EMERGENCY OVERDRIVE TRAFFIC CONTROL SYSTEM

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Abstract - *In this project, the aim is to develop a smart traffic system with an additional path for emergency vehicles. Project is basically divided into two parts. First is emergency overdrive traffic control system which has additional path with barriers. By using unique code, the normal traffic mode changes to emergency mode and traffic light starts working according to it. This helps in saving the time of emergency vehicles in the traffic jams and saving lives of people. Second part is the automatic chalaan system. When any traffic violation takes place, it sends the information of the vehicle through GSM module to the control room so that the traffic police can take further actions. This automatic chalaan system allows traffic police to work remotely from control room and helps them especially in hard weather conditions.*

Key Words: Arduino Mega, RFID Sensors, GSM module, Ultrasonic sensors, Solar Panel, Barrier.

1. INTRODUCTION

The project proposed a scheme for auto traffic-signal controller with emergency override, based on an Arduino Mega. The proposed model attempts to reduce the probability of accidents caused by violating the traffic rules. Another aim is to provide a hassle-free, pre-eminent clearance for the emergency vehicles. In order to do so, we designed a portable model that uses RFID sensor to communicate with the signal. The sensor responds to the arrival of any such vehicle and acts accordingly. The objective is to reduce the delay of emergency vehicles for reaching the scenes of disaster and hospitals with minimum possible interruption to regular traffic flow. Moreover, this model aims to co-operate the design of the intelligent traffic light system to endorse the idea of energy on demand. The traffic lights remain active for most of the time, which is wasting power consequently. To curb this problem, we advocate the use of solar panels which gets charged by the sunlight and works in the absence of it without wasting the power. Hence, traffic light works with optimal energy consumption.

2. COMPONENTS

2.1 Arduino Mega 2560:

It is an open-source microcontroller board which is based on Atmega 2560 microcontroller. It has digital input/output pins-54, where 16 pins are analog inputs, 14 are used like PWM outputs hardware serial ports (UARTs)-4, a crystal oscillator- 16 MHz, an ICSP header, a power jack, a USB connection as well as an RST button. The operating voltage of this microcontroller is 5volts and the recommended input voltage will range from 6volts to 20volts.
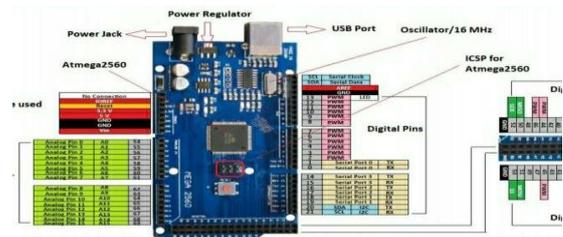

Figure 1: Arduino Mega 2560

2.2 RFID Sensors:

Radio Frequency Identification (RFID) is the wireless application. It uses radio frequency waves to transfer data. Tagging items with RFID tag allows users to automatically & uniquely identify & track inventory and assets. Within the electromagnetic spectrum, the three primary frequency ranges used for RFID transmissions are Low frequency, High frequency, & Ultra – *High frequency.*
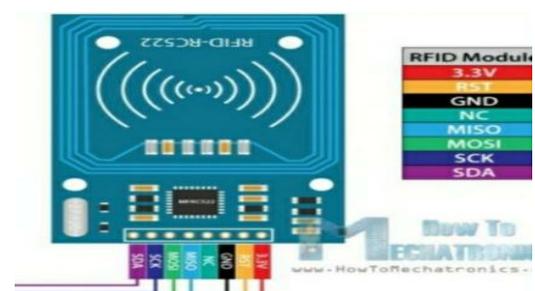
Figure 2: RFID Sensors

2.3 GSM Module:

The SIM900A is a complete Dual-band GSM/GPRS solution. It uses SMT module which can be embedded in the customer applications. Its supply voltage is 3.4V-4.5V. It supports UART interface and single SIM card.

Figure 3: GSM Module
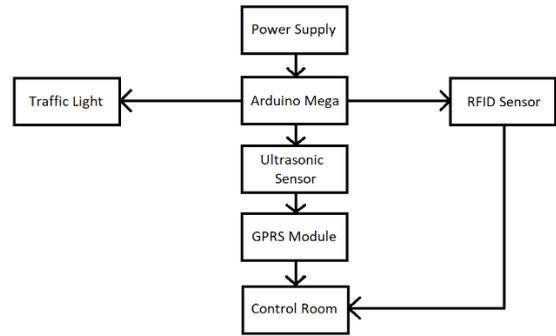
2.4 Ultrasonic Sensors:

The ultrasonic sensor has the same principles as a radar system. An ultrasonic sensor can convert electrical energy into acoustic waves & vice versa. The acoustic wave signal is an ultrasonic wave that travels at a frequency above 18 KHz.

Figure 4: Ultrasonic Sensors

3. Project Design

Project Description:

In this project, the smart traffic management system is implemented on Arduino Mega platform. This IOT based system is programmed using embedded C language. The card is coded with a unique code which can be read by the RFID sensor only and after the confirmation, the green signal is given by the processor after a delay provided by the programmer. During this delay period, an emergency is displayed at the LED Display to inform all the other vehicles. This project also include an automatic challan application implemented using Ultrasonic sensor connected to GSM Module which work only during the red light and after the violation is captured by the IOT based system, it automatically send the information about the concerned vehicle to the control room. This whole system is programmed in such a manner so that the traffic management system can become more effective.


Figure 5: Block Diagram
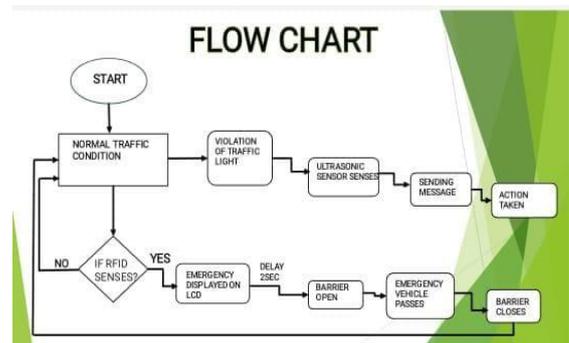
Figure 6: Flow Chart

4. ADVANTAGE

- Emergency vehicles can reach the destination on time.
- Many lives can be saved that are being lost due traffic jams.
- Traffic signals can be controlled remotely.

5. DISADVANTAGE

- If network fails, then traffic lights can't be controlled.
- Severity of accident can't be known.

6. CONCLUSION

To sum up, we believe that traffic management at the crossroads increasing day by day and the reason behind this is large density of vehicle and lack of awareness. So our aim is to create a traffic management system to reduce the traffic congestion and provide a new way to reduce the travelling time of all emergency vehicle and also provide an automatic challan to reduce the work load of the security team. This project is a first step towards smart city plan of India. In today's world where IOT based systems are finding their uses in many applications like home automation, car automation, automatic water storage system and so on, this will also take us one step further in Smart City plan.

Recently government of India is spending round about 2 crores per city on 98 cities in India which are competing to become India's best Smart city. Thus, this concept of traffic light control and transferring the traffic congestion scenarios of the city on real time basis on devices like smart phones can prove to be a good use of technology to solve day to day problems.

7. FUTURE SCOPE

The scope of this project is not just limited to controlling of traffic light and emergency override based on RFID transmission but can go further by using antenna technology to transfer the emergency vehicle's information to the system which is a fast process.

8. REFERENCE

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