

Report Draft

Abstract

As part of the CMLS course, our team, LemonJUICE, is currently developing an innovative sound-mixing application known as ColorMixer. This groundbreaking system explores the intersection of auditory and visual experiences, allowing users to influence the mix of a song using color. Through an integration of an Arduino setup with a TCS34725 RGB Color Sensor, an LCD with RGB Backlight Display, the JUCE application, and Processing for visual representation, we are bringing a fresh approach to audio manipulation.

System Overview

The ColorMixer system is constructed with a central JUCE application that serves as the heart of the project. The Arduino, outfitted with a TCS34725 RGB Color Sensor and an LCD display, scans the color presented by the user. This color data is then relayed to the JUCE application via serial communication. Upon receiving the color information, our JUCE application processes it and adjusts the volumes of the individual tracks of the selected song accordingly. These resulting changes are visually represented in Processing, achieved by sending OSC (Open Sound Control) messages from JUCE to Processing. This offers a vibrant, dynamic visualization of the music that corresponds with the color input from the user.

User Interaction

We designed ColorMixer with a strong emphasis on user-friendliness, striving to provide a unique and intuitive experience. The primary user interaction is through presenting colors to the sensor, which then triggers an automatic alteration in the mix of the currently selected song based on the detected color. The scanned color also influences the backlight of the LCD display connected to the Arduino, establishing a coherent visual feedback mechanism. Moreover, we've built a streamlined JUCE GUI for users to play, pause, loop the current song, or switch to another song, ensuring effortless control over the audio output.

Color-to-Track Association

In our ColorMixer system, we have assigned eight distinct colors to represent different tracks of a song (like bass, vocals, drums, etc.). The specific colors corresponding to each track will be further refined as we continue the development process. The volume level of the associated track is determined by the proximity of the scanned color to these reference colors in the HSV color space.

Visual Representation in Processing

Processing plays a key role in our system by providing a real-time visual representation of the scanned color and its influence on the tracks. We represent the HSV color space as a circle, viewed from above. The reference colors for the tracks are depicted as dots on the surface of this circle, all at their brightest. The user's scanned color also appears as a dot, its position in the circle determined by the hue (H) and saturation (S) values of the color. The size and darkness of this dot—which corresponds to the 'V' value, indicating its depth in the HSV cylinder—show the user how their chosen color is interacting with the audio tracks.

Current Status

ColorMixer is still in the development stage, with us actively working on refining the project. As such, the application is not currently ready to be compiled without complete instructions. Nonetheless, we have made significant progress in integrating the components and creating a working prototype of this novel sound-color experience. Future updates will provide more details about system tests, project goals, challenges, and our planned next steps.