Multipurpose Vehicle Detection System Using RFID

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Abstract: Our paper is about retrieving all the details regarding the vehicle and its owner by using RFID technology. Each vehicle would have an RFID tag that is encoded with the name of the owner, contact details, vehicle registration details and also about insurance details. RFID readers must be installed at certain distances based on the range of the reader used. Speed measuring sensors are also installed along with the readers. If the sensor detects that the vehicle crosses the specified speed limit, the details are sent to the traffic police control room for further procedures. If a vehicle is found missing, the police can easily view scanned records and then locate the area at which the vehicle is traversing.

Keywords: *Radio Frequency Identification (RFID), Speed Sensors, RFID Readers, Traffic Police Control Room.*

I. INTRODUCTION

According to the survey report most of the road accidents are caused by negligence of rules and regulations by the people who drive the vehicles. The report says that in accidents due to rash driving is very high when compared to the accidents due to drunken drive. The seriousness of speed violation and drunken drive can be seen from the Statistics given in figure 1.1

Based on the report from the Ministry of Road Transport and Highways, India's daily death toll due to road accidents is more than four times the annual death toll from terrorism. About 139,671 people lost their lives on India's roads during 2014 – 382 deaths every day.
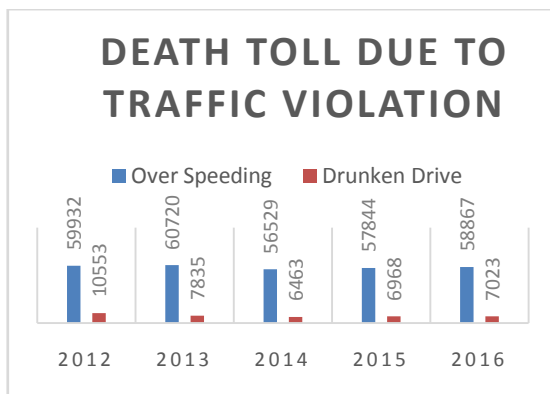

Figure 1: Statistics report on total number of deaths due to road accidents

For comparison, if 57,844 people lost their lives due to over speeding, 6968 Indians died because rash driving posts alcohol consumption in 2014.The report, based on 2006 and 2012 statistics collected from 178 participating countries, said globally over 1.2 million people die in road accidents every year and 20-25 million people suffer non-fatal injuries.

II. LITERATURE SURVEY

The main motive behind this paper is to obtain the registration details of a vehicle easily just by using a reader. The other motive is to make people follow the traffic rules properly which would reduce the reckless accidents by using RF technology. The knowledge about the type of RFID and the range of the reader to be used was obtained by reading the following papers.

The authors Ashwin K, Aswin Perumal A, Krishnakumar S, Maheshwari M's paper titled 'RFID Based Student Attendance and Monitoring System' published in 2015 tells that the students will be identified by placing passive tag in the student's ID card. The reader scans the ID card and records the attendance while he/she enters the classroom and if the student moves out of the class and enters some other class room or any other location within the campus, a message which indicates the current location of that student will be sent to the concerned staff. The RFID reader can be connected to a computer through a RS232 cable and the attendance can be recorded directly and by using the real time clock capability of the system the attendance can be noted along with the in-time and out time of every student.

Prof. Vishal Pande, MalharMohite, SupriyaMhatre, Siddhesh Desai, Anjali Kumari's 'Autonomous Speed Control of over Speeding Vehicles Using Radio Frequency' published in 2016 was also referenced. The main objective of that was to design a controller and a display, meant for vehicle's speed control and to monitor the zones, which run on an embedded system. The IR sensor detects the speed of the vehicle and sends the information to Micro controller. Micro controller interacts with motors through driver IC to take appropriate directions to prevent accidents.

Another paper published in 2015 of Grewal Kaushal, Rishabh Mishra, NeelamChaurasiya, Paramdeep Singh's, 'RFID based security and access control system using arduino with GSM module' explains about the research that makes its programming a lot shorter and easier because of replacing microcontroller with arduino. Arduino makes the circuit and programming a lot easier to understand. Paper is based upon security access and control system using RFID and Arduino with GSM module.

III. EXISTING SYSTEM

Figure 3.1 Camera and speed sensor

The existing system to identify the details of a vehicle is by entering the registration number of it in the respective website. If the vehicle passes without obeying the red light traffic signal, then that vehicle is identified by the usage of red light cameras. One such camera is shown in figure 3.1. The cameras used for

this purpose are usually intersection cameras. They measure the speed of the vehicle and if the vehicle is found accelerated without stopping, the cameras capture the pictures of front and rear views of the vehicle.
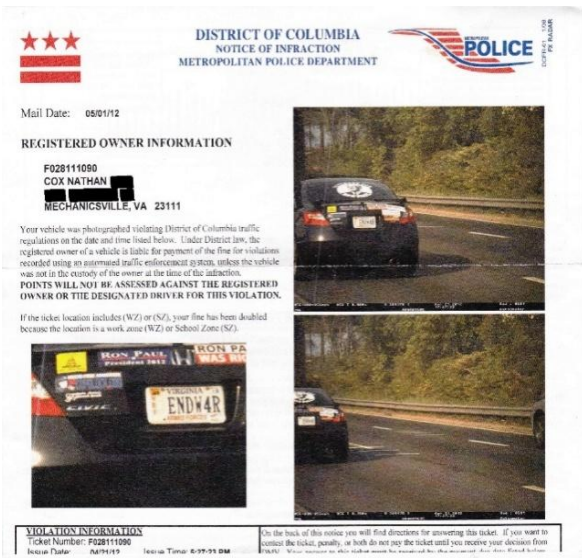

Figure 3.2 Sample ticket

Other existing system to find over speeding of vehicles is by the usage of two types of cameras in Melbourne. One is fixed camera and the other is movable one. The movable camera is fixed in an unmanned car and it is made to travel and parked at speed limit specified roads. The camera transmits a beam in the direction of passage of vehicles in the road. The frequency of the beam gets varied as the vehicle passes and the speed is measured. If the speed is observed to be greater than the specified speed limit, the cameras captures the picture of the car. Fixed cameras are installed above the roads and it does the same work of the movable cameras. The captured pictures are sent for secondary verification by the police officers who have the sole right to file the case or reject the ticket. The sample ticket is shown in the figure 3.1. If the officer wants to send the ticket to the court, he retrieves the details of the vehicle owner. Then he would sent the request for the owner to identify the driver. The driver is then liable to pay the fine charges under speeding offence.

