

A View from the Hill: Where Cross Reality Meets Virtual Worlds

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Figure 1: A user study of the Mirrorshades platform under way in St Salvator's chapel, St Andrews.

Abstract

We present the cross reality [Lifton 2007] system ‘Mirrorshades’, which enables a user to be present and aware of both a virtual reality environment and the real world at the same time. In so doing the challenge of the vacancy problem is addressed by lightening the cognitive load needed to switch between realities and to navigate the virtual environment. We present a case study in the context of a cultural heritage application wherein users are able to compare a reconstruction of an important 15th century chapel with its present day instantiation, whilst walking through them.

CR Categories: I.3.7 [Computer Graphics]: Three-Dimensional Graphics and Realism—Virtual reality;

Keywords: cross reality, head mounted display, indoor positioning

Links:

1 Introduction and Implementation

This research centers around the design, development and evaluation of a hardware and software platform which allows its user to observe and move around their Real World (RW) environment whilst wearing a wide field of view (FOV), stereoscopic 3D, Head Mounted Display (HMD) which allows them to alternatively view an immersive Virtual Reality (VR) environment from the equivalent vantage point. This is achieved by combining a head-tracked

HMD, webcams, an indoor positioning system (IPS) and a 3D game engine, into a mobile cross reality (XR) interface.

The novel aspect of this platform is the ability it imparts upon its user to transition between viewing equivalent vantage points in RW and VR environments. In order to achieve the highest quality of experience with this system, it is vital to determine how best to implement these transitions and as such multiple different transition styles have been implemented, including both those controlled by the user and those outwith their control.

2 Case Study - Cultural Heritage

Founded in 1450 but internally stripped of its medieval fittings during the Protestant Reformation (1517-1648), St Salvator’s chapel in St Andrews looks markedly different today than it did upon its completion. An existing VR reconstruction of the chapel as it stood in 1450 and the marked differences between the internal appearance of the VR building and the current building make it an ideal candidate within the context of cultural heritage for a mobile XR system to be applied.

3 Future Work

User studies are under way in St Salvator’s chapel to evaluate responses to the Mirrorshades platform in comparison to a traditional static VR experience and to assess reactions to and preferences toward different styles of transition between real and virtual environments.

References

- LIFTON, J. 2007. *Dual Reality: An Emerging Medium*. Ph.d dissertation, Massachusetts Institute of Technology, Department of Media Arts and Sciences.