

## **An implementation for efficient 8 two way traffic signal system for pedestrian and ambulance along with violation detection**

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**ABSTRACT :** *In modern life we have to face many problems because of traffic congestion. It is said that the high volume of vehicles, the inadequate infrastructure and the irrational distribution of the development are main reasons for increasing traffic jam. The major reason for traffic congestion is the high number of vehicle which was caused by the increase in population and the development of economy. Traffic congestion is a condition that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. Here I am considering vittila junction in Ernakulum district where we can see a high traffic junction. Here in my proposed work I am depending on 8 different roads that meet at a single junction. In that I will consider pedestrian, vehicles, and ambulance and red light violation detection persons too. The use of RFID and GPS will help to make the lane clear for ambulance. Using the RFID we can detect the red light violators and we can assign fine to them. Lastly for pedestrian I am providing one subway and one overbridged.*

**KEYWORDS** -Ambulance,GPS, GSM, RFID, PIC16F876A.

### **I. INTRODUCTION**

In modern life we have to face with many problems one of which is traffic congestion becoming more serious day after day. It is said that the high volume of vehicles, the inadequate infrastructure and the irrational distribution of the development are main reasons for increasing traffic jam. The major cause leading to traffic congestion is the high number of vehicle which was caused by the population and the development of economy Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, these results in some congestion. Traffic signs provide the driver various information for safe and efficient navigation. However, identification of traffic signs with respect to various natural background viewing conditions still remains challenging tasks. Real time automatic vision based traffic light control has been recently the interest of many researchers, due to the frequent traffic jams at major junctions and its resulting wastage of time. Instead of depending on information generated by costly sensors, economic situation calls for using available video cameras in an efficient way for effective traffic congestion estimation. Now days we know that many people lost their life due to traffic jam. Even the patients in the ambulance are suffering a lot due to traffic; even this can lead them to lose their life. Now days we used RFID and GPS based vehicles which can help the patients to arrive the hospital very safely by clearing the road before the ambulance reaches the traffic signal post. And red light violators are increasing day to day, to make control on this we have detected those people and

provide fine to them. Pedestrian are also taken into consideration in my proposed work. So in my implementation, all together I have 8 roads which meet at a single junction by considering all the problems which is mentioned above. In 1.1 Subsection we see about the existing system. In 1.2 Subsection we see about proposed system.

#### **1.1 Existing system**

Existing system deals with only 4 roads which are of 2 ways meeting at a single junction. In existing traffic signal system signals are fixed that means no consideration is given to people, ambulance and so on. And also traffic signals won't automatically change after detecting ambulance. There is no special way for people to cross the road. While the people need to cross they have to take a high risk looking whether vehicles are coming or not. In present situation we can see minimum of 4 or 6 roads are existing. So I thought of designing it for 8 roads.

#### **1.2 Proposed system**

Due to growth of the metropolitan cities of the country traffic jam is increasing day to day life. Lack of efficient traffic control and management has many a times lead to loss of lives due to ambulances getting stuck in traffic jams, due to high rush on the roads people lost their life while crossing. Today red light violation is one of the most common and serious problem which leads to the collision of vehicles at the traffic light signals every year. A red light violation occurs when a vehicle try to cross the intersection at the red traffic light. So we must give punishment to the drivers of these vehicles who violate these. We must identify the vehicle that violates the traffic light signals and automatic fine bill will be generated and information related to fine will be send to the person

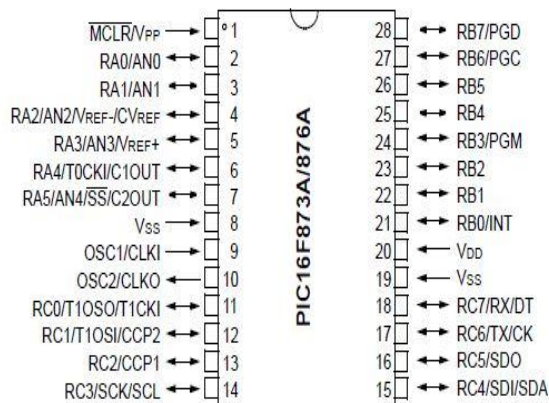
who violates the rule. By this we can solve problem like corruption that happened in the road .Once an ambulance reaches the traffic signal automatically traffic signal should turn to green so that we can save the life of people. For pedestrian a one overbridged and one subway is created.

