Modeling, Design and Analysis of Augmented Reality Applications in Virtual Reality

Keywords

Virtual Reality, Augmented Reality, Human-Computer Interaction, Usability, User Experience

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Context

Current advances in Augmented Reality (AR) technology (e.g. Microsoft HoloLens, Magic Leap) is showing the potential of augmented reality applications in consumer grade applications. Envisioned applications range from entertaining, education, collaboration or industrial training. However, little is known on the application and user requirements in such novel and unexplored interaction context. This limits the systematic exploration of augmented reality design spaces and therefore poses challenges for devising new systems, applications and interfaces. Although, existing works has begun to address such issues by understanding some of the well-known limitations of augmented reality applications such as latency [1] or the realism of the virtual simulation [2], there is still the need of a comprehensive understanding of the AR interaction process.

The goal of this internship is twofold, first, analyze and categorize the different limiting factors that can hinder interaction in an augmented reality application by proposing a theoretical framework enabling the characterization of AR interfaces. Which are the key user and application requirements? Which ones can be overlooked? What is their impact on user interaction? Second, develop a proof-of-concept system allowing the evaluation of augmented reality interfaces in a virtual reality (VR) environment [3]. The evaluation of AR interfaces is complex as they are dependent on a wide range of critical systems (e.g. tracking). Using a VR environment can potentially ease this evaluation and enable a fine control of the simulation parameters [4].

The technical development will be done using existing Unity 3D tools developed by the Hybrid Team. The prototype will be tested with the VR/AR reality equipment available at the Hybrid team (HTC vive, Oculus Rift, HoloLens and the Immersia virtual reality (VR) room at Inria Rennes.

References

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