Mica Endsley

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Speaking Topic: Human teaming with autonomous systems: Building support for situation awareness

Abstract:

As autonomous and semi-autonomous systems are developed for automotive, aviation, cyber, robotics and other applications, the ability of human operators to effectively oversee and interact with them when needed poses a significant challenge. Successful system autonomy will not function fully independently, but will need to effectively partner with human operators. Many challenges for successful human interaction with autonomous systems exist, however, indicating the need for a new approach to the design of autonomous systems that will allow them to serve as effective teammates. An automation conundrum exists in which the more automation is added to a system, and the more reliable and robust that automation is, the less likely that human operators overseeing the automation will be aware of critical information and able to take over manual control when needed. Effective manned-autonomy teaming requires a high level of shared situation awareness and situationally relevant levels of trust which underlie effective oversight, intervention and coordination.

Autonomous systems must be designed to serve as a part of a collaborative team with human operators. A model of human autonomy interaction, based on the past 40 years of research on human-automation interaction shows key factors that will need to be considered to achieve successful interaction with autonomous systems based on shared situation awareness between the human and the system autonomy.

Past paradigms that created brittle automation, with limited capabilities and limited consideration of human operators, will be replaced by an explicit focus on synergistic human-autonomy teams. This new paradigm will directly support high levels of shared situation awareness between the human operator and the autonomy, creating situationally relevant informed trust, ease of interaction and control, and the manageable workload levels needed for success.

Biography:

Dr. Mica R. Endsley is President of SA Technologies, a cognitive engineering firm, and is the former Chief Scientist for the US Air Force. She has also held the positions of Visiting Associate Professor at MIT in the Department of Aeronautics and Astronautics and Associate Professor of Industrial Engineering at Texas Tech University.

Dr. Endsley is a Fellow and Past-President of the Human Factors and Ergonomics Society. She received a Ph.D. in Industrial and Systems Engineering from the University of Southern California.

Dr. Endsley has authored over 200 scientific articles and reports on situation awareness, decision making and automation and is recognized internationally for her pioneering work in the design, development and evaluation of systems to support human situation awareness and decision-making, based on her model of situation awareness. This human-centered design approach has been found to be critical to successfully integrating people with advanced technologies and automation in a wide variety of domains. She is co-author of two books, Analysis and Measurement of Situation Awareness and Designing for Situation Awareness.