Integrated Safety and Security System for Digital Red Light Offenders

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Abstract—*In recent metropolitan areas, population increases, due to this vehicular traffic is also increasing and this leads to congestion problem, which becomes the major issue in all over the world. Congestion becomes an important problem in recent days and due to this traffic management fails. Many accidents occur due to the red light jumper, who breaks the traffic rule. To overcome this problem we used RF module to detect the vehicle, which jump the red light traffic and accident occurs.*

1. INTRODUCTION

As we know that in India, there is no sound system which correctly detects those vehicles that jump the red light signal. Many techniques are used for detection purpose but they have not been much effective. To overcome this problem, we have design a system which detects the vehicle that jumps the red light signal and an automatic message generate and sends to the traffic police of the crossing.

For all these tasks we used an RF module, which is a small electronic circuit for transmit and receive the radio wave. Here RF module is placed at traffic crossing for transmitting and receiving, which is attached by the antenna. Road marking is done according to the requirement. If any vehicle is cross the white marking when red light is ON, will be detected by the RF module and GSM module generate an automatic message "JUMP" and sends to the traffic police. Corresponding data is fetched from the central database using RF module.
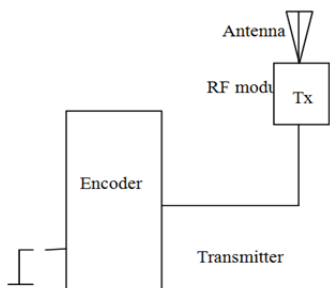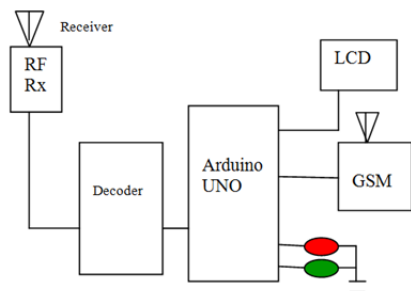

Fig. 1 (a): For transmitting

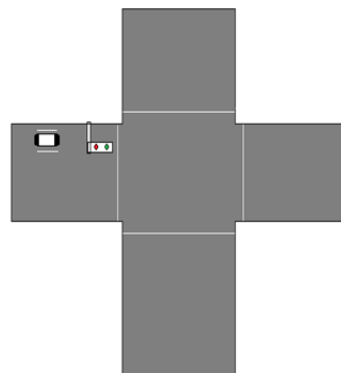**Fig. 1 (b): For receiving**

Fig. 1(c): Red light traffic system

2. ANALYSIS

In the ranking of road accident India has the highest rank in the world. The country has cross over the China death rate with 1, 30,000 death annually and now this has the worst traffic road rate worldwide. This report has been released by the World Health Organization (WHO) in their report. Mostly reason for road accidents is speeding, drunk driving, red light jumping, avoid safety gears like seat belt and helmet. Over 1.37.000 were death in road accident in 2013 alone.
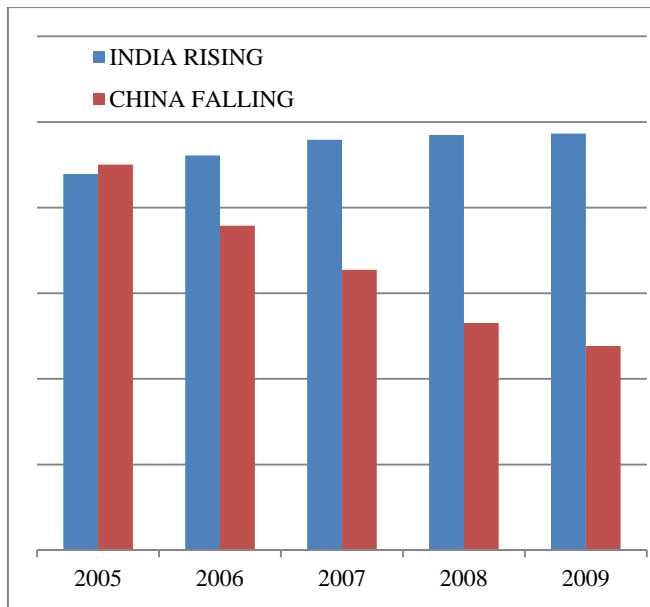
Fig. 2: Number of road accidents India and China in 2005-09

To overcome this problem we used a GSM operated safety system for automatically operated digital red jumper.

