Neurophysiological sensor-based predictive modeling for human performance in multitasking environments

BIO

Ji-Eun Kim is an assistant professor in the Department of Industrial and Systems Engineering at the University of Washington (UW) Seattle, and the director of the Human and Systems Lab. Her research spans the fields of neurophysiological sensor-based human performance modeling with a recent focus on human-automation interactions, aiming to design work systems that better accommodate individual differences. The major application domains of her research include healthcare and self-training systems. She holds a Ph.D. in Industrial Engineering from the Pennsylvania State University. Her research has been supported by the National Science Foundation (NSF), Veterans Affairs, and Northwest Kidney Centers. She is a recipient of the 2023 NSF CAREER Award, the 2020 UW Faculty Appreciation for Career Education & Training Award, and the 2017 UW Rogel Faculty Support Award.

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ABSTRACT

Multitasking occurs in our everyday lives but is especially critical in high-risk work environments in which performance errors during multitasking are potentially life-threatening. Prior research on multitasking has relied on discrete and retrospective behavioral datasets, which limits continuous monitoring and performance prediction. This talk introduces the Human and Systems Lab's recent works on predictive modeling for multitasking performance using dynamic Bayesian networks, clustering, and various features from electroencephalogram (EEG) and eye tracking. The findings provide their potential integration into assessment, training, and intervention tools for enhancing multitasking performance, which ultimately contributes to safer work environments.