IMAGINE ALL THE ROBOTS: DEVELOPING A CRITICAL PRACTICE OF CULTURAL AND DISCIPLINARY TRAVERSALS IN SOCIAL ROBOTICS

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An Abstract of a Thesis Submitted to the Graduate

Faculty of Rensselaer Polytechnic Institute

in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Major Subject: Science and Technology Studies

The original of the complete thesis is on file
in the Rensselaer Polytechnic Institute Library

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Troy, New York

November 2007
(For Graduation December 2007)

ABSTRACT

This dissertation is a comparative cross-cultural case study of social robotics laboratories in the United States and Japan. Social robots are autonomous embodied agents that can participate in social interactions with humans. They are attributed new roles as social entities—companions, care-takers, guides and receptionists, "natural" interaction partners, and mediators between ourselves and the increasingly complex techno-scientific environments we live in. Moreover, social robots are used as tools for studying and modeling human social behavior. Through their research practices, social roboticists produce not only technologies, but also cultural narratives about human behavior, cognition, and life in technologically mediated societies. This analysis focuses on three main questions: How are cultural conceptions about social interaction and human cognition implicitly and explicitly expressed in social robot designs? How are social as well as technical issues addressed in the construction and evaluation of social robots? How are the boundaries between the social, natural, and applied sciences challenged and redefined?

My research is based on 'critical practice' in the field, following a direction in science and technology studies (STS) that uses philosophical, sociological and historical studies of science and technology to not only analyze but construct techno-scientific knowledge through disciplinary boundary-crossing and collaborations between STS scholars and other scientists and experts. As a visiting researcher at the Carnegie Mellon University (CMU) Robotics Institute in Pittsburgh and at the National Institute of Advanced Industrial and Science and Technology (AIST) Intelligent Systems Institute in Tsukuba, Japan, I observed and participated in the design and evaluation of social robots. Additionally, I visited social robotics laboratories and conducted interviews with researchers across Japan and the U.S. I also attended social robotics conferences, presented papers, and organized panels on interdisciplinary approaches in the field. In my study, I use a problem-centered research approach and a variety of methodologies, including participant observation, interviewing, case study research, and behavioral observation.

This participatory approach aims to construct alternative practices and research frameworks that enable social scientists and engineers to collaborate by bringing to light and questioning widely accepted cultural and disciplinary assumptions. I first illustrate how contemporary social and cultural realities influence the development of technology, and how scientific and technological ideas feed back into the construction of cultural meanings about humans and society. I then analyze the interdisciplinary tensions and resolutions in daily social robotics practices to trace how it is re-defining science and bridging differences between disciplinary cultures of social science and engineering and computer science. By viewing social robotics as a hybrid knowledge space, I encourage alternative approaches to social robotics research that render social, cultural, technical, and scientific categories problematic. I discuss a variety of research approaches used in my collaborations with roboticists that challenge initial design assumptions and work towards more socially and responsive and responsible robot designs. Finally, I analyze my experiences as part of an STS project of mediating in the development of new hybrid knowledge spaces and boundary-crossing practices in science and society.