ICVGoggles: Wearable Personalised Simulations of Impaired Colour Vision

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Mid-Term Progress Report

Project Overview

By having organised meetings with David Flatla every week, I have been able to progress with my honours project in manageable chunks with work being reviewed regularly. We have been having meetings since the start of semester one and I personally find this extremely useful as it acts as a motivator for me to work on the project. It took a week for me to decide the methodologies which will be used to gather user data. To be able to use participants, I had to submit an ethics application to the committee for approval. The submission is comprised of information sheets and questionnaires, the questions must be checked before it can pass the review. Since I was pushed to start my ethics as soon as possible, the hand-in was completed relatively quickly and so I was able to get started on developing the ICVGoggles source code. There has been slow progress as I am slowly learning the openframeworks library and how the Oculus Rift can be used within it. Currently my idea to get the system to work is to apply RGB pixel colour swaps to the images being fed through the rift, these transformations will provide an augmented reality and David Flatla provided me with a processing application with similar functionality. This means that the ICVGoggles should be able to provide a wide array of colour deficiencies, hopefully it can also provide personalised simulations however this is a feature to be done after basic functionality is complete.

Currently there are build errors due to missing and/or incompatible libraries; there is little support for the rift and openframeworks since this is such a young technology. This makes it difficult for me to diagnose issues from home, although I am able to speak to Benjamin Gorman, a PhD student who has previously used both the rift and openframeworks. Once these build errors are resolved, I will be able to apply pixel transformations to the incoming camera feed and have basic simulations up in no time.

Grade: A3-A1

I would hope to achieve an A if I am able to create a functional CVD simulation tool. I believe it is up to my interviews, data analysis and reports to bring me up to an A grade if done well.

Aims of the Project

The aim of the project is to provide a new platform for impaired colour vision simulations. Currently, web and graphics designers must use a tablet application to see the world in the eyes of a colour vision deficient person. The Oculus Rift is the hands free headset I will use and the ICVGoggles could become mobile with additional technology. Qualitative and quantitative data will be gathered and analysed to determine if the headset affects the intended users positively.

Literature Reviewed

“So That’s What You See!” Building Understanding with Personalized Simulations of Colour Vision Deficiency - David R Flatla and Carl Gutwin, 2012
The Worldwide Prevalence of Red-Green Colour Deficiency - Jennifer Birch, 2011

I am also being exposed to many different papers about colour vision deficiencies in the ECVD module at University. Not only that, but we are also able to engage in a discussion after each presentation.

Methodology :

I will be using interviews and questionnaires to gather qualitative feedback. I will be using Ishihara plates during user testing to gather quantitative feedback. After getting in contact with lecturers at DJCAD, emails were sent out to their students to ask them to take part in my honours project. I have received several emails already and have begun doing the recorded formative interviews, after the interviews are done, I ask the participants if they would like to do the tests when the headset is complete.

Intended Users

For my data gathering methods, I will be using graphics and web designers, as they are part of the intended users. However, this does not mean they are the only intended users. I believe the headset will prove useful for designers and may make their task of tailoring their work for CVD users slightly easier. I also believe the headset can be used as a learning experience for the general population. I imagine parents of children with a colour deficiency and their friends may find it extremely enlightening to truly understand what someone they know is living with.

Project Plan

I have been using Github to store the source code for the ICVGoggles as this enables me to contribute on different computers to one repository. During our weekly meetings, David asks me what I think I will have done for the next meeting. I try to give myself realistic goals.
After handing in this mid-term report, I will be focusing on the source code whilst conducting the pre-study interviews. Once the headset is able to do the basic functionality of simulating multiple types of CVD, I will conduct the user tests with the Ishihara plates to gather quantitative feedback.
The Gantt chart is in the appendix and shows my work plan for the rest of the semester. Hopefully the targets are realistic to ensure I do not fall behind and become demotivated, the meetings with David might change my project plan if we decide to prioritise another aspect of the project.