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IOT Based Red Light Crossing Monitoring Over Android Mobile App

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ABSTRACT: The project is a prototype and software developed on android which will inform users about the status of traffic signal whether it is green or red and for how much time will it be. The traffic density which will be mentioned in the application will be static and on the basis of traffic density there will be some time displayed in the routes so that user can chose which path will be best for him/her to reach the destination based upon the traffic density and timing of traffic light in routes which he will be showed.
We have chosen microcontroller to make our prototype since it is the best way to display the traffic signals. And we have selected android platform to show our results since it is the most widely used technology nowadays to make day to day work easy for the public and almost 205 million people are using android smartphones which will help them reach their destination on time.
Our idea is a very eccentric idea which has not been implemented till date in our country. We have developed a very small prototype to execute our thought with a very limited number of funds due to which we had to compromise in our features which we have included in our android application. While there are furtherance that we can do in our application which can be done if we get proper funding and approval from government of India for the execution of such an eccentric idea which will prove helpful for people to reach their destination on time.

Keywords: Internet of Things (IOT), WiFi Module, Universal Asynchronous Receiver/Transmitter (UART),Serial Communication, Bridge Rectifier.

1. INTRODUCTION

This project is developed to monitor red-light crossing in real time to avoid traffic congestion and long time taken path. Android app is developed which shows the redlight timing counter over phone.
This Project is based on latest technology Internet of thing (IOT). Any system or hardware device can be controlled and monitored using internet with the help of IOT platform. User can simply use any website to control & check device status over internet. With help of Ethernet card a unique IP address is assigned to hardware device and microcontroller within the device can host a webpage to give access to device. We have used Wi-Fi-based IOT module.
The system has following advantages:
Any body can check real-time status of red lights using android phone, Shortest or minimal time taking path can be find out. Also, Traffic congestion can be detected using app.
Android app is developed using Android studio.

2. LITERATURE REVIEW

We know that there are a lot of applications that help us in navigation from one place to another which has been developed in common a common platform called Android. Nowadays android is a perfect platform to make our day to day work easy, by using these applications we can reach our destination faster and in a much easy way which helps us save time.

Nowadays ideas are been implemented in real-life but with high security. Each and every application has its security issues and if they overcome it they succeed. So with a good funding and a great security measures an application can be developed to help people.

In our country the traffic on roads during office hours or any other day can be avoided by the applications that have been developed. But these all applications doesn't show one simple information that is traffic light information for how much time will it be green or red. This is a very helpful information if we are travelling in city to avoid traffic jams and will help people reach their destination in less time.

The purpose of traffic signals are to give instructions to users , to give priority to a particular direction at different times of the day and through synchronization, allow large volumes of traffic to pass through the network with minimal delay.

Even Delhi Traffic Police had introduced an application where information of traffics are displayed. They even have the option to complaint about traffic lights which are not working. But they don't have the option of traffic light information displays on the routes where the user is travelling.

A successful application based on android can be developed to show the information of traffic-signal just in one touch which can help people to avoid traffic jams and reach destination in less-time.

The objective of the project is to monitor Traffic-light status in real time to avoid traffic congestion and long routes. Android app is developed which shows the Traffic-light timing counter over phone and the status of traffic signal whether it is red or green.

This Project is based on latest technology Internet of thing (IOT). IOT uses Ethernet module to connect any device with web. User can simply use any website to control & check device status over internet. With help of Ethernet card a unique IP address is assigned to hardware device and microcontroller within the device can host a webpage to give access to device. We have used Wi-Fi-based IOT Ethernet module.

3. FLOW CHART

The project is divided two modules hardware and software. The hardware module is distributed in following way:

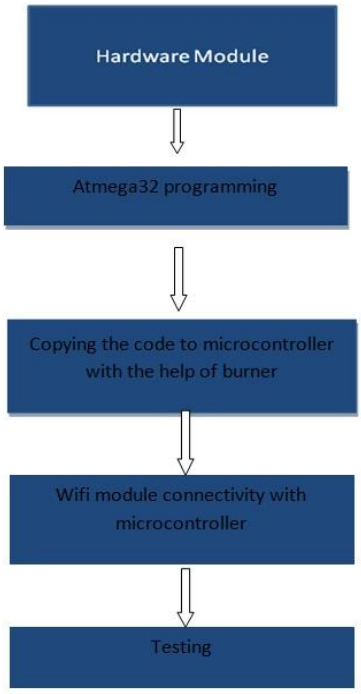

Figure. 1 Hardware Module flow

4. BLOCK DIAGRAM

The Internet of Things is a system of consistent computing devices, mechanical and digital machines that are provided with exceptional identifiers and the ability to convey data over a network without requiring human-to-human or human-to-computer communication. In this project we have used ESP8660 Wifi module.
The android application is connected to the IOT module and the information is transferred from microcontroller to application with the help of Wifi Module.

