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Editorial: User states in extended reality media experiences for entertainment games

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Editorial on the Research Topic

User states in extended reality media experiences for entertainment games

Introduction

Content for extended reality is an aesthetic experience combining a series of multifaceted media, which combined offers a unique experience to its users. Unlike traditional media, extended reality content allows users to interact and observe this content using a large variety of methods. Such interactivity leads to a series of opportunities and even questions as to how these virtual worlds are perceived, interacted with or how they influence the player themselves, both from a physiological and emotional perspective. This Research Topic tasked authors to submit their work exploring this especially daunting task, inviting multifaceted research including Research Topic such as affective computing, procedural content generation, game content orchestration, human computer interaction and human physiological reaction to the content.

One of the main difficulties when dealing with interactive content is the collection of data, classifying this data into an emotional recognition task and subsequently using this recognition to alter the game in some meaningful capacity. The first and second tasks can be a difficult due to the nature of extended reality media devices themselves, which are often active endeavours complicating the collection of physiological data, it can also decrease the effectiveness of traditional facial recognition methods due to the hardware that is being used (e.g., Head Mounted Devices, or HMD), and the heavy reliance on user annotations which itself can often be highly relative and conflicting among the population.

Thus, this Research Topic focused on several aspects of the latter Research Topic, by exploring the current technological trend in HMD technologies - i.e., eye-tracking devices and integrated EEG/EMG; and how this data could be used to model human affect.

Paper summaries

Real-time affect detection in virtual reality: a technique based on a three-dimensional model of affect and EEG signals

This paper by [Pinilla et al.](#) explores the classification of EEG signals through an HMD VR device. Given the immersive capabilities of VR, the authors used visual cinematic stimuli to collect a series of affective data and map the data using Cacioppo et al.'s three dimensional model of affect.

Instrumenting a virtual reality headset for at-home gamer experience monitoring and behavioural assessment

Despite the heavy research in the development of affective models, it is crucial that methods of gathering such data “keep up” as usability is an important aspect of the technology. [Moinnereau et al.](#), explore the Research Topic of integrating physiological EEG monitoring in VR HMD for the use of home-based experiences and how reliant such data collection methods can be in more “in the wild” settings.

Attenuation of the dynamic pupil light response during screen viewing for arousal assessment

The usage of pupil and gaze data can say a lot about how individuals play games, not to mention that it provides a very easy and non-intrusive method of data collection. This paper by [Fanourakis and Chanel](#) collected eye-tracking data of over 140 subjects while playing a first-person shooter. Results showcase that eye-tracking data allowed to unobtrusively monitor emotional arousal of users through the size of their pupil.

Effects of congruity on the state of user presence in virtual environments: results from a breaching experiment

The way content is presented and framed to users is a fundamental step when attempting to achieve concepts such as presence within virtual environments. Thus, when dealing with creating VR content that intends to enhance this effect it is

necessary to guarantee a certain consistency (or congruence) with how this content is framed towards the users, as breaking this “harmony” can easily destroy the illusion. To better understand these concepts [Cahill and Cummings](#) collected data of 138 users with the intent of understanding how disrupting three essential elements of presence (sensory, environmental and thematic) could potentially destroy the illusion.

Conclusion

Over the course of reviewing and observing the number of collected papers, we noted that authors still tend to focus heavily on the aspect of emotion detection and modelling with a large part of the work submitted exploring this particular field. Unsurprisingly, it is still a very difficult problem without a clear solution and thus heavily worked upon.

Given the breadth of the Research Topic some of the manuscripts clearly address some of the questions raised by this Research Topic. However, a large number of opportunities still exist within this particular field particularly in the content adaptation space. Thus, we believe that future work could potentially explore this gap further and understand the impact of adaptation through the lens of design.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

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