Real-Time Color Converter

This application is an aide for color-blind users. This application would perform real-time frame analysis and real-time color substitution for the user. The user first train the application on what color-to-color or color-to-pattern substitution should take place. Like an augmented reality application, the user view through this portal and when certain color appears, the app shows the remapped color/pattern to the user. For example, a user might be sensitive to the colors yellow and red and view them as brown. During training, the user can indicate to the application to map yellow as a "pattern A" and red as "pattern B". A pattern could shimmering lines, criss-crossed patterns, a darker shade of brown, etc. This allows the user to distinguish colors that are not distinguishable to the user.

Here's the usage scenario: A user trains the application one-time to allow the application to understand the "mapping" of the incoming colors and displayed colors and/or patterns. Once training is done, the application performs the following:

1. Decode incoming video stream into frames.
2. Process the image by identifying what areas to convert. The target colors are in bands and ranges.
    a. Substitute colors that are in our mapping.
3. The application should compensate for low lighting conditions (TBD).
4. Display the processed video. (An alternative is that original video is displayed and we just "augment" the requested mapped colors. TBD)
5. Ideally the app should not drop frames. However, the logic is to process existing frame and drop any intermediate incoming frames that are pending. This would allow slower phone to still use this application in a reasonable manner..

Tell us how you plan on bringing it to life.

This project is a concept stage. We have two part-time developers for this project. We plan to open source this project once it is done. We want finer design and code control for the initial release. This allows the team to learn and keep our own pace. However, we do want to share our frame-work and result with the users such that this application can be useful beyond this one single project.

The plan:

1. December-January. Iron out out all the screens and possible user interactions. Setup automated test such that we can use test-driven development for this project. Ensure we have proper unit

test framework for continuous integration. Want to have the design completed and reviewed. (Could use Google's help to review our design. For example, we want to optimize performance by only analyze areas that we predict to have data. For example, if frame #1 has a blob in one corner, and then frame #10 this blob has moved to a different color, it would be great if there was a way to interpolate the path so we can optimize speed. Could use some feedback and recommendations here.)

2. February-April. Code the application and tests. (Could use Google's help with reviewing the implemented solution.)
3. April. Evaluate and refine the product.

Having Google's AI logic in the application would help us on the following:

1. Leverage any Google augmented reality support.
2. Potentially be more efficient by processing a smaller area of the own frame (e.g. image tracking).
3. Potentially provide some type of geometric shape mapping for the overflow. For example, a bumpy object in real-life might be overlaid by a closely matching oval shape.

Tell us about you.

I have 20+ years of embedded software development experience for commercial consumer products. I have solely written a simple Android application for a class that I took a few years ago (https://youtu.be/u-eLm8dGd0E). I'm not a complete stranger to Android app development, but I only consider myself as an amatuer Android app developer.

Next steps.

- Be sure to include this cover letter in your GitHub repository
- Your GitHub repository should be tagged #AndroidDevChallenge
- Don't forget to include other items in your GitHub repository to help us evaluate your submission; you can include prior projects you've worked on, sample code you've already built for this project, or anything else you think could be helpful in evaluating your concept and your ability to build it
- **The final step is to fill out this form to officially submit your proposal.**


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