

## AUTOMATIC TRAFFIC CONTROL SYSTEM

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### ABSTRACT

Nowadays traffic signal controllers are mostly based on microprocessor and microcontroller. These TSC have some drawbacks because it uses the hardware which works according to programme that does not have flexibility. In present traffic control system, fixed time interval is provided for the signals independent of traffic density. Due to this waiting time for vehicles is more so it is not efficient as vehicles consumes more fuel and at the same time causes air pollution. We exploit the emergence of new technique called as "Intelligent traffic light controller". This makes the use of Sensor Networks along with Embedded Technology. The timings of traffic signals at each crossing of road will be intelligently decided based on the traffic density on all adjacent roads. Also we have provided manual control to signals to use it at the time of emergency and failure of automatic control. So overall design of the system helps to reduce traffic congestion on road which yields to have efficient control of traffic. As we have provided manual control, we can control traffic as per necessity. So due to these advantages we go for automatic traffic control system.

**KEYWORDS:** IR Sensor, Arduino Uno, Arduino Mega, Traffic signals, Road

### INTRODUCTION

The rapid growth in the vehicle ownership is one of the measures for economic growth of country. However indirect effect of vehicle ownership is acute traffic congestion. The exploitation of new trends and technologies requires fast transportation of goods, machinery and manpower for various reasons. The goal of each one is to reach at destination without wasting time and money. But resources provided by current infrastructures are limited. So the Traffic management at road is crucial to reduce waiting and traveling times, save fuel and money. Even though present traffic control system can control traffic but many time it causes accidents, traffic jam due to its limitations. For example if we need to travel fifty kilometres distance to reach desired destination via some cities and on the way we need to pass some intersections where the density of traffic is high and traffic is controlled of present traffic control system which uses pre-set timers. As a result we waste our valuable time, money and this leads to air pollution. The expansion of roads is not economical and practical solution for this. So we need to design some advance technique to reduce these problems. Traffic signals are used to control the vehicles. In the recent years, the need of transportation has gain immense importance for logistics as well as for common human this has given rise to the number of vehicles on the road. Due to this reason, traffic jams and road accidents are a common sight in any busy city. Traffic Signals provide an easy, cheap, automatic and justified solution to the road points where the vehicles

may turn to other directions e.g. culverts, busy walk through etc. This project uses a LED light as an indicator and controller for changing signal after a specific time interval. The proposed system also provides the map feature, which shows the traffic situation of requested traffic signal.

Dynamic time interval:

The present traffic light control system provides fixed time interval for red and green light. This causes unnecessary waiting time. As the design of proposed system provides dynamic traffic light intersection that will minimize the waiting time of vehicles and also manage the traffic load at the intersection adaptively. This maximizes average number of vehicles passing through each intersection.

A steady increase in metro-city population, the number of automobiles and cars increases rapidly and metro traffic is growing crowded which leads to the traffic jam problem. This proposed system will have effective role to avoid the traffic jam. Under ordinary conditions, traffic signals control mainly has defect when the traffic road waits until the green light, time setting is almost same and fixed.

### WORKING PRINCIPLE

We have designed this project for controlling the traffic of four roads. For this we have used three IR sensors for each road. These IR sensors are directly connected to the input ports of the arduino mega which is used as main controller of the project.

