Joel M Haight, Adv Robot Autom 2017, 6:2 (Suppl)
DOI: 10.4172/2168-9695-C1-008

The design and use of adaptive automated control systems; where and how does the human operator optimally fit? Adaptive automation - State of the literature and research quest

Joel M Haight
University of Pittsburgh, USA

In today's technologically driven world, we face the automation paradox. Bainbridge (1983) says that the more automated a system becomes; the more important it is to consciously and appropriately integrate humans. We cannot argue that automation provides immeasurable benefit (improved efficiency, reliability, accuracy, safety, etc.). However, if humans are not actively engaged in system operation they experience loss of skill, knowledge, decision-making capability and reaction-time. Without active engagement in the cognitive-based activities required by a control system, humans become less able to cope, understand and function correctly. When called upon to take over control in an automated system, we become less capable of effectively operating the system. Adaptive automation is a popular approach to solving this engagement problem. An adaptive system allows the operator to have control until they are not engaged enough to know what to do in an upset. An NYC Amtrak engineer derailed a train at 100 mph going into a 50 mph curve. Adaptive speed control gives the engineer the opportunity to slow down; if no response, the control system takes over and slows the train. Researchers at the University of Pittsburgh propose a design strategy integrating adaptive control while concurrently minimizing human error-induced incidents. Using licensed nuclear power plant reactor operators in a control room simulator, researchers identify and measure key biometric variables while varying task configuration, automation level and override authority. If impact on system output is predictable, the generated model can help designers simulate design strategies and resulting impact on system performance, thus providing more-informed training protocols and content, more-informed simulator practice decisions and improved operational and operating procedure consistency.

Biography

Joel M Haight is an Associate Professor of Industrial Engineering at the University of Pittsburgh, USA. He is currently a Professor and Director of the Safety Engineering program, appointed in 2013. He has spent 4 years as a Research Manager with the U.S. Centers for Disease Control and Prevention (CDC), 10 years as a Professor and Researcher at the Pennsylvania State University, Department of Energy and Mineral Engineering and nearly 18 years as an Engineer and Manager at the Chevron Corporation.

jhaight@pitt.edu

Notes: