

Software Engineering Project

A system to help a colour-blind person sense colour

SRS Document Outline

1. Introduction

1.1 Purpose:

- Create an application to assist individuals with color blindness in perceiving differences in color.
- Provide an effective and portable solution for managing color blindness.
- Integrate color blindness tests within the application for user convenience.
- Raise awareness about color blindness and its various types.

1.2 Intended Audience

- Color-blind individuals suffering from Deuteranomaly, Protanomaly, Protanopia, Deuteranopia, Tritanomaly, Tritanopia, or complete color blindness.
- Anyone interested in taking a color blindness test, experiencing color blindness simulation, and learning more about the condition.

1.3 Scope

- Develop an application to aid color-blind individuals in differentiating between colored objects.
- Raise awareness about color blindness through the application.

2. Overall Description

2.1 User Interfaces

- Mobile-based application with a user-friendly interface.
- Present a menu of functionalities upon app launch.
- Provide camera-based live/static color detection with clear color labels.
- Offer recommendations for similar colored objects for user reference.
- Include an information page with concise details supported by illustrations.
- Incorporate simple yet effective color filters to simulate color blindness for normal users.

2.2 System Interfaces

Mobile Device Interface:

- Interface with the mobile device's hardware components, including the camera, display, and input controls (e.g., touchscreen).
- Ensure compatibility with different device models, screen sizes, and resolutions.

Local Storage Interface:

- Interface with local storage on the device for caching app data, storing user preferences, and saving color blindness test results.

2.3 Constraints, Assumptions, and Dependencies

Constraints:

- Users must be proficient in English to understand color labels.
- Similar object recommendations limited to common colors.
- Internet connection may or may not be necessary.
- Compatibility limited to Android and iOS platforms (specific versions to be mentioned).

Assumptions:

- Users can comprehend the English language.

2.4 User Characteristics

- Identify different user personas and their potential use cases:
 - Color-blind users: Regularly utilize the app to differentiate between colored objects.
 - Color-blind users: Take color blindness tests to become aware of their condition.
 - Normal users: Test for color blindness.
 - Normal users: Explore color blindness simulation and learn about the condition.

3. System Features and Requirements

3.1 Functional Requirements

- Specify key functionalities, including:
 - Real-time color perception assistance through mobile camera.
 - Color-labeled image output from camera input.
 - Color blindness testing and type identification.
 - Color blindness simulation for normal users.

3.2 Use Cases

User Scenarios:

For Color-Blind Person Using Camera Color Detector and Color Segmentation:

Scenario 1: Real-time Color Perception Assistance

User: John, a person with Deuteranomaly, goes for grocery shopping.

Action: John opens the colorblind assistance app on his smartphone and selects the "Camera Color Detector" feature.

Outcome: John points his phone's camera towards fruits and easily identifies ripe bananas (yellow) from unripe ones (green) with the color labels provided by the app.

Scenario 2: Color Segmentation for Image

User: Sarah, who has Tritanopia, is browsing social media.

Action: Sarah comes across a photo and feels uncertain about the colors due to her color blindness.

Outcome: Sarah uploads the photo to the colorblind assistance app, selects the "Color Segmentation" feature, and receives a segmented image highlighting different colors, allowing her to discern the content more accurately.

For Non-Color Blind Person Trying Out the Color Blindness Simulator and Taking the Color Blindness Test:

Scenario 3: Exploring Color Blindness Simulation

User: Emily, a graphic designer without color blindness, wants to understand how her designs may appear to color-blind individuals.

Action: Emily opens the colorblind assistance app and selects the "Color Blindness Simulator" feature.

Outcome: Emily applies different color blindness filters to her design work within the app, gaining insights into how color-blind users might perceive her creations and making adjustments accordingly.

Scenario 4: Taking the Color Blindness Test

User: David, a teacher, wants to check if any of his students may have color blindness.

Action: David navigates to the colorblind assistance app and selects the "Color Blindness Test" feature.

Outcome: David administers the color blindness test to his students, who identify the numbers within the test images. One student, Sarah, struggles to see some of the numbers, prompting further evaluation and support.

3.3 External Interface Requirements

Camera Interface:

- The app should interface with the device's camera to capture live images for color detection and segmentation.
- Ensure compatibility with different camera models and configurations.

3.4 Logical Database Requirements

- Images used in the application, for example in the Learn More tab.