine Reconfigurations: Plans and Situated Actions,
2nd Edition. Lucy Suchman. Cambridge, UK: Cambridge University press;
2007: 314 pp. \$29.99 (ISBN: 0-521-67588-X)

Human-Machine Reconfigurations: Plans and Situated Actions (HMR) is a second edition of Suchman's *Plans and Situated Actions: The Problem of Human-Machine Communication (P&SA)*, and this edition extends her analysis of human-machine interactions to account for recent developments in technology and theories surrounding our interactions with them. *P&SA*, published in 1987, had pronounced influences in human-computer interaction (HCI), artificial intelligence (AI), anthropology, and social studies of science and technology by introducing new methods for examining human-machine interaction. The original text makes up chapters 2-12 of this second edition; Suchman's updates are provided as footnotes throughout these chapters. In *P&SA*, Suchman argues that plans, a fundamental concept in AI and associated computer science research, are best understood not as determinates of action but as rhetorical devices for explaining action. She recommends the methods of ethnomethodology and conversation analysis for studying the relationships among humans and their machines. Her work in both editions is significant in its ability to use theories and methods from multiple disciplines to inform the problems of human-machine interaction research by using accessible real-world examples of problematic interaction and thorough theoretical explanations of those situations.

Designers interested in changing the way humans and machines interact will benefit from reading Suchman's second edition. Her relational approach emphasizes the impacts designed objects can have and provides us with methods of exploring those impacts. Researchers looking for examples of how to employ conversation analysis and ethnography in novel environments will also benefit from the book. Suchman explains the procedures of conversation analysis and ethnography while providing examples of her own work using both methods. She anticipates and addresses some of the challenges researchers unfamiliar with them will encounter (e.g. determining what is a conversation). Her overviews of plans, situated action, agency, and figuration are brief but useful. For readers interested in theories beyond their current purview, Suchman's overviews can provide introductions and her footnotes provide helpful pointers to fundamental work using those paradigms. In the first edition, Suchman provided chapter-length overviews of the central concepts – plans and situated action. The second edition spends less time explaining its central concepts of figuration and agency. This change benefits readers who have some familiarity with the recent feminist and sociological theories from which she borrows those concepts.

The shared, broad aim of both editions is to rethink interaction between humans and machines. Suchman's original edition focused on arguing against the planning view of action then popular in artificial intelligence (AI). The planning view suggests that plans are series of steps to be executed and that such steps (and their sequence) are determined

prior to action. Suchman's situated action approach suggests that instead, plans are representations of action and that actions themselves result not from rules or plans but from situations. Suchman argues that plans are resources that can be employed in service of action not that they actually determine action. At the time of its publication, the first edition broke ground with this new approach to understanding plans and action, and Suchman's research demonstrated that such a view could not account for phenomena surrounding human-machine interactions.

Suchman trained as an anthropologist, and her first edition resulted from her dissertation work at Xerox PARC. There, she employed ethnomethodology and conversation analysis to explore interaction between Xerox employees and a photocopier with an AI help system. The copier's interface designers assumed its users would arrive at the copier with a goal and that their primary problem was in determining how to accomplish that goal. Suchman's videos and analyses of interactions between users and the system illustrate that AI's assumptions about conversation led to inadequate interface designs. AI's problem, she claims, was that it assumed a message-passing model of interaction in which conversation partners, whether humans or machines, simply moved information back and forth. Instead, she argues, understanding conversations and interactions as dynamic co-constructions could prove more useful for designers of human-machine interactions. Under this dynamic model, conversational partners co-construct meaning using embodied competencies and situational circumstances (p. 10). The co-construction approach enables us to explore situational effects on interaction

and helps account for complications (i.e. unexpected behavior) that the planning view cannot explain.

This second edition pushes us to explore how social understandings of agency and figuration impact the human-machine interface. Multiple readings will be rewarded, and readers should not be put off by the density of Suchman's material. *HMR* relies heavily on theories from a variety of disciplines including philosophy, Actor Network theory, artificial intelligence, robotics, anthropology, and sociology. A reader who is unfamiliar with any of these fields is likely to get lost easily in Suchman's prose. Readers who have expertise in at least one area will find enough familiar territory to ground themselves in her discussion but are likely to find themselves needing to read some of the work she references in order to better understand Suchman's arguments. This edition builds on the original situated action view, and expands the support and explanation of this view to include concepts from a variety of areas including feminist theory (e.g. embodiment, figuration), artificial intelligence (e.g. agency), and Actor Network theory (e.g. relational networks including non-human agents).

