Color Vision Project

Problem

In a typical classroom of 30 students, odds are that at least 2-3 have some form of color vision impairment or "color blindness". The impairment can interfere with peoples' abilities to recognize and differentiate between colors in the same way people with common color vision do. Many people have the condition but are unaware their vision is any different from others and are often undiagnosed.

Meanwhile, more and more of our lives involve use of digital screens. Apps, websites, scientific charts/figures, and other digital images often use combinations of colors that make understanding the content more difficult for people with color blindness. Even for those with full color vision, many graphics use combinations of colors that are hard to distinguish from each other.

We want to help improve digital charts and graphs so information represented by color can be understood by any person who sees it.

Innovation

Just over 100 years ago, Professor Ishihara at University of Tokyo developed a test to evaluate peoples' perception of color. This is referred to as the "Ishihara Test" that uses colored plates to help identify when people cannot perceive particular color combinations. There are now applications and **websites that approximate the Ishihara test** ↪ **(https://www.colorlitelens.com/ishihara-test)** and some designers have also tried to **design some tools and palettes that are "safe" for people with color blindness** ↪ **(https://davidmathlogic.com/colorblind)** .

However, there is still a lot of room for innovation to help.

You will choose to innovate one of the following **FOCUS AREAS**:

a. Analyzer: Provided a palette of colors, evaluate to what degree its color combinations are problematic for people with a particular form of color blindness
b. Optimizer: Provided a palette of colors, adjust the colors when necessary to optimize the percentage of people who will be able to easily detect the color differences
c. Designer: Provided a base color and a number of additional colors needed, generate a palette that incorporates a the base color with others without problematic color combinations

Human-Centered Design

We will work on projects in iterations where we:

1. Incrementally build tools to help address part of the problem
2. Periodically examine how the tools serve their purpose and how they can be improved
3. Adapt our plans to improve the tools and make them more useful

This is a process of incremental improvement that is followed in science, technology, and entrepreneurship.

Collaboration and Intellectual Integrity

Innovation is driven by creative and unique perspectives. Each person brings unique experiences and perspectives and will help everyone more innovative. This semester, we will work independently so each person builds a unique tool with a unique approach to the problem. You may discuss general approaches, but your work should reflect your own understanding of coding and your own unique approach.

If any part of your implementation is based on someone else's ideas or code:

1. You are responsible for understanding how it works
2. You need to give credit to the person by documenting in your project who/where you got the idea/code and which part(s) were derived from them
3. The overall project still needs to be unique and predominantly your own work
4. If you have any uncertainty about your situation, ask the professor for clarity and direction

Any violations of this policy will constitute a violation of the course Intellectual Integrity Policy (described in the syllabus)