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Editorial: Perspectives in human-media interaction 2022

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Editorial on the Research Topic
Perspectives in human-media interaction 2022

1. Introduction

We are now in the third decade of the 21st Century, and, especially in the last years, the achievements made by scientists have been exceptional, leading to major advancements in the fast-growing field of Human-Media Interaction. This article collection is aimed at promoting a critical reflection on the research conducted so far, as well as the future perspectives on all aspects of human interaction with computers and related media.

This Research Topic has solicited perspective articles that describe the state of the art, outlining recent developments and major accomplishments that have been achieved and that need to occur to move the field forward. Authors have been encouraged to identify the greatest challenges in the sub-disciplines, and how to address those challenges. The goal of this special edition Research Topic is to shed light on the progress made in the past decade in the Human-Media Interaction field, and on its future challenges to provide a thorough overview of the field. This article collection is meant to inspire, inform, and provide direction and guidance to researchers in the field. Although not limited to perspective articles, original research and review papers were welcomed as well, we focussed on receiving articles that cover all aspects of human-media interaction. Therefore, topics of interest included but were not limited to human-computer interaction and interaction design, multi-modal and multisensory interaction, verbal and non-verbal behavior, affective and physiological computing, augmented and virtual reality, human-food interaction, embodied interaction, tangible interfaces and wearables, conversational agents, interaction in smart environments, and social media interaction.

Many of these topics were covered by the articles submitted to this Research Topic. In total, 20 articles were submitted, and 12 articles, including desk rejects, were rejected. In this editorial, we discuss the articles that were accepted. We can distinguish between original research, perspective, and review articles. Two "Original Research" articles, four "Perspective" articles, and two "Review" articles were accepted. We introduce and summarize these contributions in the next section. In section 3 we have some concluding remarks on these articles and how they fit in the development of human-media interaction research.

2. Contributions

In this section, we survey the accepted contributions to the Frontiers Research Topic "Perspectives in Human-Media Interaction 2022." They can be distinguished into original research, perspective, and review articles.

The Original Research article by Vi et al. presents their extremely original and solid research on measuring the sense of agency (SoC) in gustatory interfaces. Research on SoC is scarce. Choosing an unusual interface makes it possible to bring out SoA characteristics unhindered by preconceptions and compare them to what has become known previously, with visual and auditory interfaces. However, it should be clear that a gustatory interface is activated consciously, on the part of the user, with the tongue receptors and with the intake of food. Vision, hearing, touch, and smell are stimulated externally.

The Sense of Agency is the subjective experience of the user's interactions with the technology. Having taste as the output of a gustatory interface, do we have a sense of being in control while interacting with this interface? In this article, this sense of agency (SoC) is compared with SoCs of other modalities, in particular the auditory modality. More importantly, different sweet- and bitter-liker phenotypes are distinguished, and how these taste profiles help to qualify taste experiences and distinctions between taste and other multisensorial experiences. Ways to measure the SoC are discussed, in particular, the intentional binding paradigm (Haggard et al., 2002), and on-skin experiences. Experiments include the use of gustatory interfaces that deliver taste to a participant's mouth. In the conclusion, the authors mention that taste elicits the user's SoA in a way comparable to more traditional output, such as audio. Nevertheless, it remains useful to distinguish, in this case, between the various types of taste phenotypes and such a distinction might be useful for other types of user characteristics that have an impact on SoA.

In an Original Research article, Li investigates the differences between females perceiving same-gender (female) and heterogender (male) sex robots regarding adoption and intentions. One of her assumptions is that there is a lack of investigations into females' attitudes toward sex robots. Her study aims to better understand females' psychology and perceptions toward sex robots. The underlying theories in this study are the theory of planned behavior (TPB) (Ajzen, 1991) and the knowledge, attitude, and behavior (KAB) model (Evans and Durant, 1995).

Viewpoints and associated hypotheses concerning attitudes deal with feeling threatened by sex robots, seeing sex robots as products rather than being similar to sex workers in the prostitution industry, perceptions of advantages and disadvantages, and issues such as jealousy and infidelities in a relationship.

Responses to the author's Internet questionnaire were collected from 130 female subjects and analyzed. A distinction was made on, for example, age, education, and income, with a high proportion of young respondents (more than 72%). One of the general conclusions is that females are not intolerant of the development of sex robots, although there may be a negative attitude to the way sex robots are presented in society. More detailed results on the various hypotheses are discussed in the article. Sometimes the article is difficult to read, and the motivation for the hypotheses is not always clear, but the approach is original.

In a Perspective article, Pons et al. aim to present a narrative review concerning the application of extended reality (XR) for mental health scenarios. XR includes augmented reality (AR), mixed reality (MR), and virtual reality (VR). Examples from VR are shown, but without following a framework for reviewing such as PRISMA (Page et al., 2021). These examples show the use of VR technology for treating phobias and disorders such as ASD and ADHD. The authors make global observations of challenges, such as engagement, efficacy of treatment, personalized therapy, and democratizing mental health (XR) technology.

Observations and challenges are not yet translated to specific technical aspects of AR or VR or opportunities that are new to AR and VR. Rather, the authors mention current research approaches in AR and particularly VR such as multimodality (multisensorial), multiuser, serious games, and digital phenotyping. No distinction is made between opportunities for AR and VR although they represent different types of technologies, with different affordances and challenges (technical, usability, etc).

