

論文内容の要旨

Human-Engaged Computing (HEC) aims at creating synergized interaction between humans and computers to enhance human capabilities, emphasizing on human *softer* skills such as focus, mindfulness, and self-control. In this dissertation, we investigate *HEC* through the lens of *mindfulness* as it is a valuable salient human skill.

Mindfulness practices are well-known for their benefits to attention, mental health, mood, and well-being. Nevertheless, the practice of mindfulness is difficult in particular for novices and practitioners with insufficient attentional capabilities. Technological aids still meet the design challenges, e.g. biofeedback devices require dedicated accessories and mobile applications cannot support well attention regulation due to lack of feedback. This dissertation presents a theory-based overarching interactive framework - *Attention Regulation Framework (ARF)* for Mindfulness-based Mobile Applications (MBMAs). *ARF* presents (i) how to identify principles of mindfulness, (ii) how to detect user attention without the use of dedicated sensors, and (iii) how to design an appropriate closed-loop feedback. Following *ARF*, we developed two design cases for *still* and *movement* practices. Four studies were conducted to evaluate *ARF*. A further study was also conducted to understand the effect of human senses in interactive practices. Our main findings include: (i) Users could succeed to train mindfulness in both still and movement forms. (ii) In the still practice our design case has a unique advantage for practicing in a busy environment, while an existing application lacks the support. (iii) In the movement practice, our design case allows users to train in different postures according to their preferences. (iv) Users can achieve significant improvements on different aspects after short-term interventions with our design cases. (v) The effectiveness of human senses can be defined by their respective roles in maintaining the balance between relaxation and focus. Our work provides theoretical and practical implications for the future development of well-being technologies and MBMAs.