3. LITERATURE REVIEW

In [1] Athavan, K gave a scheme AARS (Automatic rescue ambulance system). The main aim of this scheme is to provide a smooth flow for the ambulance to reach the hospital in less time In [2]. Marikhu, Ramesh works on image processing concept to reduce road accident. It captures the image of the vehicle. In [3]. Kale et al. gave a view on traffic light controller and which is used to minimize the waiting time of vehicle. This system work for heavy traffic and set the priority of emergency vehicles. In [4] Kamal, Md Abdus Samad gave the concept to reduce the congestion problem due to this traffic achieve the smooth flow. In [5] Wei, Wang et al. gave the concept of an automatic alarm device which automatic detect any accidents, search the location and sends the basic information to the first aid so that help will provide at time. In [6] Assum, Terje focus on the road lightning due to this reduce the risk of accidents. In [7] Chowdhury, Tandrima, et al. is gave the concept to pass the vehicle like ambulance according to the priority wise by using Automatic rescue ambulance system i.e. (AARS) scheme. In [8] Fisher, P. David gave the concept of radar which are used to help for offenders by using laser, cameras etc. In [9] Papageorgiou, Markos, et al introduce the control of congestion problem via uses different type of control strategies which is used in traffic system. [10]. Rai, Bhawna gave the concept to reduce the accident problem and track the vehicle who jump the red light signal when red light is on.

4. DESIGN

This project has main aim is to reduce the accident problem which is occurred in the traffic crossing area by the jumper. In this system we show the red light crossing by using the IR sensor which is get interrupted when any vehicle crosses the red light and generate a message by the use of GSM module and sends to the traffic police of the crossing.

This system contains following components:

GSM Module: For establish a communication between a computer and a **GSM-GPRS system** we used GSM/GPRS module**. Global Packet Radio Service (GPRS)** is an extension of GSM which enables higher data transmission rate. Global System for Mobile communication (GSM) is an architecture used for communication via mobile.

RF Module: An RF module is a small electronics device is used for transmit or receive radio signals between two or more device. It is an embedded system which desired to communicate wirelessly between the devices. This wireless communication it may be accomplished through optical communication or through RF communication.

Arduino UNO: Arduino uno, it is a small computer on a single integrated circuit containing a processor, memory, external power supply, input/output peripheral, Atmega 328 microcontroller. It is easy to use because it has all the different connection at one place.

5. PROPOSED WORK

A fully automatic system is required for this proposed work like other nations have well developed traffic light systems which are more efficient to control. The aim of this paper is to resolve this jumping problem due to these accidents occur. We resolve this by using GSM module, RF module, Arduino uno major components. By using this technology we can do (i) Provide safety and security on the traffic light crossing. (ii) Reduce number of accidents.

By using the component GSM module, Arduino uno, RF module this project is designed. This will get interrupted when any vehicle crosses at the time of red light. Sensors automatically activated and with the help of GSM module an automatic message generate and send to the any traffic police pre- defined mobile number.
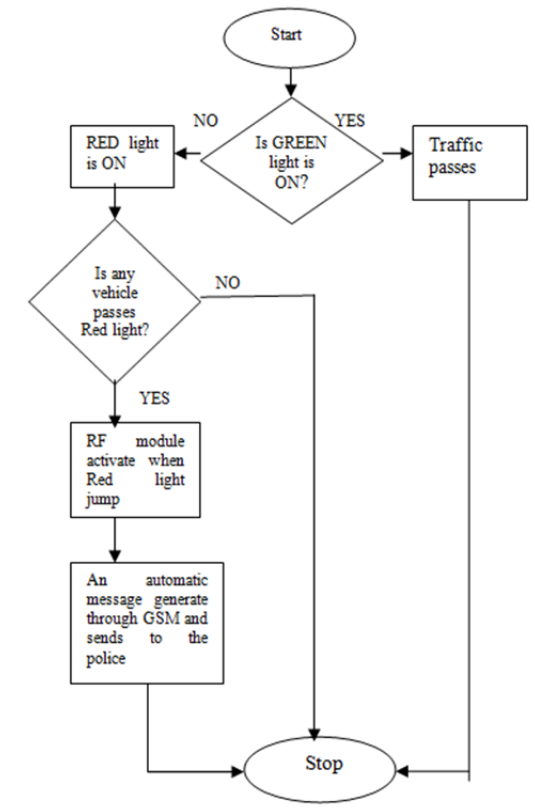
Fig. 5: Block diagram of the traffic light system

6. CONCLUSION

In this paper we studied the optimization of the red light traffic system using the Arduino uno, GSM module, RF module. By using of this system we can reduce the accident ratio which occurs due to red light jumper. This system reduce the traffic related problem such as traffic jam, traffic latency problem, emergency vehicle passing can be solved. This system has several benefits like it is high reliable, low cost, an easy installation etc.

The proposed system automatically detects the red light offenders and sends an message to the traffic police of the crossing.

Traffic Police department has shown genuine interest in the system. Once the system is deployed, it will prove to be beneficial to society, as it will improve traffic flow and will help reduce road accidents.

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