Mindfulness Interfaces

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A growing interest in HCI and interaction design towards developing technologies that support mindfulness, awareness, and self-regulation for health and wellbeing. While current systems mainly focus on relaxation and emotional awareness, there has been limited exploration of novel interfaces that support bodily awareness before, during, and after meditation. The current study aims to explore novel interfaces for mindfulness.

I. Introduction / Background

Mindfulness, defined by [11] as the intentional and non-judgmental awareness of present experiences, has proven to significantly benefit both physical health and mental well-being [1]. Various interventions have employed mindfulness training to help individuals cope with stress [10], chronic pain, depression, and addictions [5]. Such interventions aim to cultivate a specific quality of body awareness characterised by non-judgmental mindfulness. Mindfulness is defined as *"a quality of non-elaborative awareness to current experience and a quality of relating to one's experience with an orientation of curiosity, experiential openness, and acceptance"* [3]. Body awareness refers to an individual's ability to perceive and understand their bodily states, processes, and actions [14]. It is believed to originate from sensory signals within the body, such as awareness of body position and interoceptive cues (awareness of internal bodily sensations). Through body awareness, people can become conscious of specific physical sensations like their heartbeat or the function of their limbs [14].

II. Related work

Mindfulness practice offers significant emotional benefits [4] and physical health improvements [9], which has spurred growing interest in developing mindfulness technologies. Training to maintain present-moment attention [3] enhances this skill over time [12]. Various technologies have been explored to externalize and communicate real-time mindfulness states to users [17]. These technologies often incorporate brain-computer interfaces (BCIs) and provide feedback in forms such as binaural sounds [15], visual cues like colours used in mandala colouring [8], audio-visual feedback [16] and VR-based feedback [2]. There has been an increase in mobile apps supporting mindfulness, which predominantly focus on guided meditation sessions for sitting meditation. However, these apps often neglect the kinetic aspect of mindfulness that engages the body more effectively [6]. This is crucial as meditation is a mind-body practice, and HCI research highlights the rich sensory experiences that expert meditators are attuned to [7].

Beyond traditional audio-visual interfaces, wearable biosensors and actuators are being explored to better capture and communicate users' bodily experiences during meditation. For example, WarmMind [8] integrates BCI with thermal actuators, offering haptic feedback through warmth, which subtly helps users focus inwardly on their bodily states.

HCI research on mindfulness technologies has primarily focused on audio-visual interfaces. Recently, there has been growing interest in haptic modalities, which leverage bodily sensations during meditation, addressing both external senses and internal (interoceptive) ones.

III. Imagined or existing prototype sketches/drawings/photos

We aim to focus on developing interfaces that increase users' bodily awareness before, during and after meditations by providing visual feedback and validated scales from the literature such as the Mindful Attention and Awareness Scale (MAAS) [13]. These interfaces can be utilized as mobile apps or as smart gadgets that are built by using flexible materials.

IV. Responsible innovation

Considering the benefits of mindfulness, we believe that designing and developing such interfaces can enhance individuals' overall wellbeing and increase their awareness towards their bodily sensations.

V. Author bio(s) / experiences

Lala Guluzade - I hold both a bachelor's and a master's degree in product design and have over six years of experience in the field, working with design companies and startups. For the past three years, I have specialized in user interface design. Besides my PhD studies, for over 3 years I work as remotely, designing the interface for an AR-based inspection app which is mainly used by automotive companies such as Audi, BMW etc (https://supar.eu). I have skills in using design tools including Figma *(for UI design);* Rhinoceros *(for 3D modelling);* Keyshot, Adobe InDesign, Illustrator and Photoshop *(for rendering/visualisation)*. I am eager to attend this summer school to gain valuable experience that will support my PhD studies. The list of publications are:

- Guluzade L, Sas C. Functionality and User Reviews Analysis of Mobile Apps for Mindfulness Eating and Eating Disorders. InProceedings of the 2024 ACM Designing Interactive Systems Conference 2024 Jul 1 (pp. 1-22).
- Guluzade L, Sas C. Towards Heuristics for AI-Based Eating Disorder Apps. In CHI'2024 Workshop: Designing(with) AI for Wellbeing Workshop at CHI 2024 (pp. 1-11).

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- Guluzade L. and Sas C. 2023. Evaluation of Mindfulness Eating Apps. In 36th International BCS Human-Computer Interaction Conference. 1. https://bcshci2023.org/ British Human-Computer Interaction (BHCI), BHCI; Conference date: 28-08-2023 Through 29-08-2023.
- Guluzade L, Sas C. Mindful Eating: Apps Review. In CHI'2023 Workshop: Smell, Taste, and Temperature Interfaces 2023 (pp. 1-4).

VI. Acknowledgements

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