

# Implementing a system to detect over speeding & inform authorities in case of any violations

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**Abstract** - Road accident occurrences have increased lately and so there needs to be a system that can help us to reduce such accidents. The main reason behind these accidents (as per the stats) is the over speeding of cars. Although all highways do have signboards indicating the maximum speed limit, no one tends to follow them. In addition, the current speed detection systems are handheld guns by the police personnel that allow them to check the car speed thereby manually informing authorities about the vehicle. Our proposed system does not need any human interception and records the car speed as well as informs the concerned authorities for the violations. This paper aims at developing a system that will detect the speed of the vehicle, if over speeding occurs, extract the license plate number and send it immediately to the nearest concerned traffic authorities

**Key Words:** LPR, ARDUINO, RASPBERRY, HC-05, PUTTY, VNC SERVER.

## 1. INTRODUCTION

Our project deals with detection of over speeded cars on highways and thereby informing the authorities in case of violations. There are so many ways to detect the speed of the car. One of the most promising technologies is LIDAR technology. It is the technology used in the speed guns held by the police personnel to check the speed of the moving car. The other technology, rather the one we use in our proposed model are by using hardware sensors in the car itself. We do have speed sensors in the car which detect the rotations per minute of the car. This can be used to detect the speed of the car and then transfer it wirelessly.

The reasons behind those accidents are driving under the influence, over speeding, reckless driving etc out of which the major cause being the over speeding of car. In order to overcome this problem and decrease the death rate caused by such accidents, introduction of new and innovative speed enforcement technology is necessary.

Increase in speed multiplies the risk of the accident and severity of injury during the accident. At high speed, the vehicle needs a greater distance to stop i.e. braking distance needs to be more. The need of the hour thus is to build a system that will detect such over speeding vehicles. Also the other factors like driving at night, weather conditions are going to affect the manual system.

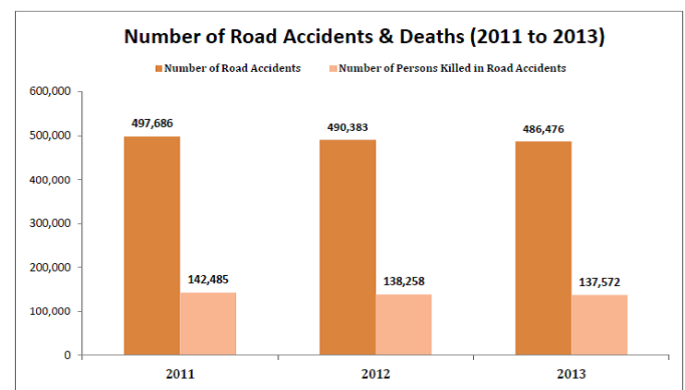


Fig. 1.1 Accident Statistics

In addition, the police officer has to inform the nearest authority to stop the car. This is inefficient and a lot of time is wasted. With the number of vehicles increasing day by day, this method cannot be trusted with the lives of people.

After keeping all these considerations in mind, we have designed a model of highway over speeding vehicle detection system to control the over speeding of cars. The advantage of our proposed system is that it will detect the speed of the car and if it is above the defined speed limit of the road, it will click a snap of the license plate number of the car. Not only that, it will also read the license plate number, extract the number and send it to the nearest concerned traffic authorities.

## 2. LITERATURE SURVEY

As VANET and image processing being the core disciples of the technology field, there are multiple numbers of study resources and papers available from various

publication journals. Based on definition of our problem statement, we have selected few papers as a base reference for the completion of our project.

The following study represents a brief introduction of the papers we are using in our research project-

“Detection of Over Speeding Vehicles on Highways” by Monika Jain, Praveen Kumar, Priya Singh, Chhavi Narayan Arora, Ankita Sharma.

This paper presents a device to detect rash driving on highways and to alert the traffic authorities in case of any violation. In past, lot of devices to detect rash driving on highways has been made. Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement. In this paper it is intended to design a system aimed at early detection and alert of dangerous vehicle driving patterns related to rash driving.