Agre's review of *P&SA* provides a readable overview of the impact of that first edition (Agre, 1990). Agre points out that Suchman's first edition bridged anthropology and AI by comparing how each tradition thinks about action. He credited Suchman's work with introducing him to the idea that cognition could be something in the world rather than just in the head and expected that research on the "nature of the social world" to influence AI (p. 379). Readers who tackled *P&SA* when it was first published may find reading

Agre's review a helpful way to review before reading material new to the second edition.

Figuration and agency are central concepts for Suchman, and she borrows these concepts from Haraway and Latour. Figuration refers to our representations of the world, and Suchman borrows this concept from Haraway (Haraway, 1997). Figures are sticky and require effort to adjust to new representations of the world. Latour, and other Actor-Network theorists, provide Suchman with ideas of agency that allow her to uncouple humanness and agency (Latour, 2004, 2005; Law, 1992). She wants us to explore how humans and machines are intertwined, and uncoupling humanness and agency enables us to think of machines as active agents rather than programmatic respondents. Allowing machines agency enables them to participate in the co-construction of situations central to Suchman's analysis.

Material new to the second edition expands the argument that we should think of effective human-machine interactions in relational terms. Suchman argues against the notion that humans and machines must be thought of as individual, autonomous entities and suggests instead that humans and machines are "assemblages of stuff" (p.227) and that those assemblages necessarily change the nature of both human and machine. She uses discussions of MIT robots and interactive performance art to illustrate her argument. For example, she describes interactions with Kismet, a robot that is part of the sociable computing project at MIT, to illustrate the co-constructive nature of interactions between humans and machines.

Kismet is designed to have natural, intuitive interactions from humans and to learn from those interactions¹. Suchman and her colleagues were unable to interact successfully with Kismet. To them, his behavior appeared random rather than intuitive. Suchman takes this failure as evidence for the mutual constitution of the relationship between Kismet and his developer, Cynthia Breazeal. Just as Kismet supposedly learns from his interactions with humans, so do humans learn from interacting with him. Breazeal's success in interacting with Kismet indicates that she has adapted more to Kismet's responses than have other, less familiar humans. Together, Kismet and Breazeal create a situation in which they successfully interact with one another.

Suchman's explanation of the story argues that Kismet's agency is a result of the specific sociomaterial arrangement. Unlike previous understandings of agency – the capacity for action – that required only autonomy and rationality, Suchman's understands agency to result from a history of interactions and social arrangements. Kismet's capacity for action depends on the humans with whom he interacts. This notion of agency echoes Actor-Network theory's (ANT) approach². Suchman introduces ANT briefly (p. 260-261) to gain support for relational approaches to human-machine interactions, but she also implicitly references ANT's understanding of agency as a set of competencies rather than intentions. Under ANT, nonhuman entities possess agency because they do things. This "doing" is

¹ See <http://www.ai.mit.edu/projects/sociable/overview.html>; last accessed June 15, 2007.

² For a brief introduction to Actor-Network theory, see Felix Stadler's *Actor-Network-Theory and Communication Networks: Toward Convergence* at http://felix.openflows.org/html/Network_Theory.html (last accessed June 18, 2007).

all that is necessary for agency, according to Latour (Latour, 2005). Suchman wants us to think about agency as a set of “possibilities generated... through specific sociomaterial assemblages” (p.242). The rational view of agency limits its reach to humans and therefore cannot account for the effects objects and machines have on interactions. Thinking of agency in relational terms emphasizes the importance of understanding each component, including nonhuman components, of an interaction. Agency, as Latour defines it, extends to objects such as the AI help system in Suchman’s case study; Latour’s and Suchman’s broader view of agency allows us to think of the help system as an actor with abilities to influence and change situations.

Suchman also relies on Haraway’s conceptions of *material figurations* (italics original) to discuss human-machine configurations. Figurations, for Haraway and Suchman, are something like conceptions or schemas – mental images that embody our understanding. Buying into a figuration, such as the autonomous, rational agency figuration against which Suchman argues, perpetuates and empowers the figuration. Reconfiguring, then, requires additional effort to unpack the original figuration and to challenge it. The exercise of challenging figures is important in itself, for Suchman, because doing so allows us to know our world better. She wants us to think about science as culture and a set of practices rather than exercises in uncovering universal truths. Suchman’s argument is that “humans and artifacts are *mutually constituted*” (italics original) (p. 268). Rethinking the interface of machines and humans as a dynamic one requires changes in the designs of

systems that include humans and machines. Using the language of agency and figure that she introduces emphasizes the situated nature of our research and enables us to imagine how a change in situation may have influenced the research differently.

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