ICVGoggles: Wearable Personalised Simulations of Impaired Colour Vision

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**ABSTRACT**

It is becoming increasingly difficult to perceive all colours correctly in today's world; our usage of them can tie in closely with a specific meaning, signal or message, however they are mostly used for aesthetics. Designers must consider users with impaired colour vision, information can be misinterpreted or even missed because some colours cannot be distinguished. Current software and hardware solutions provide real time simulations of various spectrums of impaired colour vision. This project aims to go above and beyond current technologies to provide designers with adjustable simulations viewed with an Oculus Rift headset.

# INTRODUCTION

Most cases of Impaired Colour Vision (ICV) are hereditary meaning it is passed on genetically from parent to offspring. They can also occasionally be acquired as a result of certain eye diseases. Failing to discriminate between red and green is the most common form of ICV (Protanopia / Deutranopia) and the gene is X- linked recessive which explains the prevalence difference between genders (8% in males and 0.5% in females). Blue-yellow ICV or Tritanopia is rare and tritanomalous symptoms are more commonly acquired from environmental factors such as age, where the eye lens becomes more transparent over time, cataracts or trauma to the front or the back of the head. Monochromacy is even rarer, affecting around 1 in 100,000 people. Colour vision can be said to be an illusion created by the interactions of billions of neurons in our brain[[1]](#footnote-1), we do not all perceive colours the same way and empathy is inherently difficult to achieve because of this.

There are a plethora of applications available on many different platforms which can detect and manipulate pixels to simulate ICV. For example, it is possible to obtain a browser add-on for Google Chrome which simulates ICV for the current web page[[2]](#footnote-2). One flaw most software applications present when simulating ICV is the exclusion of environmental factors such as room brightness.

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# ACKNOWLEDGMENTS

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1. P.Gouras, 'Colour Vision', in webvision.med.utah.edu, last update 1 July, 2009 [↑](#footnote-ref-1)
2. Spectrum, offered by Yehor Lvivski for Google Chrome [↑](#footnote-ref-2)
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