

Head-Mounted Displays and Physiological Sensing for Human-Machine Interaction

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Abstract

Evolution has always been the main driving force behind slow but steady change for the human brain and body. However, living in the Information era, our perceptual and cognitive capacities cannot simply rely on natural evolution to keep up with the immense advancements in emerging technologies. On one hand, technologies we use daily (PCs, smartphones, wearables, etc.) remain largely uninformed about our perceptual levels, cognitive states and physiological needs, thus forming an “awareness gap” between the human (user) and the machine (system). On the other hand, the same technologies, if properly actuated, can revolutionise Human-Machine Interaction (HMI) and augment our perceptual and cognitive capacities: improved capture and sensing (e.g., cameras and sensors), in-situ information presentation (e.g., AR/VR displays and ubiquitous projection), and technologies for implicit input and adaptive control (e.g., eye-tracking, electromyography (EMG), and electroencephalography (EEG)). This presentation will focus on research conducted at the crossroads of Human-Computer Interaction (HCI), Ubiquitous Computing, AI, Cognitive Psychology, and Neuroscience. The showcased research entails the digitalization, introduction, and evaluation of previously in-lab clinical methods into the users’ natural settings. Ultimately, HMI is deemed the medium for extending human abilities beyond the humanly possible.

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