Virtual-reality monitoring : How to distinguish between real vs VR memories

Project IGR205

Supervisors

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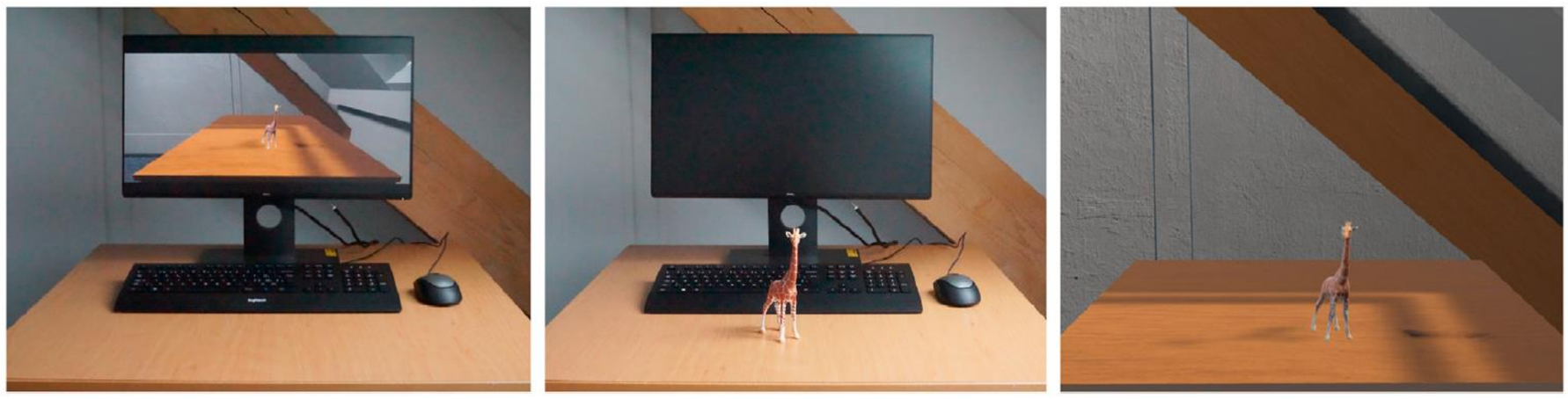

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Description

Virtual Reality (VR) technology is able to immerse a user inside a completely artificial environment and is starting to be widely used. However, VR can lead to the creation of false memories. Indeed, cognitive psychology showed that humans often confuse the source of their memories. For example, people sometimes confuse imagined events with real ones (a failure of “reality monitoring”) [1]. VR can amplify the effect of source confusion : the more VR technologies improve, the less there are cues to distinguish real and virtual events. Confusing memories of real and VR events is known as failure of “virtual-reality monitoring” [2] and can lead to the creation of false memories. A few “virtual-reality monitoring” studies exist [2, 3, 4], but there is still a lack of understanding on how to limit this source confusion.

Goal

The goal of this project is to propose a solution to limit confusion between memories of real and VR experiences. In a first step, each group will design and set up a simple experiment to monitor memory confusions between reality and VR, using Unity 3D. If they have enough time, they should run the experiment with 1 or 2 participants and interpret the results. In a second step, each group will design and implement a protection mechanism to limit source confusion, based on literature and their understanding of the phenomenon. For example, this protection mechanism could be an intentionally non-realistic rendering (e.g. wireframe rendering) or could be to add a “reality-check” to the VR experience (e.g. the spinning top from the movie Inception). Students are encouraged to try creative ideas. If they have enough time, they should run the experiment again to evaluate their solution. Each group is expected to meet once a week with their supervisor and discuss their ideas and the direction of the project. Each student will get an Oculus Quest to be able to develop individually.

Prerequisite

- Object Oriented Programming (e.g. Java, C++, C#)
- Basic understanding of Computer Graphics
- Basic understanding of Human-Computer Interaction (HCI) Methods
- (optional) First experiences working with 3D Game Engines (e.g. Unity3D, UnrealEngine)

Acquired skills

- Being able to apply a research driven design process for HCI projects.
- Being able to develop VR applications in Unity3D
- Being able to use the Oculus SDK
- Outstanding projects will have the option to contributing to a scientific publication at a top tier HCI Conference (e.g. ACM CHI, ACM UIST)

Sources:

[1] Marcia K. Johnson and Carol L. Raye. 1981. Reality monitoring. Psychological Review 88, 1 (1981), 67–85. https://doi.org/10.1037/0033-295X.88.1.67 Place: US Publisher: American Psychological Associa

[2] Hunter G. Hoffman, Azucena Garcia-Palacios, Ayanna K. Thomas, and Anne Schmidt. 2001. Virtual Reality Monitoring: Phenomenal Characteristics of Real, Virtual, and False Memories. CyberPsychology & Behavior 4, 5 (Oct. 2001), 565–572. https://doi.org/10.1089/109493101753232

[3] Ajoy S. Fernandes, Ranxiao Frances Wang, and Daniel J. Simons. 2015. Remembering the physical as virtual: source confusion and physical interaction in augmented reality. In Proceedings of the ACM SIGGRAPH Symposium on Applied Perception (SAP ’15). Association for Computing Machinery, New York, NY, USA, 127–130. https://doi.org/10.1145/2804408.2804

[4] Marius Rubo, Nadine Messerli, and Simone Munsch. 2021. The human source memory system struggles to distinguish virtual reality and reality. Computers in Human Behavior Reports 4 (Aug. 2021), 100111. https://doi.org/10.1016/j.chbr.2021.100111

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