

# IOT Based Traffic System By Vehicle Number Plate Identification & Traffic Monitoring

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**Abstract**— Traffic signal management is one of major issues in current situations. The concept of project is to detect vehicle registration number plate and save this registration number to system and also by using IR sensors detect traffic density. IOT based traffic system by vehicle number plate identification & traffic monitoring is being developed as a solution for traffic system. Those vehicles who violets stop signal at that time sensor mounted on zebra crossing will be detect vehicle after that vehicle image will be captured by using high clarity camera. After that by using Raspberry Pi vehicle registration number is stored in database. Also we provide SMS to alert monitoring person whenever any vehicle breaks traffic signal. In normal conditions, every signal are getting 60 seconds of timing on the road at a regular interval, even when traffic on that particular road is dense. In this project the timing interval of the traffic signal purely depends on the number of vehicles on that particular roadside.

**Keyword**a— IOT, Vehicle number plate, Raspberry Pi, IR Sensor, Camera.

## 1 INTRODUCTION

This project is proposed to implement vehicle number plate detection and recognition by capturing image of those who violets vehicle rules on traffic signal and also by using IR sensors it detects traffic density on that particular road. In recent years, this technology of number plate recognition has increased popularity in security, traffic control and monitoring applications. Technically, the technology is sounding research topic because enormous discoveries of computers and sophisticated high resolution infrared cameras. This make easier for image processing techniques more applicable analysing and extracting important features for plate numbers detection and recognitions.

Traffic monitoring system can be used in parking, number plates are used to calculate duration of the parking. when a vehicle enters an input gate, number plate is automatically recognized and stored in database. when a vehicle later exits a parking area through an output gate, number plate is recognized again and paired with the first one stored in the database. the difference in time is used to calculate the parking fee. traffic monitoring system by registration number plate identification can be used in access control. for example, this technology is used in many companies to grant access only to vehicles of authorized personal.

Managing traffic signal timing is one if the key thing in the urban areas. Managing to time on the road will decrease the waiting time of the drivers on the road, and that will help to reduce the fuel consumption. In traffic density monitoring we are going to use IR Sensors. IR sensor is also called as an Infra-Red spectrum. IR sensors have 2 parts in it, one is the transmitter and second is a receiver. The transmitter is used to transmit the light and receiver keeps on receiving the light. When the receiver does not receive the light transmitted by the transmitter it is said that the object is there in between transmitter and receiver.

## 2 PROPOSED SYSTEM

All cities are facing traffic congestion issues are daily basis. Everybody is in hurry. They are violating traffic rules. It is difficult to identify the traffic violators. There is no automation system & IOT based system is available in current situations. We need IOT based traffic system to monitor traffic in particular road and vehicle number plate identification. We need laser sensor to detect those vehicles who breaks traffic signal. After that camera captures vehicle image in high clarity. Image is stored in database through Raspberry Pi. By using that image traffic police can punish that vehicle owner. We need of IoT to utilize in the traffic signal monitoring systems and to control it in an advanced controlling system. Any system is designed to act smartly with higher control features for all four side way traffic systems. Every road towards heavy traffics of vehicles in higher counts. We need to define the priority level of traffic in our system on the basis on which least or highest priority. every road lane needs IR sensor to monitor and capture data of vehicles in that lane. In this proposed system depends on the more no of vehicles from the road lane IR data we are allocating higher time rate for that signal. If traffic is less in all lanes then system runs in normal conditions. In this system is easy to find path for ambulance in emergency conditions.

- Block Diagram:-

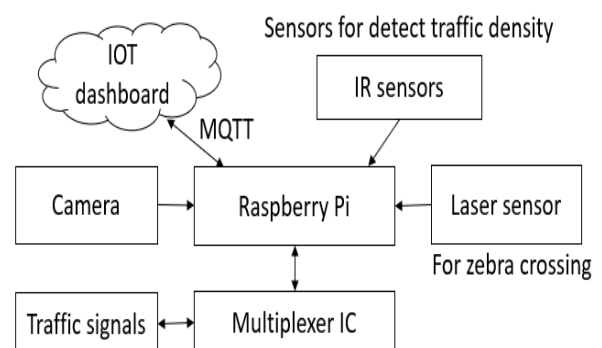


Figure 1. System Architecture

The main working of the project is, when the signal is red then all vehicle are stop before the zebra crossing. And our project sensor system will be activated. Then the laser sensor light falls to the LDR sensor. If any vehicle are cut that the signal then that can be trigger to raspberry pi and camera will be taken image of this vehicle. Then this image is saved in SD card which is installed in raspberry pi. The authority person can access this database through IOT dashboard. By vehicle number plate image this person can identify vehicle and then he could punish vehicle owner for violating traffic rule.

