Arduino RGB

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Abstract

RGB light are special lights, with only one LED which is capable of emitting red, green & blue with a single LED (Light Emitting Diode). Though there are such LEDs present in market which come pre-programmed. What we are talking about is making it more interactive and making it instantly programmable by swipping on android phone.

Keywords- LED, RGB, Rpi, OTG, TIP Transistor

I. INTRODUCTION

The term RGB stands for Red, Green and Blue. It is a combination of 3 colors which give us a million combination of lights. As every light has million frequencies which can be controlled by controlling voltage. For that we will be using Arduino, for the coding purpose to make it instantly programmable and making it more reliable for real time working. Though there are systems which are pre-programmed for light shows but here is the big difference we are making it programmable as per our requirements. We also will have a variety of usage for such systems which we will discuss further. As compared to systems present in market it is cheaper in cost and making.

Less efforts are also required to set this system. Easy to manage and less hardware required to make this system.

II. LITERATURE REVIEW

Light is a necessity of nights for obvious reasons, the sun is not present to enlighten the world so we have light bulbs and various other sources of lights. It's not only for simple process like providing us light but also for various purposes like light shows, emitting specific frequency for growing plants and making a house lights more interactive. To set up such system capable of doing such abilities we need a few components like 1) Bread board 2) a tip transistor 121 npn diode 3) connecting wires 4) an Arduino uno board 5) an external power source of 12V.

Arduino Uno is not capable of giving an output power of 12V so we will need a 12V power source. Thought there are some systems present but they are not cost efficient and working is complex and most of all they require high maintenance.

III. PROPOSED SOLUTION

The main objective of this research is to provide people a better alternative for people trying to set this type of system for various purposes. The cost of RGB LED strip is around INR50 and a TIP transistor costs up to INR20 and the most important an Arduino Uno INR500. Using any board will do the same like Rpi, but there are hidden costs associated with Rpi so I would suggest you to choose Intel's Arduino Uno.

IV. IMPLEMENTATION & CONNECTION

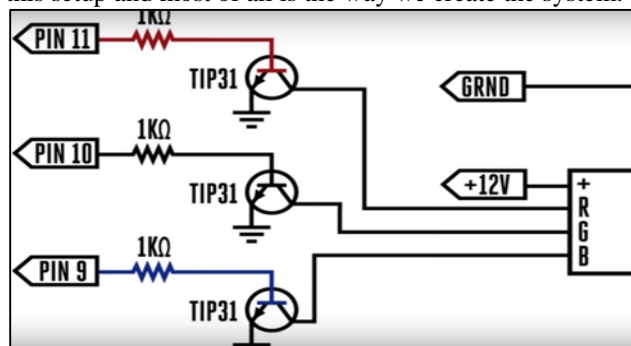The components are necessary for this setup and most of all is the way we create the system.

Fig. 1: connection schematics of connection

Using a RGB strip also gives up the advantage as the strip could be cut down as per our requirement.
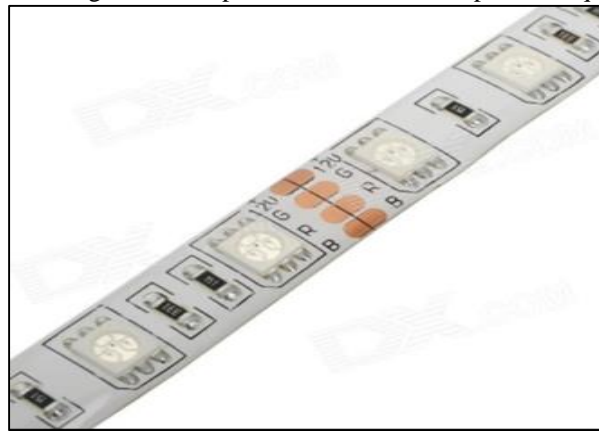