It basically uses the following formula to detect the speed-

$$\text{Speed (kmph)} = \text{Distance} / \text{Time}$$

$$= 0.1 \text{ km}$$

$$(\text{Reading} \times 0.01) / 3600$$

$$\text{Or, Reading (on display)} = 36000 / \text{Speed.}$$

“Advanced Vehicle Over Speed Detection and Billing System” by Vijin P, Suhail Basheer V, Shaab Mon PK, Sabin MK, Nikhil V.

Advanced vehicle over speed detection and billing system will entail a speed sensing mechanism which automatically updates a database of traffic police with the details of an over speeding vehicle using the GSM/GPRS system. Once the details are updated, the driver is charged for over speeding. . This method is an advanced version of speed detection and billing system and it is placed in vehicles.

It makes use of the following units-

Arduino MEGA, Speed sensors, GSM/GPRS unit, LCD display unit.

“Automated Over Speeding Detection and Reporting System”

The theme of this paper includes automated system with no manual intervention. It also uses Image Processing techniques to extract the license plate number. The limitation to this proposed system is that the research based

only on the Punjab license plates (green and white colour plates).

Some of our base paper are related to the image processing techniques as it is used as one of the domains in our proposed project.

Some of them are listed as-

“Vehicle License Plate Recognition System Based on Digital Image Processing “

The theme of this paper is vehicle license plate recognition system based on image processing in intelligent transport system. It uses Character Recognition Technology for extraction and accuracy analysis is done based on lightning conditions.

“Research on the License Plate Recognition Based on Image Processing “

The theme of this paper deals with various gray degree reinforcing and filtering treating. It uses Edge detection and character recognition techniques for the same but is not feasible for real time purposes.

“Localization of License Plate Number Using Dynamic Image Processing Techniques “

Connected component analysis technique and Geometric Relationship Matrix has been used. It uses gray scale transformations and linearization techniques.

Thus the study of these papers have helped us to propose a system which will not only avoid the human intervention but will also be independent of light or weather conditions and uses simple but efficient image processing techniques to extract the required number plate.

### 3. SYSTEM ENVIRONMENT

After studying the research already done in this field, we have prepared a generic model, which is used to accomplish automated speed detection system.

The proposed system will prove useful on various state and national highways where the rate of accidents due to car over-speeding is relatively high.

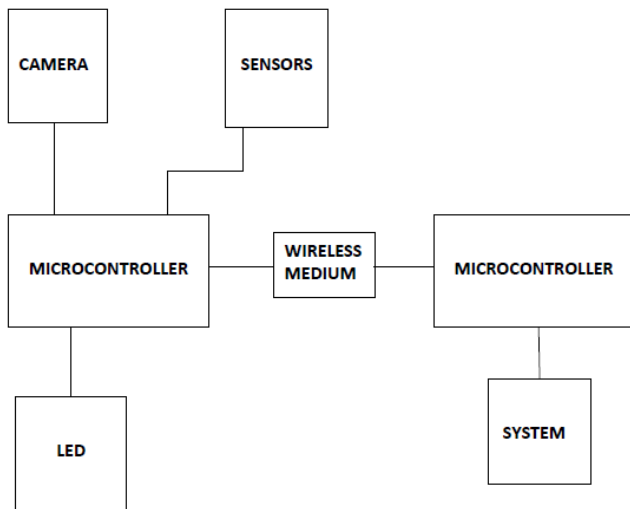


Fig 3.1 System Architecture

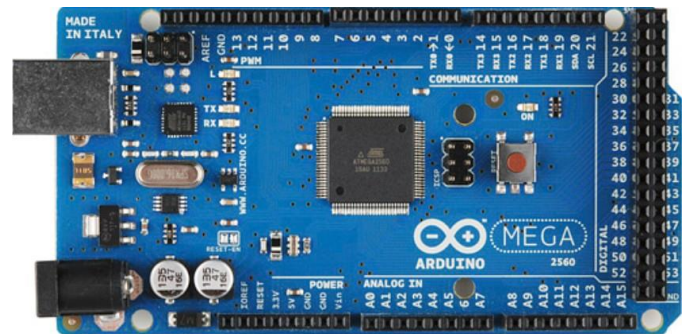


Fig. 4.2 Arduino Mega

#### 4. TECHNOLOGIES USED

**Raspberry Pi:** The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside of its target market for uses such as robotics. Peripherals (including keyboards, mice and cases) are not included with the Raspberry Pi.

