Investigating an automated solution for colour blindness in video games.

ABSTRACT

Colour-blindness affects countless video game users, the impact of the information which is lost on these users, in some cases, can make the game unplayable. Furthermore, in the realm of ESports and professional gaming, lack of useful colour-blind solutions inhibits the effectiveness of colour-blind players and ruins the "fair play" of the professional setting. Understanding and knowledge of the effects of colour-blindness as well as resources available to game developers inhibits the effectiveness and existence of colour-blind solutions in games created across the game development spectrum.

This research project aims to investigate the current colour-blind solutions used in the video game industry, for the purpose of developing an automated colour-blind system for use in game engines, such as Unity and Unreal. To this extent we aim to propose the system as an effective solution for colour-blind individuals and increase the number of games on the market which accommodate the needs of colour-blind players.

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WHAT IS YOUR RESEARCH PROBLEM STATEMENT?

The purpose of this research is present an integrated colour-blind system within an existing game engine which effectively provides colour-blind solutions while keeping the integration into the game as minimal as possible for the game developer.

WHY YOUR RESEARCH IS IMPORTANT?

Video games are an interactive media which heavily rely on visual information to convey important data to the player. With 4.5% of the world population suffering from some form of colour-blindness, the games industry must account for in-game colour-blindness solutions in order to preserve the experience for these players.

However, in many cases;

- A game may not have any colour blind solutions.
- A game's colour-blind solution may be a filter which alters un-necessary components of the game, changing the experience.
- A game's colour-blind solution may not provide an effective result on a case by case basis.
- A game's colour-blind solution may involuntarily present different information than the game is presenting.

The emergence of ESports and professional gaming also possess the issues regarding integrity of fair play when colour-blind individuals compete in games with ineffective colour-blind solutions.

Our solution to these issues would, in practice, aid colour-blind players by providing an easy to use tool to developers as well as creating an effective and normalised, case-by-case colour-blind solution which does not change the intended game experience.

WHAT IS THE EXISTING RESEARCH LITERATURE IN THE AREA?

One research paper which directly co-insides with the aim of this research paper, "An adaptive fuzzy-based system to simulate, quantify and compensate color blindness." In this research literature, a software tool which uses fuzzy logic to analyse as well as compensate for colour blindness.

Another paper, Landini, G., & Perryer, G. (2009), investigates digitally enhancing images for red-green colour blind observes in the field of biology. This paper is particularly useful as it

provides a case in which accuracy and understanding are vital to the user of the proposed solution.

Furthermore researchers, 5. Navada BR, Venkata SK., investigated a mobile application which provided digital information to colour blind individuals in the real world. This research also focuses on provided raw information to those with colour blindness, leaving unnecessary information unchanged.

WHAT IS YOUR PROPOSED RESEARCH METHODOLOGY?

We will be using a Qualitative research method using existing research material and a participant study to confirm the effects of our solution. Additionally, we will be using qualitative research on existing games and programs to find existing solutions.

WHAT RESOURCES WILL YOU NEED TO CARRY OUT THE RESEARCH?

Internet and library access.

WILL YOU RESEARCH NEED APPROVAL FROM AN ETHICS COMMITTEE?

We will not require approval for this research paper.

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