Here we were considering 8 two way roads which meet at a single junction and thus it makes a round after joining all this 8 roads. Here at a time 2 signals will be working that means opposite 2 roads will be green at the same time and rest of the roads will be red. A time delay of 7 seconds is been given for signals for working as green after 7 seconds, it signal turns to red. In the next case I am considering ambulance. When an ambulance came if the signal of that road will automatically turn green if it was red. We use compass for this case, which means here degree is been set. For north direction degree is 0. Here 8 direction I have taken ie, north, south, west, east, north west, north east, south west, south east. So a degree is been set for all this direction starting from 0 degree to 360 degree. When the ambulance came signal for that road turns to green automatically and till its destination road, the road will be green . And after ambulance left the signals will work as usual that is green for 2 roads. Next I have considered red light violation. Here I used RFID to detect those vehicle which violates red light and by using ZIGBEE messages like ID of the vehicle will be send to officer and officer will cross check with all the ID stored in the database . If it matches with the stored ID officer will send information or messages to those violator telling him to pay fine of 500 for violating red light. For pedestrian I am implementing an overbridged so that people can safely cross the road.

## II. HARDWARE USED

### 2.1 PIC16F876A

28-Pin PDIP, SOIC, SSOP



**Figure 2.1 PIC16F876A**

Here PIC used for my project is PIC16F876A. For my project I think this PIC will

help me.PIC16F876A is user friendly and the user can understand the program easily.

### 2.2 ZIGBEE MODULE

The ZIGBEE technology has evolved based on standardized set of solution called layers. ZIGBEE has unique feature like it is low cost, easy implementation, reliable, low power, and high security.

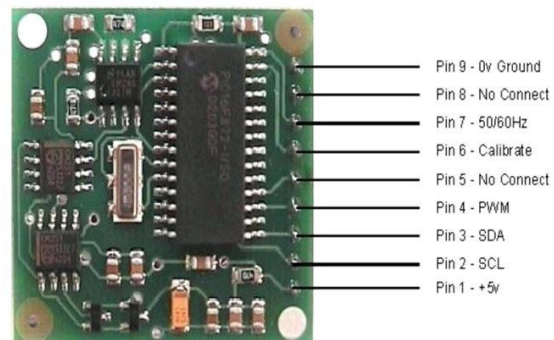
### 2.3 SIM900, GSM/GPRS MODULE



**Figure 2.3 ZIGBEE**

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900 can fit almost all the space requirements in your M2M application, especially for slim and compact demand of design. SIM900 is designed with a very powerful single-chip processor integrating AMR926EJ-S core. Quad - band GSM/GPRS module with a size of 24mmx24mmx3mm. SMT type suit for customer application. An embedded Powerful TCP/IP protocol stack. Based upon mature and field-proven platform, backed up by our support service, from definition to design and production.

### 2.4 CMPS03 - Robot Compass Module



**Figure 2.4 of CMPS03**

This compass module has been specifically designed for use in robots as an aid to navigation. The aim was to produce a unique number to represent the direction the robot is facing. The compass uses the Philips KMZ51 magnetic field sensor, which is sensitive enough to detect the Earth magnetic field. The output from two of them mounted at right angles to each other is used to compute the direction of the horizontal component of the Earth magnetic field. The compass module requires a 5V power supply at a nominal 15mA.

The PWM signal is a pulse width modulated signal with the positive width of the pulse representing the angle. The pulse width varies from 1mS ( $0^\circ$ ) to 36.99mS ( $359.9^\circ$ ) – in other words  $100\mu\text{S}/^\circ$  with a +1mS offset. The signal goes low for 65mS between pulses, so the cycle time is 65mS + the pulse width - ie. 66ms-102ms. The pulse is generated by a 16 bit timer in the processor giving a 1 $\mu\text{S}$  resolution, however I would not recommend measuring this to anything better than  $0.1^\circ$  (10 $\mu\text{S}$ ). Make sure you connect the I2C pins, SCL and SDA, to the 5v supply if you are using the PWM, as there are no pull-up resistors on these pins.