The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

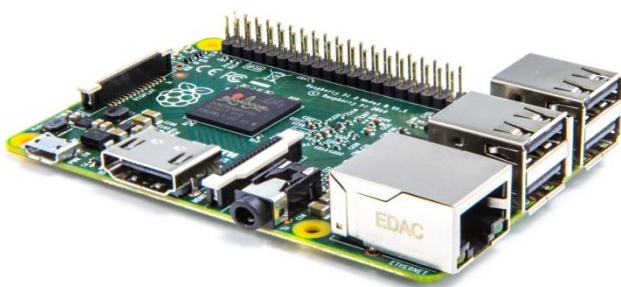


Fig. 4.1 Raspberry Pi

**ARDUINO MEGA:** Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

**Bluetooth (HC-05):** HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.



Fig. 4.3 HC-05(Bluetooth module)

**Wheel Speed Sensor:** A wheel speed sensor or vehicle speed sensor (VSS) is a type of tachometer. It is a sender device used for reading the speed of a vehicle's wheel rotation. It usually consists of a toothed ring and pickup.

Most vehicles need a rotary speed sensor for their regulator system. The most common type is a two-channel sensor that scans a toothed wheel on the motor shaft or gearbox which may be dedicated to this purpose or may be already present in the drive system.

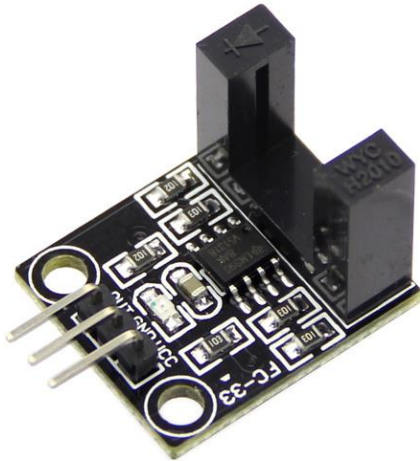


Fig. 4.4 Speed Sensor

## 5. Implementation

Various algorithms that were used to make the entire system work are described in this section.

The entire project is divided into two important parts-

1. Detection of speed of the vehicle.
2. Capture the Image using the camera.

The first part consists of the following hardware:

- a) Speed Sensor
- b) Bluetooth Module
- c) ARDUINO MEGA
- d) Motor Driver
- e) The Vehicle
- f) Motor attached to the wheel
- g) Number Plate on the vehicle

The second part consists of the following hardware:

- a) Raspberry PI
- b) Camera with resolution 720p

## 6. CONCLUSION

An efficient advanced vehicle over speed detection and billing system has been proposed which prevents the vehicle from over speeding. We have done a detailed survey among the existing speed detection and billing systems for vehicles. On the basis of our analysis, we are proposing this method.

The advantages of the proposed system over other methods are:

- It is a self-billing system.
- It does not limit the use to any specific vehicle.
- This system can track the speed from a long distance.
- It is free of manual intervention.

When this system is damaged, the police can be notified and can take action against this problem. It is well suitable for all vehicles especially for school buses and public buses. It can be used as a speed alert. It can reduce over speeding and accidents. It can reduce highway bribery.

Vehicle license plate intelligence recognition system forms the core of traffic identification system & will play an important role in the future traffic control. This project also dealt with the vehicle license plate recognition system based on image processing in the intelligent traffic system, and proposed a character recognition solution.

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