Live streaming real life images on VR for people with hemianopsia

Table of contents.

Abstract

Chapter 1.

Introduction

Proposal

Chapter 2. Analysis and Requirements

Functional Requirements.

Must Have

Should Have

Can Have

Wont Have

Software and Hardware Requirements

Head Mounted Display

Streaming

Chapter 4. UI design

Chapter 3. Implementation

UML architecture

Manu and navigation

Perimetry\_Reader.py

Relationshipt with Visual\_Remapper.py

Visual\_Remapper.py

SSH connection

Transformation

Projection

Chapter 4. Usability testing

Methodology

Pilot study

Conclusion

Chapter 1

Introduction

Hemianopia is a visual impairment usually caused by stroke, head trauma or tumours wherein half of of the peripheral vision is lost in both eyes. It is one of the most common visual impairments worldwide, one Harvard study estimates that hemianopsia accounts for one third of vision rehabilitation patients in the US. [1] And considering that ten percent people develop hemianopsia after a stroke, it is clear that Hemianopsia affects and will continue to affect a lot of people worldwide. People with hemianopia report difficulty watching television, using mobile devices, reading, and navigating physical environments.[1][2]

There have been many attempts to build tools to help hemianopia patients adapt. Some have proposed optical methods, for example X proposes the use of optical lenses that shift images in the centre of the visual field to the side of the eye. However, with the rise of head mounted displays over the last decade, there have been some efforts to create software based visual aids. A California State University study used Google glasses and machine learning software to find objects of interest in the patients blind area and project them where they can see them.[3] Solutions involving a projection of all the whole visual field are less common, this may be because AR devices like google glass are not well suited for projecting a whole visual field as VR HMD’s would be, and these in turn tend to be less portable and tend to have smaller screen sizes themselves. It may also be that researchers have been discouraged by the negative side effects of optical methods that did something similar. Nevertheless, it is worthwhile to test solutions that project all of the contents of an expanded visual field. I successful, a solution like this one can help patients with tasks for which repositioning specific objects may not be useful, such as reading, writing and interacting with PC’s and other screens.

*Third paragraph. Proposal. A brief description of what we are going to build.*

Proposal

To explore the utility of projecting an expanded field of vie on a high definition head mounted display for aiding hemianopia patients with the identified difficulties, my plan is to produce a program that collects, transforms and projects live video footage onto a head mounted display. To make the program usable, additional components will be created to measure dimensions of the visual field of a patient and to measure the size of the lenses of any immersive HMD.

The program will come with specifications for usability studies. A pilot study will be done with at least one test subject to test the potential for further research in this topic.

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[1] People with Hemianopia Report Difficulty with TV, Computer, Cinema Use, and Photography

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