Editorial

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Foreword: Physiological Computing

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Physiological computing has proliferated into our everyday life, providing us with a deeper understanding of how our bodies react to different stimuli. Originating from medical fields, physiological signals are analyzed to treat medical conditions and detect anomalies in the human body. Only recently, physiological computing has received growing interest in human-computer interaction.

The relatively simple deployment of off-the-shelf physiological sensors bridges the gap between the medical and consumer sector. More and more consumer devices bring physiological sensing to the masses and provide a spectrum of insights that range from raw to interpreted data. Fitness trackers are commonly used devices with which users reflect on their activity levels. Eye trackers are integrated into the cars to detect and intervene during driver fatigue. Facial expressions and device usage insights are used to interpret the users' emotional states. Recently, physiological interaction and sensing have been used as modalities for input and implicit methods to detect attention, proficiency, and cognitive competencies.

This special issue aims to bring together researchers from the scientific areas concerning physiological sensing, ubiquitous computing, and interpretation of physiological states using artificial intelligence. The combination of the three regions has become a relevant research field in the area of Human-Computer Interaction. Several scientific conferences, such as the Neuroadaptive Technology[1] or the Neuroergonomics[2] conferences, are concerned with collecting physiological signals to sense cognitive and physical states. The recently started Augmented Humans[3] conference entails a community involved with designing, implementing, and evaluating human-computer artifacts that react to the user's physical and cognitive conditions. The result is a growing community that is heavily involved in moving the field of physiological computing forward.

This special issue received four submissions, after which three papers were initially accepted. These papers were considered for publication in this special issue after another round of reviews. We are happy that we received a diverse set of topics in physiological computing, showing the versatility in which the field acts. The article provided by Fernandez et al. exemplifies how eye tracking is used to communicate and deliver contactless input with computers, showing how gaze-aware systems can pinpoint expected communication with their users. Faltaous et al. present how motor skills can be augmented using electrical muscle stimulation, allowing novices to learn new motor skills and extend their physical abilities. Finally, Karolus and Woźniak introduce how physiological computing is used to design proficiency-aware systems. Proficiency-aware systems consider the user's physical and cognitive competencies to dynamically change user interfaces to adapt to the user's skill set.

In summary, these articles capture various topics around explicit physiological interaction, human augmentation, and physiological-driven user interface design. We are confident that the selected papers are both compelling and inspirational for all readers who wish to dive deeper into the domain of physiological-centered Human-Computer Interaction.

Bionotes

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1 https://neuroadaptive.org/conference
2 https://www.neuroergonomicsconference.um.ifi.lmu.de
3 https://augmented-humans.org

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