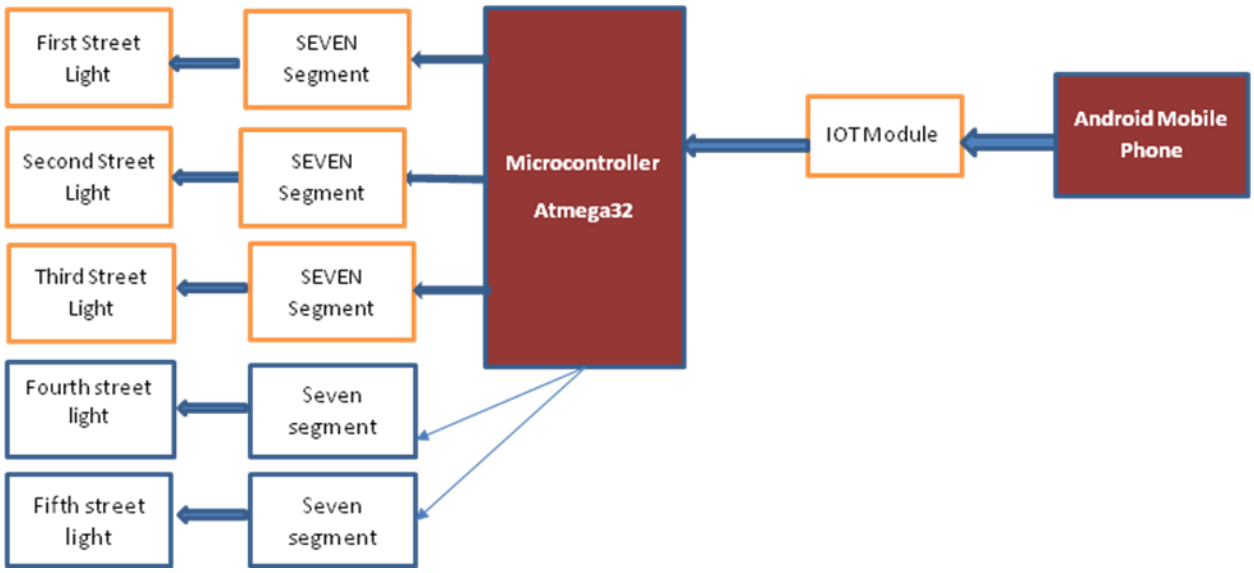

Figure. 2 Block representation of project

5. CIRCUITRY

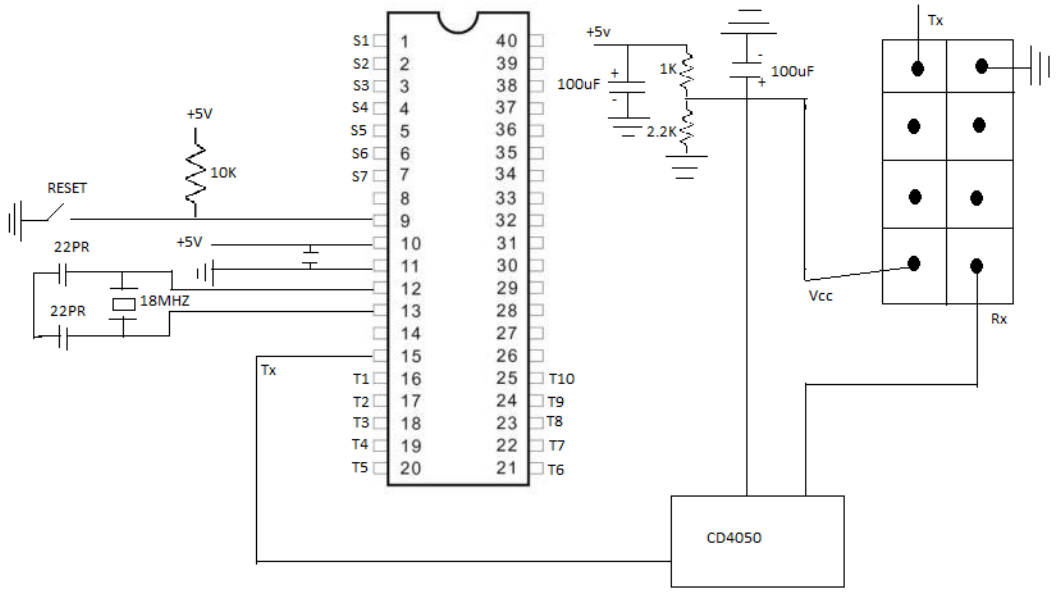

Figure 3: Circuit Diagram 1

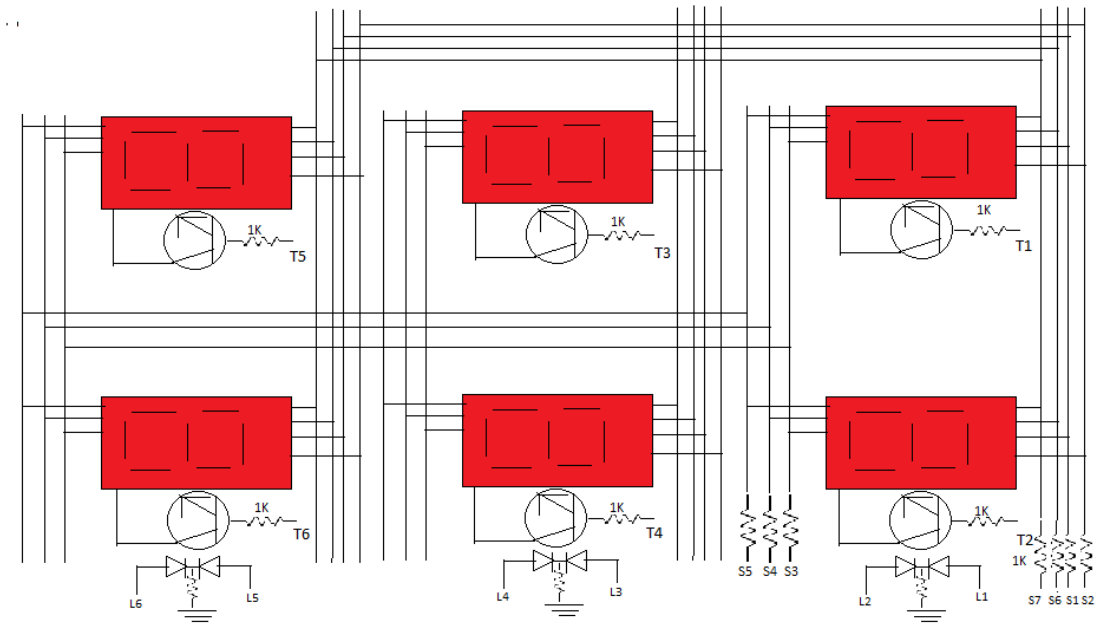

Figure 4: Circuit Diagram 2

In our project we are using serial communication for the transfer of data between two devices. Serial interfaces transfer their data, one single bit at a time. These interfaces can operate on as little as one wire, usually never more than four. There is transistor switching taking place due to which our 7 segment are displaying numbers in a delay of 3ms in such a way that our human eye doesn't not notice the delay and it appears like the numbers are switching continuously.

6. FUTURE PROSPECTS

- The system can also be related to a database to keep track of the traffic information which will be helpful for security issues, pedestrian traffic management and air traffic control.
- Time can be saved when we move to one place to another.
- Image processing is a beneficial technique to control the current status of the traffic light.
- Determine the movement of vehicles on road by images.
- Extension of the green light if heavy movement of vehicle is present.
- Information sent to the traffic light to go red if the road is empty.

7. CONCLUSION

This system which we have developed is developed in a low budget. This will help people who are navigating in the city to avoid traffic jams and long traffic signals. This will for sure prove to be a better application if implemented in real life. The wifi module which we have used helps us in getting information without any delay. The system can be successfully implemented since the cities are turning into wifi city.

As per now, we are testing all the technologies needed in this project and right now we lack a good graphic user interface and GPS. In the near future, we will come up with an interactive, user-friendly and easy in navigation. For this we have to do some study and research i.e for choosing colors, layout, font colors etc. Further development of a user friendly GUI, testing it on test users and finally publish the application on the Android market.

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