TOPIC	(Enter Topic here)
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Mechanical Engineering
SPEAKER	Dr. Neera Jain
DATE	Friday October 23, 2020
TIME	3:00 – 4:00 P.M. (EST)
VENUE	WebEx video-conferencing
FEES	No Charge

SYNOPSIS

What's trust got to do with it? Closing the loop between human and machine

Today, autonomous systems interact and collaborate with humans in ways that demand a greater level of trust between human and machine. From the control engineer's perspective, this is a feedback control problem. However, closing the loop between human and machine is not trivial – we require a real-time estimate of human trust (and other relevant feedback variables) as well as mathematical models of the plant (human behavior) and actuator (user interface) through which the machine affects the human. In this talk, I will describe our interdisciplinary efforts at tackling this problem, focusing specifically on recent work in which we synthesized a near-optimal control policy using a trust-workload POMDP (partially-observable Markov decision process) model framework that captures changes in human trust and workload for a context involving interactions between a human and an intelligent decision-aid system. Using transparency as the feedback variable, we designed an optimal control policy to balance competing performance objectives in a reconnaissance mission study in which a virtual robotic assistant aids human subjects in surveying buildings for physical threats. I will discuss how calibrating trust alone may be insufficient to achieve synergistic human-machine interactions and highlight how our approach is able to mitigate the negative consequences of "over trust" that can occur in such interactions. I will also discuss our more recent efforts to extend this research to human interaction with higher levels of automation.

ABOUT THE SPEAKER

Dr. Neera Jain joined the School of Mechanical Engineering and Ray W. Herrick Laboratories at Purdue University as an assistant professor in January 2015. She is the principal investigator of the Jain Research Laboratory and has authored more than forty peer-reviewed articles on dynamic modeling and optimal control of thermal energy systems, human-machine interaction, transportation systems, and manufacturing processes. Her research is supported by the National Science Foundation, Office of Naval Research, as well as private industry. She is also a contributor for Forbes.com, writing on the topic of human interaction with automation and its importance in society. From May 2013-May 2014 Dr. Jain was a visiting member of the research staff in the Mechatronics Group at Mitsubishi Electric Research Laboratories in Cambridge, MA where she designed advanced control algorithms for HVAC systems. Before earning her doctorate in Mechanical Engineering at the University of Illinois at Urbana-Champaign in 2013, Neera earned her S.B. from the Massachusetts Institute of Technology in 2006 and her M.S. from the University of Illinois at Urbana-Champaign in 2009, both in Mechanical Engineering. She is a recipient of the Department of Energy Office of Science Graduate Fellowship and the ASME Graduate Teaching Fellowship.