The another working of the project is, traffic density monitoring. IR sensors have 2 parts in it, one is the transmitter and second is a receiver. The transmitter is used to transmit the light and receiver keeps on receiving the light. When the receiver does not receive the light transmitted by the transmitter it is said that the object is there in between transmitter and receiver. IR sensors are placed in each path of road. We defined different priority levels of traffic. Normally traffic signal time is 60 seconds. If IR sensor detects high rush of traffic then this condition goes to raspberry pi. Raspberry pi will send this signal to particular traffic signal of that path which has high rush of traffic. Then signal changes its state red light to green light and increase some time of that signal. This system depends on the more no of vehicles from the road lane IR data we are allocating higher time rate for that signal. If traffic is less in all lanes then system runs in normal conditions.

In emergency conditions if any ambulance comes and that time if traffic is more then that particular path signal turns into green signal form red signal.

### 3 PROBLEM STATEMENT

This project is proposed to implement automatic registration number plate detection and recognition by capturing the images of vehicles violating the traffic rules, typically vehicles halting at red signal on a cross road or jumping the signal. From captured images, registration number plate should be extracted. Further, text on the registration number plate should be recognized by character recognition techniques and registration number to be identified should be stored. Traffic density and time management for signal is challenging part.

#### 3.1 OBJECTIVE

- The main objective of this project is IOT based traffic system by vehicle number plate identification and traffic management.
- The system should detect vehicle which breaks traffic signal then trigger camera to capture image.
- Captured image should store in database through Raspberry Pi.

- From variety of registration number plates the system is proposed to detect registration number plates with black lettering on white background and black lettering on yellow background.
- System should be able to generate SMS to the traffic monitor person.
- IR sensors should detect vehicles defined in priority levels.
- In emergency conditions signal should be changed in green light.

## 4 RESULT

Whenever number of vehicle exceeds broking signal the captured image is converted into grey scale image, where it undergoes dilation and edge detection ,and later is stored in database.

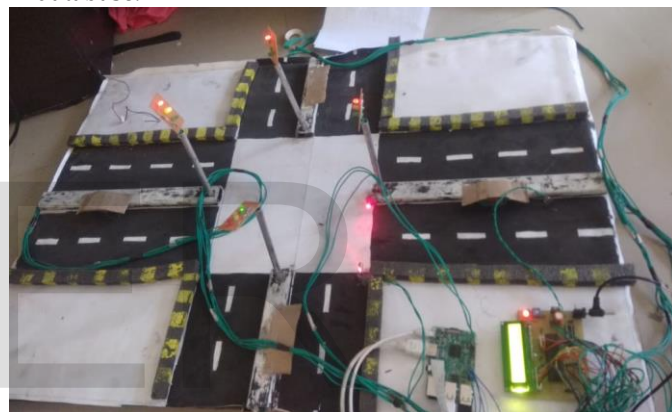


Figure 2:- Traffic Signal System

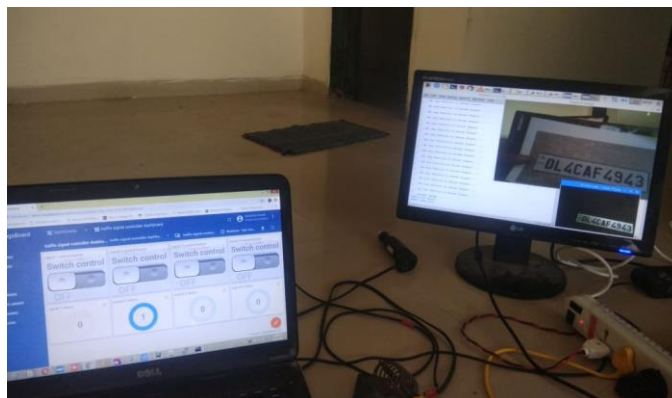


Figure 3:- Photo of Vehicle Number Plate & Traffic Signal Dashboard

## 5 CONCLUSION

We design the traffic system with IOT. We recorded data of number plates of vehicles in form of images. We modified traffic signal for traffic density with different priorities. We gave most priority for emergency vehicles such as ambulance etc.

## 6 FUTURE SCOPE

Here we are presenting a demonstration of traffic monitoring system & vehicle number plate identification. In future we can make a traffic monitoring system with many more facilities. In future the modification of this project is a IR sensor technique is changed with image processing. With image processing technique we can monitor traffic density. By using these techniques, we can increase accuracy of system.

## REFERENCES

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