

Review on “Vehicle Over-Speed Detection and Identification”

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DOI: - <http://doi.org/10.5281/zenodo.3738938>

Abstract

Road accidents are major problem and the occurrences have increased day by day, so we need a system that can help us to reduce such accidents. According to the statistics of road accidents, over-speeding of vehicles is the main reason. To reduce the number of accident some rules are made and all the highways do have signboard that indicates the maximum speed limit but no one think to follow the rules. The current speed detection systems not able to fulfill the requirements. Number of techniques and technologies used for the over-speed detection in which some are based on micro-controllers, IC555 and Raspberry pi etc which also required human power but because of some drawback they may be not effective. To overcome we need system that not even detect the over-speeding vehicle automatically but also inform to the nearest authorities in the case of over-speeding so that the rider have to pay fine for rule breaking. This paper aims to develop a system that will help to detect the speed of the vehicle with the help of Arduino and IR sensor, if over speeding occurs the camera will capture the image of the number plate of vehicle and send it to the RTO through server.

Keywords: - IR sensor, Arduino, Image Processing, Server, Cam Module.

INTRODUCTION

Automated speed detection systems have been implemented worldwide. The system

involves a speed gun which is used to check for over-speeding of vehicles by placing it in the direction of moving

vehicle. This involves manpower with a person holding the gun. If over-speeding is detected, the person informs the Toll where the vehicle can be charged for fine. Over speeding vehicles become major issues for road safety and it required proper addressing to reduce the accidents. High Speed is a reason for most of the accidents on road.

Vehicle speed detection is based on the use of the speed sensor or IR sensor that detect the speed of the moving vehicles. IR sensor can able to detect as, it gives the time instant of vehicle and we know that, $Speed = \text{Distance} / \text{time}$. Once the speed detected the LCD unit show the speed of that vehicle on it display. We need to set a specific speed limit so that above this speed the vehicle can be considered as over speed vehicle.

Road accidents become the major issue in India and most common reason is rash driving of cars This year according to the government data in 2017 around 1.5 lac people have lost their life in road accidents out of this one third case is due to the over speed or high speed driving. The case is worst in U.P where around 20000 people lost their life in whole year due to road accidents.

This project will help to detect the speed of the vehicles without any manpower and detect over speed vehicle it will help to punish the concern person and can help to reduce the road accidents happen due to the rash driving.

LITERATURE REVIEW

Many authors have been proposed various over speed detection systems using various processors and algorithms to avoid accidents, some of them are reviewed in this paper:

- Monika Jain, Praveen Kumar, Priya Singh, Chhavi Narayan Arora, Ankita Sharma “**Speed detection using ic555 and buzzer**” IJCMC, vol. 4, issue 4, April 2015, In this paper authors have been proposed the vehicle over-speed detection with help of ic555 and indicate over-speed using buzzer. IN 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 we intend to design a system aimed at early detection and alert of dangerous vehicle driving patterns related

to rash driving. The entire implementation requires an IR transmitter, an IR receiver, a control circuit and a buzzer. The speed limit is set by the police who use the system depending upon the traffic at the very location. The time taken by the vehicle to travel from one set point to the other is calculated by control circuit and displays that on seven segment displays. Moreover, if the vehicle crosses the speed limit, a buzzer sounds alerting the police.

Leo Cetinski and David Dawson “**Over-speed detection using Speed gun and LPR software**”- 2008, They used the speed gun to detect the speed of the vehicles and LPR that is LICENCE PLATE RECOGNITION software for the recognition of the vehicle that make overspeed .The Speed gun is similar Device that used by the police authority to detect the speed of the vehicles. The speed gun speed detection method need the manpower only and only if someone handled this gun then only it in use hence it is not a automated system and need huge manpower.

Sumit Deshpande and Vishant Bhole, “**Overspeed detection and recognition with the help of raspberry pi and recognition with the help of Bluetooth**

module.” Vol. 4, Issue 4, April 2017, In this paper authors have been proposed the system which detects the speed with the help of hb100 Doppler radar sensor that work on Doppler effect and detect the speed of the vehicle. If over-speed vehicle is occurred it detect that vehicle and captured the photo of that vehicle send to respected authority via Bluetooth medium. But the cost of the raspberry pi and Doppler sensor is very high which makes the project costly as well as the range of wireless media is very less about 100m so if the near authority is far away from system it is failed to report the authority.

