AUTODESK Instructables

Mood Light That Matches Any Color You Tap on the Art

By Arpan Mondal in CraftArt
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Introduction: Mood Light That Matches Any Color You Tap on the Art

It's quite sad to see traditional art slowly fading into the background as AI-generated pieces, crafted by tools like DALL-E and diffusion models, become nearly indistinguishable from the finest artworks by talented artists. All it takes is a tiny prompt and about 10 seconds. As an artist myself, it's heartbreaking to see creative talent being valued less and less. However, I firmly believe that human creativity is limitless. We have the ability to dream up ideas that AI will only ever be able to catch up to, but never surpass. It's a bold statement, but I like to believe it to be true (I am telling this because I'm also a professional AI developer)

This project is a fusion of ancient artistic traditions and 20th-century innovation. Inspired by Picasso's cubism style, a revolutionary art movement from the **early 20th century**, it transforms historical aesthetics through modern technology by incorporating interactive moodlighting.

The painting itself is a modern take on Picasso-style cubist work, with five vibrant, distinct colours. Hidden behind the canvas are capacitive touch sensors, detecting which area of the painting is being

touched. The integrated RGB LED strip then dynamically shifts its colour to match the hue selected on the canvas. It's a beautiful blend of interactive mood lighting and fine art, all in one stunning creation.

The making of this piece of art was captured into a beautiful short film, which you can watch by playing the YouTube video above.

Supplies

Arduino Nano / SAMD21 microcontroller Purchase Link

WS2812B / WS2813 LED Strip Purchase Link

TTP223 Touch sensors (x5) Purchase Link

Watercolour paper

Poster colours

Any A4 sized IKEA picture frame Purchase Link

Step 1: The Artwork

First, we need the painting itself. You can either paint it yourself (which I highly recommend since it adds such a personal touch and makes it truly authentic) or get an existing artwork printed. I've attached a PDF with a bunch of beautiful artworks if you want to pick one and print it. Just a heads-up, those aren't my own creations. I've collected them from Pinterest and other places over time, so they're strictly for personal use, not for commercial use.

I decided to go the DIY route and make my own painting. I started with a rough sketch to get the basic idea down. Then, I added the five colours using poster paints (you can totally use more colours, but you'll need a touch sensor for each one!)

Finally, I did the line work with black poster paint.

Step 2: Solder the Touch Sensors

Next, we'll prepare the touch sensors with some soldering.

Follow these steps:

1. **Ground (GND) Connections:** Solder all the GND pads of your touch sensors (five, or the number corresponding to your colors) together. Use enough wire between each sensor to allow you to position them freely later.
2. **Power (VCC) Connections:** Similarly, solder all the VCC pads of the sensors together, again using sufficient wire lengths for flexibility.
3. **Signal (I/O) Connections:** Attach a single wire to the Signal (I/O) pin of *each* individual sensor. These wires will be connected to the microcontroller, so ensure they are of adequate length for easy placement.

Justway

Part of this project was sponsored by Justway.

Justway offers a comprehensive suite of solutions, including CNC machining, 3D printing, sheet metal fabrication, injection molding, and urethane casting, offering rapid prototyping and mass production solutions.

Here are the steps to get your project 3D printed by Justway's 3D printing service.

First, head over to Justway's 3D printing service and select 3D printing. You also have options like CNC machining, injection Molding and Urethane Casting. But for this project, we will use the 3D printing service.

Click on "upload your design". A new page will appear. Here, you need to click on "Select CAD files" and upload the STL file.

After that, select the Quantity, Material (I recommend PLA or ABS for this project). In the color section, you can either select white and paint it later, or select the color you like directly in the 3D print. This will save time later.

Finally, after selecting all the options, you can enter your email and submit the request to get a quote.

Step 3: Install the Touch Sensors

Now it's time to attach the touch sensors behind their corresponding colour sections in the painting. Using glue is not a good idea as it would add unwanted thickness between the paper and the sensor. For optimal touch detection through the paper, we need the sensor to be as flush as possible. I simply used cellophane tape to stick the sensors.

However, this approach has a limitation. The touch sensitive zone is restricted to the sensor's surface area. Ideally, I wanted the *entire* area of each colour to be responsive. I experimented with aluminium foil to expand the sensing region, but that unfortunately resulted in false triggers. As a compromise, I positioned each touch sensor at the centre of its respective coloured region. If you have any other ideas on how to make the whole coloured area touch sensitive, please share them in the comments – I'd love to hear your suggestions!

Step 4: Solder the Sensors and LEDs to the Microcontroller

Next, we'll solder the signal output (I/O) pin from each sensor to a corresponding GPIO pin on the microcontroller. I connected my sensors sequentially to GPIO pins 0 through 4 on the XIAO SAMD21.

An Arduino would work just as well. However, the XIAO conveniently offers additional Vin and GND pads on the underside, directly connected to the USB-C power input.

We can now solder the WS2813 LED strip to the Xiao. Disregard the white wire (B0). Solder the yellow wire (D0) to GPIO 6. It's crucial to connect this *only* to GPIO 6, as this specific pin is designed to handle the high-speed data transfer necessary for the LED strip.

Next, solder all GND wires from the sensors and the WS2813 to the GND pad on the underside of the Xiao. Similarly, connect all VCC wires from the sensors and WS2813 to the Vin pad, also on the underside. This eliminates the need for a separate power supply for the LED strip, allowing the entire system to be powered by a single USB-C cable plugged into the Xiao.

Step 5: Programming

Now, connect the Xiao to your PC using a USB-C cable and upload the code. Initially, identifying which sensor corresponds to which color might be challenging. To address this, I initially uploaded the code with a random assignment of colors to sensors. After testing out the sensors, I then adjusted the color assignments in the code to match the actual sensor connections.

The code itself is relatively straightforward. It begins by displaying a sequence of colors, positioned to align with the corresponding colors on the painting. When a sensor detects touch input, the LED strip illuminates with the color associated with that sensor.

Step 6: Final Assembly

Next, I framed the painting using a white IKEA picture frame.

I also constructed an enclosure to conceal the wiring and microcontroller behind the frame. This enclosure serves a dual purpose: it hides the electronics and creates space, allowing the light to reflect off the wall and diffuse around the back of the frame.

Finally, I secured the LED strip around the perimeter of the enclosure, behind the painting.

Step 7: And We're Done!

Finally, all that remains is to hang the painting in your desired location, maybe beside your bed, desk, or anywhere a mood light would be suitable. And enjoy the unique and satisfying experience of changing colours through this interactive method.

It's incredibly pleasing to simply tap a colour on the painting and see the mood light transform to match. It almost feels like having a superpower! I hope you'll build your own version and share your artwork, too!