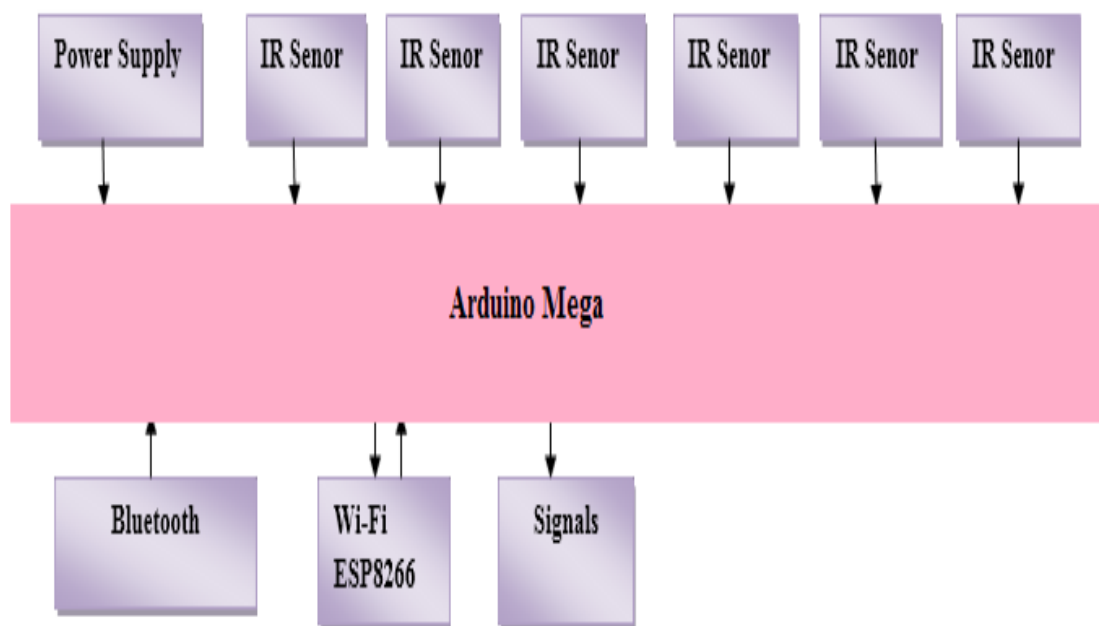


Figure no.1 .block diagram

In addition to arduino mega, we have included arduino UNO as auxiliary controller to control traffic lights manually in case of any emergency, for example to give clearance to ambulance or fire brigade. To have connectivity between the two controllers, we have used Bluetooth module. In addition to this, we have also used Wi-Fi module ESP8266 to have communication with server. We can get status of traffic through server and can control the signal by sending command; in addition to this we have connected the LCD (16\*2) to know the status in control room.

### OPERATION

When vehicles on particular road are more than other roads IR sensors beside the road detect the density of vehicles and gives input signal to the arduino mega. When controller gets signal from IR sensors, it will change the normal time setting of traffic lights and gives more delay to green signal of that particular road according to density. It will repeat the same procedure again and again and control signals accordingly.



Fig. Typical view of traffic system

By using auxiliary controller we can control signals manually in case of any emergency or failure of automatic control system.

Emergency vehicle management:

The priority has been given to emergency vehicle like ambulance, Fire Brigade by glowing red lights to all roads except from the road where emergency vehicle is passing. With the help of IR sensors we are going to take vehicle count as input to system. According to vehicle count, we are decided the time ranges for all signals.

### COMPONENT USED

The block diagram consists of following main parts. These are

1. Arduino Uno board.
2. Arduino Mega board
3. WIFI ESP8266 module.
4. Bluetooth HC-05 module.
5. IR sensor.
6. LCD 16x2.
7. Voltage Regulator IC 7805.
8. Resister.
9. Capacitor.
10. Switch.
11. Power supply.
12. Android App.

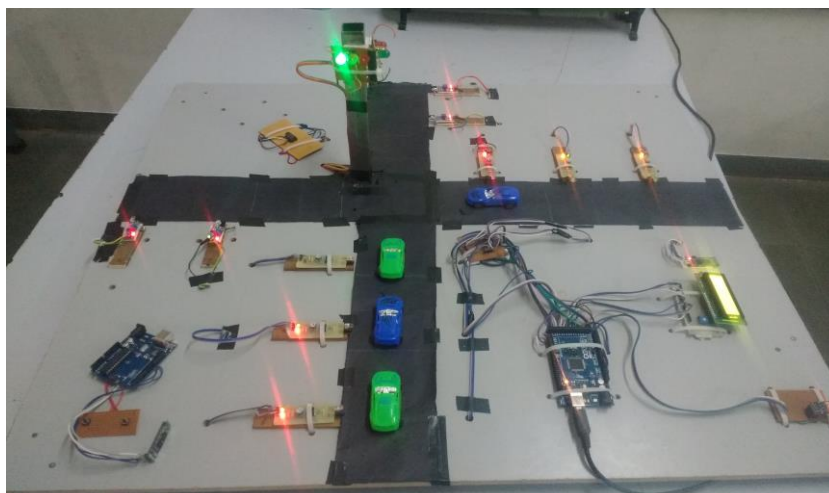


Photo no.1. Hardware

## CONCLUSION AND ANALYSIS

This project is designed to have intelligent traffic control in which we can have automatic control of traffic signal along with manual control. This paper may help in future to minimize problem related to traffic and to have efficient traffic control system. The system is very efficient and economical as it uses simple arduino mega and arduino Uno along with IR sensors.

## RESULT

We got clearance on the road as per the density of vehicles as well as provide manual clearance in emergency situation like ambulance, fire brigade etc.

## FUTURE SCOPE

We can upgrade this system to control the signal at different places in coordinated manner to have smooth control of traffic within city where traffic is high.

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