Call for Papers

Computational Human Performance Modeling for Human-Machine Systems Design

Special Issue of IEEE Transactions on Human-Machine Systems

In many complex human-in-the-loop systems, humans often represent the greatest source of variability in overall system performance. For this reason, the field of human performance modeling (HPM) has developed to describe and quantify various types of human behavior as well as provide a basis for predictions of performance under specific task circumstances. Although many forms of models have emerged in the literature, including qualitative, quantitative, mathematical and computational, the latter form has substantial utility for application in systems design and engineering as well as real-time control applications to support safety and performance.

This special issue will focus on recent advances in mathematical and computer simulation-based models for quantifying and predicting human performance, including cognitive and physical behaviors. Such models are based on fundamental understanding of human information processing and human interaction with real-world systems. Model outcomes include task time estimates as well as predictions of errors, levels of cognitive workload, situation awareness and decision outcomes. Human factors researchers and practitioners use results obtained from these models to design, evaluate, and improve human-machine systems.

To emphasize the importance of HPM in human-machine system design and evaluation, this issue invites high-quality HPM papers addressing the following three types of research contribution:

1. Model development: Descriptions of computational model(s) of human performance and behavior that are theoretically grounded in cognitive science and/or information processing theory.
2. Model validation: Descriptions of approaches to validating human performance model predictions with empirical data (e.g., reporting R square values, root mean square error, etc.)
3. Systems design or evaluation: Descriptions of how model outcomes have been (or can be) translated and applied for specific system design. Papers should make clear how models can be introduced into the systems design process. Alternatively, papers should describe how model outcomes can be used (or have been used) for evaluation of human performance with real machine systems in actual applications as a basis for improving legacy technology.

For the purposes of this special issue, a human-machine system is considered to be any real-world system involving human-in-the-loop control for (near) real-time information processing and/or decision making. This definition can include various systems in: industry, transportation, space, healthcare, power and energy, military applications, cyber security, and service. Models of consumer device use or robotics with human-in-the-loop control are also suitable. (Potential contributors should contact the guest editors with inquiries regarding other human-machine application areas.)

Important Dates:

Original manuscript submission due date:	May 1st, 2018
Initial decision notification:	July 1st, 2018
Revised manuscript due date:	September 1st, 2018
Final decision notification:	December 1st, 2019
Final version of manuscript due date:	February 1st, 2020

Manuscripts should be submitted at: http://mc.manuscriptcentral.com/thms. All submissions must include a cover letter with the statement, "Computational Human Performance Modeling for Human-Machine System Design." For detailed submission information, please see the "Information for Authors" at:

http://www.ieeesmc.org/publications/transactions-on-human-machine-systems/information-for-authors.

Guest Editors

Changxu Wu (Lead), Department of Systems and Industrial Engineering, University of Arizona, changxuwu@email.arizona.edu
Matthew L. Bolton (Associate), Department of Industrial and Systems Engineering, University at Buffalo, mbolton@buffalo.edu
Ling Rothrock (Associate), Department of Industrial and Manufacturing Engineering, Pennsylvania State University, lrothroc@psu.edu