

Online Traffic Light Control System

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Abstract: This project is very useful for this modern world. The best way of controlling the Traffic light system through IOT. This project is a prototype with two traffic light system. There are many platforms which provides a bridge between the user and the device. Here this device use the best and simple IOT platform "Thingspeak". In this generation, there are many way of controlling the traffic light system like traffic density calculator. It is waste of time standing idle even at the night time when there is no heavy traffic. This project will be useful for the Traffic Authority to control the particular signals via online from anywhere. The main component is Raspberry Pi 3 and Webpage prototype. This device is designed in such a way to avoid accidental switches. It is possible to control more number of traffic lights with upgradation in python and HTML coding.

Keywords: Online Traffic Light Control System, IOT based Traffic signals, Cloud controlled signals, Traffic signals control prototype.

1. Introduction

This device helps this developing city for a better control of traffic signals. The main requirements are Raspberry Pi 3, and any IOT platform. This device uses Thingspeak IOT platform because of the flexibility. This prototype is designed for two-way traffic system. Even it is suitable for four-way traffic system and it is easily accessible from any traffic authority base station. The thingspeak platform requires a less data usage in comparison with any other platforms. The program is done in python format and designed in such a way to avoid any disaster by unexpected switching. The program handles such situation and provide a best way of traffic system. The circuit connection is also simple one. The need to use the advanced Raspberry Pi board is because of the inbuilt hardware such as WIFI, Bluetooth. The Pi 3 is secured and also free to change or modify the program in future. The heavy traffic lights cannot be connected directly to the board. So, it requires an amplifying circuit or relay circuit. This RPi3 can be connected to the public network or any private network. The graphical view of Raspberry Pi3 is show below.



Figure 1: Raspberry Pi3

The device works on Ubuntu OS and the board accepts Python coding for controlling GPIO pins. There are two ways of requesting library files for accessing the internet. One is by installing the Thingspeak library and another is calling the built in URLLIB3 or URLLIB2. Here this device is designed with relay rather than using amplifying circuits. Pictorial view of 5V relay is show below.



Figure 2: 5V Relay component

2. Circuit connection and execution

After installing the basic necessary files to the board, feed the program into the board and save the file in the format of .py extension. Before execution, connect the circuit as per the circuit diagram shown. If any short circuit happens, the GPIO pins' fuse gets damaged and the board becomes useless so be careful in connection. Check for the proper library file installation too. This board gives maximum supply of 5V volt from the GPIO pins so use the 5V relay. The prototype designed for the coding test was successful and this requires the relay component for real time implementation. The circuit diagram is a prototype

(i.e.) connection without the relay channel. Refer the below circuit diagram for circuit connection.

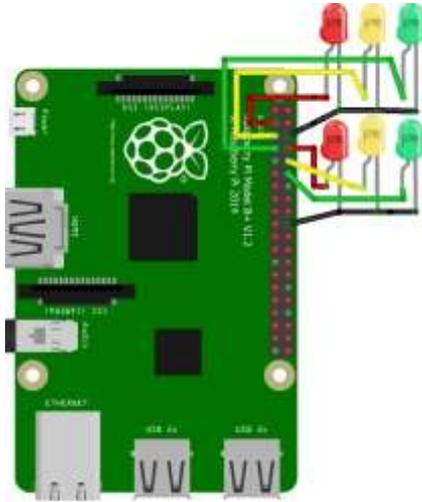


Figure 3 : Cicut connection

In this prototype, the circuit is designed with two traffic signals. These connections are given according to the **BOARD** not **BCM**. Check the API keys and channel ID. The website is constructed using HTML codings and if a button is clicked, it executes the URL code along with the passing parameter values. When the values reach the thingspeak server it checks for the channel id and API key then send the values to the Raspberry Pi board via Internet it checks for the same values. In this python coding, **if...else..** condition is used and not the switch case. The conditions are written by using the command **elif**. The connection can be established either via Ethernet cable or WIFI (Wireless Fidelity). Later, four traffic signals can be introduced in the circuit by modifying the website and python coding. It becomes quite complex when four signals are added. The website designed for this protocol is not published in online. The website for two traffic signal is designed and the example shown is an simple one.

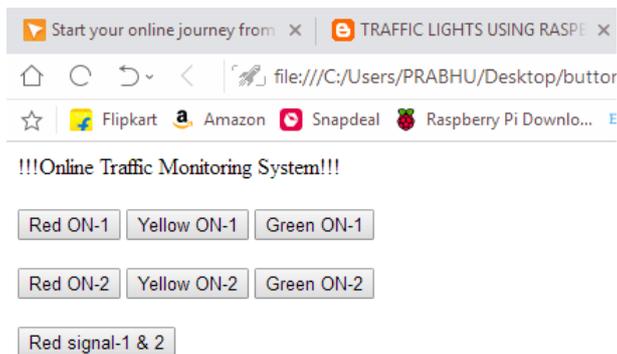
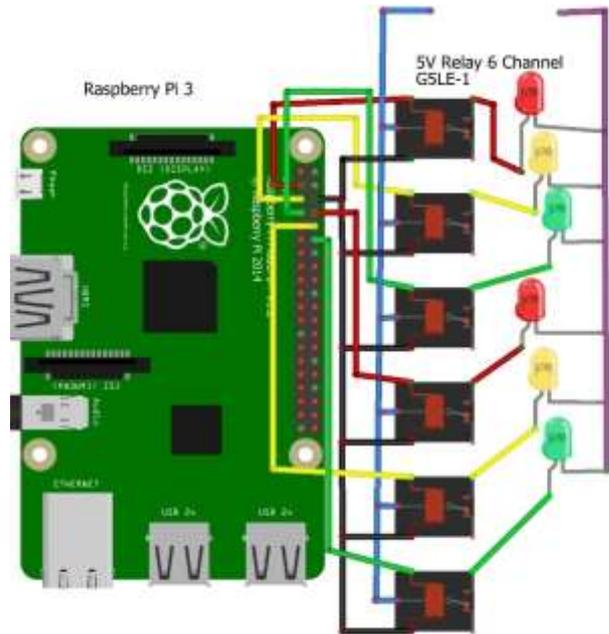


Figure 4: HTML page

The above image shows a simple HTML page and it also works properly. The device must be connected with uninterrupted connection both for network and power supply. When both the HTML and the cicuit is ready for connection execute the program the command.

Sudo python filename.py

The circuit connection along with the relay channel is shown below for a reference when it is implemented in real



time.

Figure 4: Real time Application design

The board is fed with codings that it can turn ON both the signals to red light in case of emergency. There will be no countdown so the public must be aware of the timings between the signal light change.

3. Benefits

There are many advantages in this new way of controlling signals and some are listed below.

- Quick response
- New way of controlling the signals.
- Saves time by avoiding standing idle even at night time.
- Easily controlled in case of emergency.
- Accesible only by the traffic authority after implementation.

4. Conclusion

Later, in this circuit, it is planned to add the sound detector to identify the tresspass of an Ambulance so the circuit can automatically arrange a way for the ambulance. And also it is planned to add the pedestrian density calculator at zebra crossing for allocating a time to allow the

pedestrian to cross the road. The website will be modified with good background image and also an authentication mode. So, no public can access this. These can be brought in real time if this methodology is accepted for controlling the signals.

5. Reference

1. Traffic light control by RPi 3

<http://4tronix.co.uk/blog/?p=219>

2. Thingspeak library

<http://www.iotleague.com/d-i-y-how-to-upload-your-raspberry-pi-sensor-data-to-thingspeak-website/>

3. Relay channel

<http://www.instructables.com/id/8-Channel-Relay-interface-board/>