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EE 368 Project Proposal
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Assisting Color Blind Viewers

Color blindness affects roughly ten percent of human males. It is possible for a woman to be color blind, however, because the main form of color blindness manifests as a defect in the X chromosome, most color blind individuals are men. Of those diagnosed with color blindness, over ninety-nine percent of them suffer from some sort of red-green deficiency, where they are unable to distinguish well between red and green.

The goal of this project is to design and implement an image processing algorithm to help red-green color blind individuals perceive color diversity in digital images.

Because color blindness almost always refers to a deficiency of color perception rather than an absence of it, one method of correcting images for the red-green color blind is to enhance the contrast between red and green pixels. Another approach is to map both red and green to different colors easily distinguished by a color blind person, essentially changing them until the viewer is able to perceive them.

I propose a combination of these approaches by converting an image into the HSV space and manipulating the hue, saturation and value of red and green pixels such that they are more easily distinguished by color blind viewers. This will require first developing a red-green color blind filter to both aid in the development of the corrective algorithm as well as test its results and ensure its effectiveness. Then an algorithm will be developed to choose pixels of interest, those that a color blind person may not be able to differentiate between. Finally, the algorithm will determine weights for each of the three HSV components and modify each pixel independently.

This project will not be built on an Android smartphone. It instead will be designed implemented and tested in Matlab.

References

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