Fig. 2: Image of RGB strip

The setup is easy, connect each of `the color to breadboard and the base of each transistor to each of the mentioned pin number of the board here mentioned as 9, 10 & 11. With help of a 1 KOhm resistor so that the base of the transistor is not fried, after this connect collector of each transistor with the RGB light colors, different collector of different transistor for different color, like one collector of one transistor for red and like this for others as well. Provide the 12V power supply for powering the Led strip. After the connection is set, here comes the part of coding the Arduino for making doing the important part of limiting the voltage on the strip, for doing that we need Arduino IDE for programming it. The simplest algorithm like limiting the power as it is initialize as ([0][0][0]) for power source. You also need an android app for providing the input to Arduino. Now for final step all you need is OTG (on the go cable). The OTG cable serves two purposes for this system. 1) For directly giving inputs to the Arduino board from your smart phone. 2) Providing power to Arduino board. If you're good with programming and IOT you can add a Bluetooth module you can also add it to the Arduino so that the range of system increases .The OTG system is also not supported in every phone and the phone.
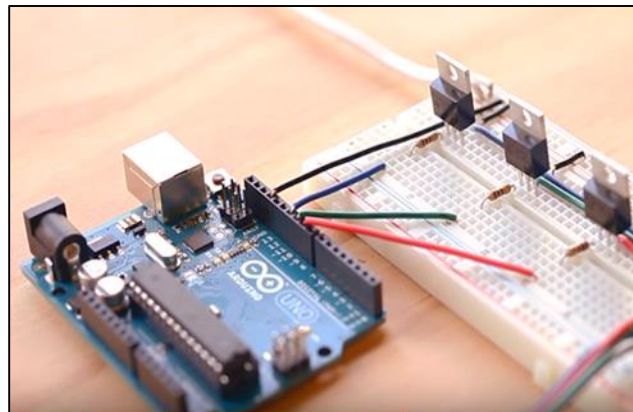

Fig. 3: Image of TIP connection with arduino

Fig. 4: OTG connection with arduino

Might get damaged. It might even explode, so beware check before implementing OTG system, so using HC-05 or transceiver module for embedded system with TTL outputs.
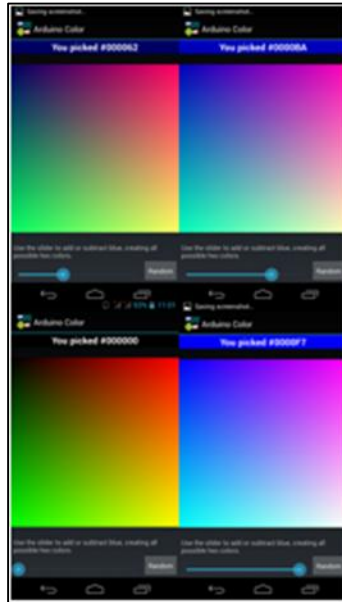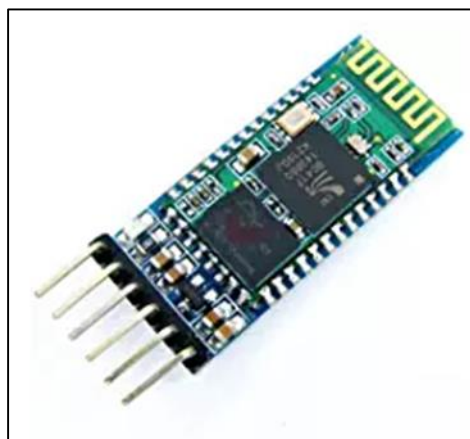

Fig. 5: Image of Android app

Fig. 6: HC-05 Bluetooth module

V. PERFORMANCE

Performance is a subject to 3 main parts for setting up a new system, those important aspects being resources needed, cost, and portability.

1) Resources Needed

The resources are more as compared to pre-programed LED strip, but it's worth the resources which are used in making this, but as compared to real time systems which are not preprogrammed.

2) Cost

Cost is very less as compared to various other systems, the main cost is for the Arduino board which is around INR500- INR1000. The rest are very cheap components.

3) Portability

The portability of the device is up to the range of Bluetooth module (10-50 meters) only if you use the Bluetooth module, if you choose OTG oriented system the range is very less.

VI. CONCLUSION

In this research paper we have discussed about making such systems which are capable making different frequencies of light, and about these systems working, and cost required for making these systems. We have also studied about how such systems are different from the other systems present in market. This systems is also easily accessible for various purposes (one I will discuss

in future scope). Making and development of this system is a quite easy process and its usage are limitless. Using this system for decoration of hotels, in Diwali lightings etc.

VII. FUTURE SCOPE

In a research carried on plants and their habilitation it was found that plants absorb specific type of light for their growth. There are such systems present which emit white light even at night so that plants have continuous access to light source for their growth. In an experiment it was found that a perfect mixture of LED lights such as red, blue & white can help grow specific plants. Different color combinations for different plants. Every light has its important in this system. The use of red LED light to power photosynthesis. The blue light has its important as counter balancing the effects of red light. The amount of blue light required or optimal for different species is an ongoing question. Blue light has a variety of important photomorphogenic roles in plants, including stomatal control (Schwartz and Zeiger, 1984), which affects water relations and CO2 exchange. Lastly comes the use of white light for making it more energetic, as white light is a mixture of 7 lights. Thought light from sun seems to be white but it's actually a little yellow. And if this specific lights are used for long time they might also effect the plants genetically. You can also control their time of flowering, and fruiting. Many previous studies indicate that even with blue light added to red LEDs, plant growth is still better under white light. Certainly to humans, plants grown under red plus blue light appear purplish gray. To make things go easy we can use the system we mentioned above it will come handy and it will be easy to set up and use.

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