

# **Density Based Traffic Signal System**

## **Using Microcontroller**

### **Introduction**

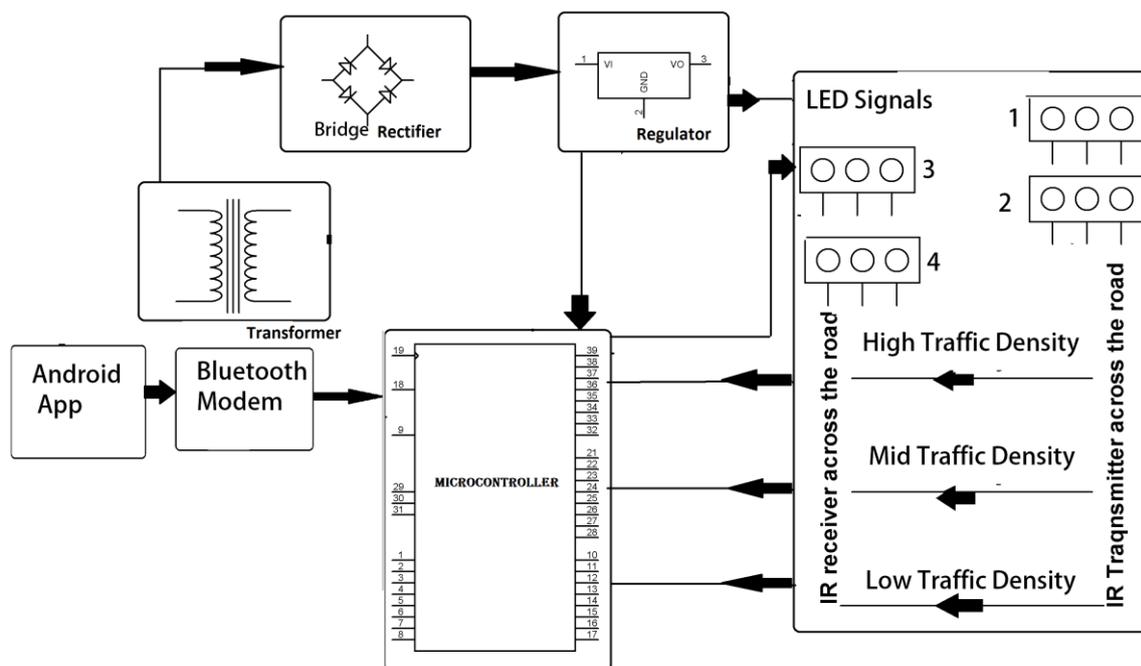
The project is designed to develop a density based dynamic traffic signal system having remote override facilities. During normal time the signal timing changes automatically on sensing the traffic density at the junction but in the event of any emergency vehicle like ambulance, fire brigade etc requiring priority are built in with Android application device remote control to override the set timing by providing instantaneous green signal in the desired direction while blocking the other lanes by red signal for some time. Traffic congestion is a severe problem in many major cities across the world thus it is felt imperative to provide such facilities to important vehicles.

Conventional traffic light system is based on fixed time concept allotted to each side of the junction which cannot be varied as per varying traffic density. Junction timings allotted are fixed. Sometimes higher traffic density at one side of the junction demands longer green time as compared to standard allotted time. The proposed system using a microcontroller duly interfaced with sensors, changes the junction timing automatically to accommodate movement of vehicles smoothly avoiding unnecessary waiting time at the junction. The sensors used in this project are IR and photodiodes are in line of sight configuration across the roads to detect the density at the traffic signal. The density of the vehicles is measured in three zones i.e., low, medium, high based on which timings are allotted

accordingly. The override feature is activated by an on board Bluetooth device from the Android application device operated from the emergency vehicle. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation.

Further the project can be enhanced by synchronizing all the traffic junctions in the city by establishing a network among them. The network can be wired or wireless. This synchronization will greatly help in reducing traffic congestion.

## Block Diagram



## Component

- **Hardware Specifications**
- Microcontroller
- Crystal Oscillator

- Resistors
  - Capacitors
  - Transistors
  - Cables and Connectors
  - Diodes
  - PCB and Breadboards
  - LED
  - Transformer/Adapter
  - Push Buttons
  - Switch
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- IC
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- IC Sockets
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- **Software Specifications**
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- Keil  $\mu$ Vision IDE
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- MC Programming Language: C

## **Conclusion**

The density based traffic control system has been designed, constructed and tested to ensure validation of its function and operations. In this research, we have succeeded in minimizing the traffic congestions created by the fixed time based traffic light

system. The system is effective and the cost of production is very low. Future work is recommended in order to produce the device on a large scale and deploy to all roads in order to reduce traffic congestion in places like Lagos where traffic congestion has become a big issue.