EyeSee: Beyond Reality with Microsoft Hololens

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ABSTRACT

Head-mounted Augmented Reality (AR) devices allow overlaying digital information on the real world, where objects may be out of view. Visualizing these out-of-view objects is useful under certain scenarios. To address this, we developed EyeSee360[1] in our previous work. However, our implementation of EyeSee360 was limited to video-see-through devices. These devices suffer from a delayed looped camera image and are decreasing the human field-of-view. In this demo, we present our EyeSee360 transferred to optical-see-through Augmented Reality to overcome these limitations.

CCS CONCEPTS

• **Human-centered computing** → **Mixed / augmented reality**; **Information visualization**; *User studies*;

KEYWORDS

Head-mounted; augmented reality; out-of-view; off-screen; visualization techniques; peripheral awareness

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1 INTRODUCTION

Knowing the position of out-of-view objects is a problem in many different environments (e.g., ship docking [2] or gaming[1]). A solution for this problem is our visualization technique EyeSee360[1]. EyeSee360 is shown in the user's periphery and therefore, keeps the user's focus uncluttered. We evaluated EyeSee360 for a video-see-through device. However, video-see-through is decreasing the natural human field-of-view and is known for causing simulator sickness. Optical-see-through devices on the other hand, leave the human field-of-view unchanged and do not cause sickness.

[1] 3D game with out-of-view objects https://en.wikipedia.org/wiki/Eve:_Valkyrie

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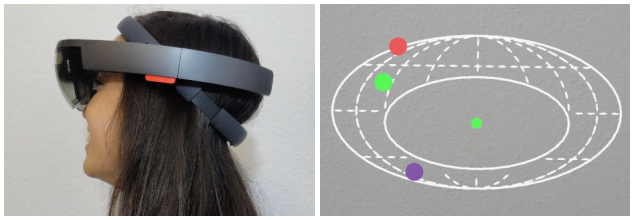

(a) Person wearing HoloLens **(b) EyeSee within Hololens**

Figure 1: Implementation of EyeSee360. *Best seen in color.*

2 IMPLEMENTATION

The inner ellipse of EyeSee360 is representing the user's field-of-view. Since the Hololens is an optical see-through-device the field-of-view is nearly the same as the human field-of-view. Our adaption of the inner ellipse can be seen in Figure 1. Further, we had to change the color of the ellipses and helplines from black to white because black is only poorly visible on optical-see-through devices. One of the constraints of the Hololens is the limited display, which only has a field-of-view with 30° in horizontal and 16° in vertical. Therefore, EyeSee360 can not be shown in the user's periphery.

3 DEMONSTRATION

For the demonstration at the conference we plan to show EyeSee360 on a Hololens device. We will create several virtual out-of-view objects placed in the environments. The audience will be allowed to test EyeSee360 by themselves through finding the virtual objects in the environment with the Hololens.

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REFERENCES

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[2] Marie-Christin Ostendorp, Jan Charles Lenk, and Andreas Lüdtke. 2015. Smart Glasses to Support Maritime Pilots in Harbor Maneuvers. *Procedia Manufacturing* 3 (2015), 2840 – 2847. https://doi.org/10.1016/j.promfg.2015.07.775