IV. PROPOSED SYSTEM

RFID readers are to be installed in the newly manufactured vehicles with unique IDs. When the vehicle is taken for registration, all the details along with the tag number is collected by the government and fed into database. RFID readers and speed guns are placed on the roadsides. As the vehicle passes the speed is measured and if it exceeds the specified limit the reader is made to scan the details.

The camera and the work of searching the owner details using images is replaced by the usage of RFID tags and a reader in this paper. Laser speed guns or Radio Detection and Ranging guns can be used for speed measurement. The selection of their ranges must be according to the parameters like measuring length of the road, distance from the next reader, etc. The readers can be connected using local area network or wireless network.

V. SYSTEM IMPLEMENTATION

We have used the Infra-Red sensors for the speed measurement. EM-18 reader is used along with Arduino UNO. Laptop or personal computers can be used for display. The block diagram is shown in figure 5.1
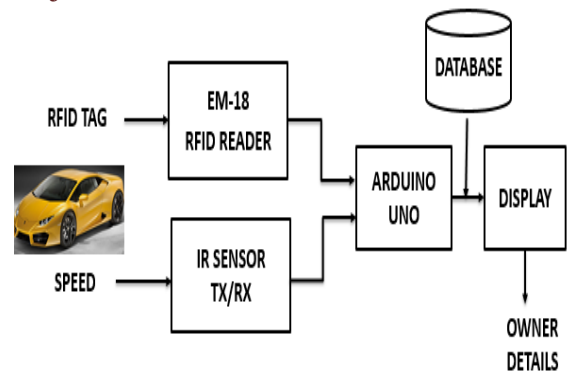

Figure 5.1 Block Diagram

A. ARDUINO UNO

Arduino UNO is an open source physical computing platform based on ATmega 328 microcontroller and provides a development environment for writing software for the board.
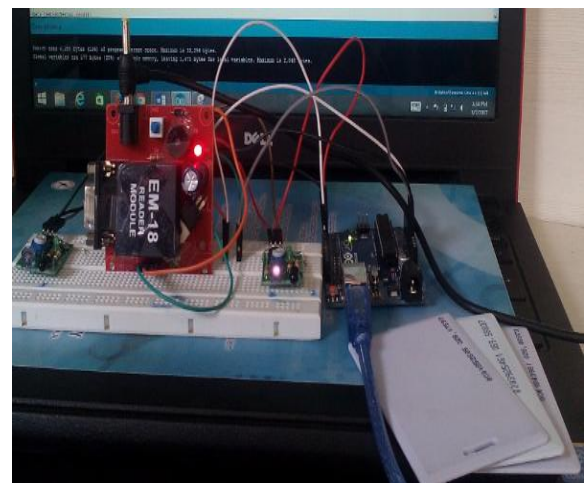

Figure 5.2 Hardware connections

B. EM 18 RFID READER

EM-18 RFID reader is one of the company used RFID reader to read 125 kHz tags. It features low cost, low power consumption, small form factor and easy to use. It provides both UART and Wiegand26 output formats. It can be directly interfaced with microcontroller using UART and with PC using an RS232 converter.

C. IR SENSOR

Infrared sensor is used to detect the presence of some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion of the object. In this project an IR Sensor of range up to 2 feet is used. A total of 2 IR Sensors (transmitter and Receiver) are used for measuring the speed of a vehicle. The whole module connections are made and shown in the figure 5.2

VI. RESULTS AND DISCUSSION

The sample RFID tags are swiped over the reader and the result obtained. It is learnt from the result that the details stored for that tag is displayed on the screen as shown in the figure 6.1 as the vehicle passes. If the speed of the vehicle is to be calculated, it must be detected and compared with the provided threshold speed. If the measured speed is greater than the threshold, the details can be sent to the traffic authorities for further procedures.
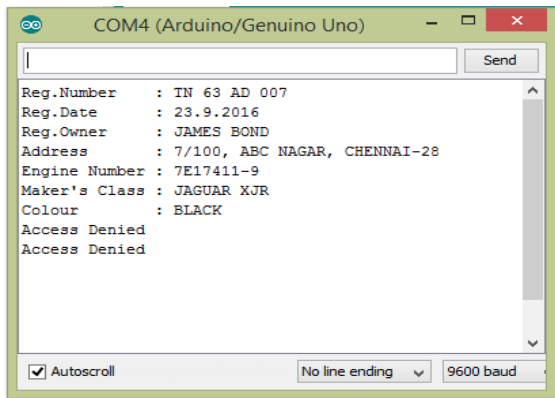
Figure 6.1 Result obtained

CONCLUSION AND FUTURE SCOPE

This paper explains the vehicle details retrieval based on the RFID technology. It has explained how to reliably, cost-effectively, securely, identify vehicles at various situations. Thus we hope that this can revolutionize the traffic management and avoid accidents caused due to over speeding in the near future. The above prototype can be installed in vehicles which will have all the details of the owner and the readers can be installed at the road side at each and every road where speed limit has to be maintained.

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