### 2.5 RFID TAG



Figure 2.5 RFID tag

RFID tag is placed between roads to detect red light violators.

### III. DIAGRAM IN MODEL

In these section diagrams of this entire model is showed. Diagram of the ambulance, diagram of RFID ID Tag, figure of 8 road which meet at junction.

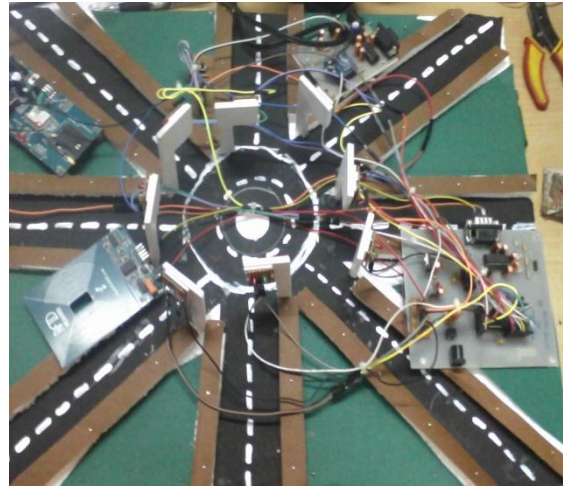


Figure of 8 road in a junction



Figure 3.1 ambulance unit



Figure 3.2 RFID Tag



```
AT
OK
AT+CMGF=1
OK
AT+CMGS="8547103144"
> ID no: 65003375EC
> violated red light OF NORTH DIRECTION
+CMGS: 43
OK
AT
OK
AT+CMGF=1
OK
AT+CMGS="8006898075"
> ID no: 65003375EC
> violated red light OF NORTH DIRECTION.Fine of Rs.500/-
+CMGS: 44
OK
```

Figure 3.3 messages shown in terminal



Figure 3.4 Message for violator

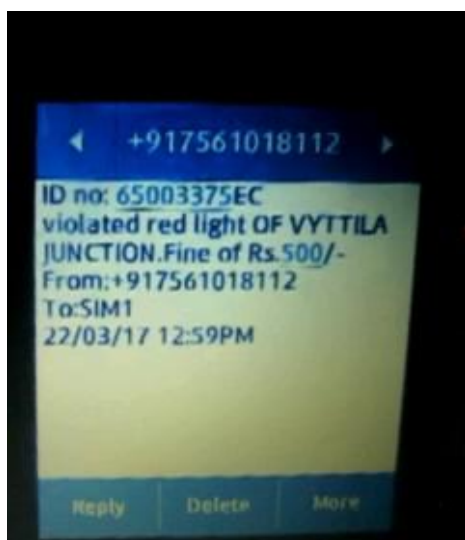


Figure 3.5 Message for officer

#### IV. CONCLUSION

The proposed Intelligent Traffic Light Controller is more efficient than the conventional controller in respect of less waiting time. I am going to implement my project for 8 different roads which meet at a single junction. The proposed system has simple architecture, fast response time, user friendliness and scope for further expansion.

In this project, the basic concepts of RFID technology are used which is then used for identifying the signal violators and punishing them. The main objective of the project is to identify the violators and improving the security in communication between RFID tag and RFID reader. By implementing this project, I am able to manage the traffic related problems efficiently and identify violators. After identifying the violators, we send a notification to him/her according to notification a fine amount will be paid by violator and if he do not pay fine, further actions will be taken on violator.

Special consideration is given to pedestrian for crossing. I will implement one overbridged which help pedestrian to cross the road. For easy movement of ambulance in road is also considered in this project. This system can be effectively implemented for an entire city or countries with large population like India for better results.

#### V. Acknowledgements

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