

Team :

- Lucky Konatham (lrk4)
- Alexander Kaplich (kaplich2)
- Rajeev Bommana (bommana2)

Problem :

Whenever a painter starts a new project they always begin by mixing their desired colors on their palette using some combination of red, blue, yellow and white. However, the painter will inevitably run out of paint, and then will need to mix the exact color that they had before. Speaking from experience this part of the process is very frustrating and time consuming, especially for artists that are bad at mixing colors. Rather than wasting time learning color theory, or buying the color you were using straight from the tube, we will save time and money by designing a machine that can determine the pigments required to mix any color using RGB sensors, and it will also mix it for you using a combination of primary colors so that you don't have to.

Solution :

The idea is pretty simple, the user of the device will "scan" the desired color by using a color sensor that detects the RGB values of a surface using red, green, blue and 'clear' photodiodes. The device will send the RGB values of the color to the onboard mcu which will do some simple calculations to convert the RGB value of the color to CMYK format using conversion formulas. This is the same principle behind color printers which create color images by mixing cyan, magenta, yellow, and black. The mcu will then communicate with 5 stepper drivers which are wired to 5 Stepper motors that will dispense the appropriate amount of white, cyan, magenta, yellow and black paint into a cup. The components will be powered by a non-rechargeable battery bank and the final result should be a paint cup with the color that was scanned before. Ideally the person using this tool never needs to actually do any mixing, they can just scan a color and apply it directly on the canvas/work surface.

Subsystem 1 (Color Classifier) :

Materials:

- HiLetgo TCS-34725 TCS34725 RGB Light Color Sensor Colour Recognition Module RGB Color Sensor with IR filter and White LED for Arduino
- STM32 Series MCU
- 4 x WWZMDiB A4988 Stepper Motor Drive
- Custom pcb for Microcontroller management
- Standard button
- 12 volt power supply (L6R24-120)

The Color Classifier subsystem will have all the logic for the design. It will have a pcb that contains input from a color sensor and a microcontroller to process the input from the color sensor. This will all happen when a button is pressed and a high signal is sent. The motor drivers are also placed on the PCB to interface with the microcontroller to receive the processed signals once the color is processed. We will use a 12 volt power supply in order to power this system. A voltage regulator circuit will be used in order to get the voltage to the 3 volts needed for the microcontroller.

Subsystem 2 (Paint Dispenser) :

- 4 x Low flow peristaltic pump 12V dc Kamoer NKP
- 4 x Nema 17 Stepper Motor Bipolar 2A 59Ncm(84oz.in) 48mm Body 4-lead
- Custom 3d printed casing for holding pumps
 - Printing at idea lab / material to be used: PLA
- Wires for connections
- 3d printed reservoirs for paint
- 12 volt power supply (same one as Color Classifier subsystem)
- Silicon tubing for peristaltic pump

The Paint Dispenser will receive signals from color classifiers in order to pump the correct materials. The motors will drive the peristaltic pumps to pump the paint from the paint reservoirs into a central location centered around the 3d printed pump holder. The artist can put their palette in this area and mix around their colors once every paint needed for that color is dispensed.

