Virtual Reality for Health and Wellbeing

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ABSTRACT

Virtual Reality (VR) has become a mainstream opportunity to develop immersive environments where people are exposed to relevant stimuli in a systematic but safe way. Besides the controlled exposure to stimuli, VR systems enable a more efficient and unbiased gathering of information with practical applications in diagnosis, intervention, and health monitoring processes. Nonetheless, scientific literature has demonstrated that interacting with VR technology and its peripherals can be challenging, especially in populations less familiar with technology (e.g., older adults) or with clinical conditions that are not adequately accommodated by the technology, such as cognitive (e.g., dementia) or physical impairments (e.g., blindness). This workshop will focus on systems, technological approaches, and theoretical frameworks to develop user/patient-centred VR tools for diagnosis, intervention, and monitoring of health and wellbeing outcomes. Moreover, we welcome work focused on accessibility issues, aiming to promote equal access and opportunity to use VR tools by people with diverse abilities.

CCS CONCEPTS

• **Human-centered computing – Human computer interaction (HCI) – HCI design and evaluation methods**;

KEYWORDS

Virtual Reality, Healthcare, Accessibility, User-centred design, Opportunities, Challenges, Rehabilitation, Training, Diagnosis

1 INTRODUCTION

Virtual Reality (VR) has the potential to become a ubiquitous technology in healthcare. VR systems have been applied to a variety of contexts, such as the diagnosis of neurodegenerative disease [9], intervention in mental health disorders such as anxiety, phobias, post-traumatic stress disorder [6], depression, fatigue, and mood disorders [4], as well as the prevention and rehabilitation of cognitive [1] and motor impairments [5]. Among the advantages of using VR technology is the ability to create complex and ecologically valid virtual scenarios that otherwise would require more human and financial resources to create physical mockups.

From a clinical perspective, VR technology offers the opportunity to emulate reality [11] and measure response in the laboratory. Furthermore, the immersive experience of being physically present in the virtual environment has been shown to trigger the responses/behaviours that people would have in the real world [13], thus enabling the analysis of errors, difficulties, and disruptive behaviours. In other words, through VR, health professionals and researchers now have a golden window of opportunity to observe and study human behaviour in a more naturalistic, ecologically

valid, but controlled environment while keeping a precise record of people's responses [8]. In addition, combining VR with sensor technology to study people's physiological responses when exposed to specific stimuli presents an opportunity for more intelligent, user-tailored, and informative scenarios [12]. Moreover, the rich and novel experiences provided by VR technology represent a unique opportunity for users to come into contact with new contents and realities, learn how to perform new tasks (e.g., start playing a new sport), and have greater control over their health status, thus enhancing user interaction and empowerment [10].

Nonetheless, there is still a discrepancy between the intention/willingness to use VR systems and their daily use in healthcare [3]. One major limitation is the lack of controlled clinical trials that attest to the efficacy of such systems [2]. However, the lack of knowledge, familiarity, and perceived low self-efficacy to use VR systems identified in people and health professionals also contribute to the low implementation of such systems [3]. In addition, limitations associated with systems' usability, user experience, accessibility and ethical implications constitute other significant barriers to the clinical/medical adoption of VR systems [7]. In this workshop, we aim to further debate the implications and possible factors that might hamper the implementation of VR systems targeting health and wellbeing outcomes and the possible approaches and strategies to overcome such issues.

2 WORKSHOP GOALS

This workshop aims to promote the exchange of experiences, knowledge, and know-how on strategies to develop effective and accessible VR tools for diagnosis, intervention, rehabilitation, and monitoring of health and wellbeing. Its main goals are:

- Provide practical guidance for developing effective, usable, and accessible VR tools
- Understand the strengths and limitations of VR technology in healthcare
- Raise awareness and provide guidance to the design of technology that effectively takes into account patient needs, aligns with their values, and offers them benefits over more traditional approaches
- Understand the ethical, privacy, and access implications of VR technology in clinical populations
- Future scenarios and opportunities for the use of VR technology

3 WORKSHOP TOPICS

The workshop organizers' backgrounds are diverse and include experience in VR tools for cognitive and functional training and rehabilitation, games for health, serious games, human-computer interaction, accessibility, pervasive health, digital health technologies, physiological sensing, AI, and machine learning.

Possible topics for the workshop include:

- VR applications and tools
- Case studies of VR in healthcare
- Challenges and opportunities of VR in healthcare
- Longitudinal deployments and user studies in VR
- Interaction and sensing in healthcare
- Diagnosis and monitoring in VR

- Medical care and interventions in VR
- Cognitive and/or motor training and rehabilitation
- Contextual challenges of VR systems
- Human factors in VR
- Subjective presence/embodiment in VR
- Accessibility in VR
- Ethical implications in clinical research with VR
- Participatory design approaches to VR
- Position papers on the future of VR in healthcare

4 WORKSHOP SUBMISSION

The workshop organizing committee invites submission of original and empirical work (e.g., case studies, position papers or provocations) and demonstrations that describe VR tools relevant to the healthcare field.

A website was created to disseminate and publicize the workshop (https://techandpeople.github.io/vrhealth/.. Call for papers, important dates (i.e., deadlines), and the list of accepted papers with links to access the paper's full text will be available on the website. Furthermore, the workshop will be disseminated and publicized through mailing lists of different research communities, social media, and organizers' professional networks.

Submissions should use the ACMsigconftemplate and have a maximum of 4 pages, excluding references, and should be submitted via EasyChair. The deadline for paper submission is October 23rd, 2022. Authors of accepted papers will be notified on October 27th, 2022.

5 WORKSHOP FORMAT

The workshop organizing committee welcomes everyone who wishes to participate, even if they have not submitted a paper (subject to space availability; priority to authors). The workshop will take place on the 27th of November 2022 and will be a one-day event (9h00 – 17h00 GMT) at room 6.2.51, C6 building, at FaculdadedeCiênciasdaUniversidadedeLisboa,Portugal.

The workday will start with a lecture by a high-profile keynote speaker followed by a *speed-dating* session, where all workshop attendees will be invited to present their work in rotating one-to-one meetings. The second part of the workshop will consist of presentation sessions, where authors of accepted papers will give a short presentation, followed by a Q&A session. Presentations will be grouped according to research areas, and a panel of discussion will be gathered for each group of presentations. At the end of the workshop, we will conduct a town hall meeting to discuss and outline the major challenges, opportunities, and scenarios of the future of VR in healthcare and wellbeing. This discussion will be supported by a shared document where all participants will be invited to contribute. Based on the contributions gathered and the potential interest of participants, the results of the workshop can be published as a whitepaper or magazine article (e.g., ACM interactions).

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