- Chetan Sharma and Amerdip kaur, “**Indian vehicle license plate extraction and segmentation**” Vol. 2 no. 2, July-December 2011, pp593-599, This paper demonstrate automatic number plate extraction and character segmentation of Indian vehicles, in India there are variations in character segmentation and plate extraction is difficult so they worked on plat that contain English character for preprocessing of the image and edge detection algorithm.
- Paras Sandip Waykole, manish vijay thombare, paresh vilas patil, rajat gopal patil, “**smart vehicle system for over-**

speeding detection” volume 4, issue-2, 2018, in this system speed monitoring of every vehicle can be done and reported directly to higher authorities. The system uses the hall-effect sensor to read the current speed of the vehicle and record the speed and coordinates of the vehicle in the database situated in the cloud. The system can then analyze the data to see which vehicles over-speeded at which location at what time and generate the map of the ride where the user can see the over-speeding statistics of the vehicles. Further, the system can be used for two-wheeler vehicles where in cases where parents can track the over-speeding stats of their children.

Abhrajit Chattopadhyay, Gunda ravichandra, Vivek Sudhanshu Solanki, P Suganya, **“Enhancement on vehicle speed detection system for avoidance of accidents”**, Volume-4, Issue-2, 2018, This paper presents an arrangement to detect reckless driving or over speeding on highways and by design send tickets to violators over email. In the past, many devices have been proposed but they require human effort. There are no means of control or monitor speed of the vehicles except the use of traffic policemen. Given the huge mileage of driveways, the number

of traffic policemen is far from enough to observe and analyze most drivers. The proposed model is advantageous as there will not be any need of traffic policemen and will accurately detect speed rather than maintaining trust in the eye. This paper discusses the hardware as well as the software modules involved in the speed detection system.

The system requires a microprocessor, a camera for input, and network capabilities to send data. It includes some reflections on the evolution of this methodology and different design decisions and their impact on the system.

METHODOLOGY

Proposed system is used to detect the speed of the vehicles moves on the roads and detect the over-speed of the vehicle. If it is to be found that the vehicle makes the over-speed it will detect that vehicle and captured it image and send it to the nearer authority so that punishable action takes on high speed riders.

In this two IR sensors are kept at constant distance, the vehicle will instant at the IR sensors respectively at sensor1 and sensor2 it will give the total time taken by the vehicle to calculate time, $t=t_1-t_2$,

Where t_1 =time instant at sensor1 and
 t_2 =time instant at sensor2

Hence we get the total Δ Now Speed = distance/time, by this formula we get the speed of the vehicle that crosses the IR sensors. The Arduino UNO used as processor that can calculate the speed of the vehicles in programming the threshold speed limit is kept so to detect the over-speed of the vehicles. As the speed indicate on the LCD display if it is found that vehicle makes the over-speed the arduino will send signal to NODE MCU and it will trigger the camera connect with it and captured the photo with help of image processing and send photo to nearer authority via server.

Arduino

It's an electronic device is used for making computer that sense and control physical world then the desktop computers and arduino is open source electronic prototyping platform based on a simple microcontroller board we can develop the environment for writing software to allow creating interactive electronic device.

Image Processing: Once the camera is positioned with respect to road, image frames of the vehicles are captured by the

camera at 30 frames per second. Several image processing tasks are carried out to obtain the speed information. Noise Reduction Initially, Salt and pepper noise, is generated in images when it is transmitted over noisy channels as in video cameras. The images can also be degraded due to electrical sensor noise. Secondly the convolution noise (blurring) can appear due to misfocusing of the camera lens, camera motion and atmospheric conditions. All these noise sources increase the contributions to high frequency noise components. Hence median filtering is employed to reduce this high frequency noise. This way object edge information is saved for the detection algorithm.

NODE MCU

Node MCU is an open source IOT platform. It includes firmware which runs on the ESP8266Wi-Fi SOC from Espressif Systems, and hardware which is based on the ESP12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266.

CONCLUSION

Many authors proposed the speed-detection system based on different technologies which have some drawback like need of man power, system cost is high, time delay and other parameters.

In this paper, we suggest a system that not only detects the over-speeding vehicle automatically but also sends the photograph of detected vehicle to the police authorities. Proposed system shows better performance compared to existing systems.

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Cite this Article as

Dr.P. B. Pokle, Harshada Buradkar, Aditya Charde, Sarfaraz Sheikh, Snehal Dange (2020) "Review on "Vehicle Over-Speed Detection and Identification" *International Journal of Research in Electrical, Electronics and Communication Engineering*, 5 (1), 1- 7
<http://doi.org/10.5281/zenodo.373898>