The Perspective article by Witter et al., is on bridging the sensory gap between deaf and hearing people. Rather than focusing on speech and hearing, the authors discuss other signals that deaf people rely on, commonly missed by hearing people, and vice versa. This sensory augmentation, the needed sensory augmentation technology, and the required research on usability and acceptance issues are discussed in detail. A sensory gap between deaf and hearing people exists. Innovative technologies have been developed and have been designed to support the lack of verbal communication. For example, audio signals captured by a microphone can be translated to tactile stimuli actuated by vibration motors placed on the skin. Human perceptual capabilities can be extended and translated.

In their article, usability and user acceptance issues with sensory augmentation technology are discussed. How to control environmental real-life conditions, social disturbances, and use context? The authors introduce a "situated design" approach and reflect on bridging the sensory gap in the communication between deaf and hearing by looking at real-life conditions and situated actions in everyday situations. In their research, they consider a museum environment where visitors have been exposed to sensory augmentation experiences.

In the Perspective article by van Erp, a distinction is made between implicit and explicit physiological measures. Examples of implicit measures are heart rate, brain activity, and skin conductance. In this article, the author introduces gastrointestinal tract-based implicit measures and explores their relation to emotion, cognition, and behavior. The assumption is that there is a relation between families of bacteria and emotional, cognitive, and behavioral processes. The author distinguishes four pathways between the gastrointestinal tract and the brain: efferent and afferent nerves, metabolism, neuro-endocrine signaling, and neuro-immune and inflammatory reactions. These pathways are discussed in detail.

Based on these pathways, classes of implicit measures are defined. It is concluded that the gastrointestinal tract is not yet

included in affective and human-media interaction research. The author mentions several topics that require further investigation. One of them is the lack of human studies in this area, another one is the lack of non-invasive tools. Three conclusions are mentioned: the exploration of gastrointestinal measurements is not yet well-understood and requires further research, it has added value, and it is complementary to more explicit measures that also focus on emotion, cognition, and behavior. How to move forward from this research on implicit measurements is another issue that is discussed.

In the Perspective article by Hespanol, the notion of human-computer intra-action is introduced to emphasize a shift to a relational approach to human-computer interaction. Rather than having an interface between humans and computers, there is a co-constitution that is defined through performative acts and sympoiesis, where the increasing ubiquity of digital media requires a design process that not just focuses on the interface, but that should focus on "relationalities": the relationships among the parties participating in a particular context. This involves the identification of synergies and antagonisms framing a technological solution.

The author distinguishes between low-level relationships, zooming in on the immediate vicinity of the interface, and high-level relationships, zooming out, exploring how the technological solution interacts with natural and societal ecosystems at large, including factors such as social responsibility and environmental sustainability. Spatiality (local or remote) and temporality (immediate or stretched in time) are additional factors that are taken into account in the (preliminary) intra-action design method that the author proposes.

The Review article by Hu et al., provides a review of the effect of self-discrepancy on online behavior and the impact of online behavior on self-discrepancy. The self-discrepancy theory was introduced in Higgins (1987). It distinguishes between the actual self, the ought self, and the ideal self. In this review article, we find reports about the collection (databases, search strategies, and selection) and characteristics of reviewed articles devoted to people's self-discrepancies associated with their online behavior. The research questions aim to provide answers to the following questions. How does the Internet affect people's self-discrepancy, and what kinds of online behavior are associated with self-discrepancy?

On the Internet, individuals can create a virtual self. It can be different from their real identity and the distance between their ideal and ought self can be smaller. An anonymous online environment may affect their self-discrepancy also because they can compare themselves to others. From the articles that are reviewed, the authors focus on the effect of self-discrepancy on an individual's behavior, such as impression management behavior, knowledge contribution behavior, commercial behavior, and avatar creation behavior. They identify various gaps in the existing studies: how people cope with discrepancies, the impact of expectations of others, problematic online behavior such as addiction, and the lack of longitudinal studies. It can be said, as mentioned by the authors, that their article "provides an empirical landscape of the research on self-discrepancy in the Internet era."

In a Review article by Chiotaki et al. the PRISMA review methodology (Page et al., 2021) is used to identify how the adaptive game-based learning (GBL) approach is applied in education. In this context, adaptiveness refers to the selection of teaching material and game-based activities suited to the needs of the learner. Research results in this field indicate that adaptive GBL leads to better performance, increased motivation, and more interest in the course material.

This article provides a systematic review of implementations of adaptive GBL. Search criteria, information sources, and selection criteria are made explicit and the remaining 15 studies are discussed in detail, distinguishing effectiveness and means of adaptivity. Personalization that involves presenting students with different game environments is mentioned as a future research direction. New generations of adaptive GBL technology should explore the possibilities to be based not merely on a pre-defined set of materials or a rigid game narrative.

3. Conclusions

In Nijholt (2014) we gave an overview of existing and new foreseeable research areas within human-media interaction. Understanding human activity (physical, cognitive, affective) using digital technology was a major theme there. The articles in this Research Topic also address other, no less important, themes. This also has to do with the ongoing ubiquity of digital technology and mobile computing. From the reviews of the various articles, it may be concluded that many of them address topics not yet embedded in the traditional human-computer interaction research field. Identification of such topics was one of the goals of this Research Topic. The authors should be thanked for their creativity and thoroughness in introducing and discussing these topics.

Author contributions

AN: Writing—original draft.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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