ANALYSIS OF VEHICLE SPEED DETECTION USING RFID TAG

Omkar Bhosale, Sayli More, Vinayak Mule, Sandesh Karande, Prof. Swati Khodke

Department of Computer Engineering
JSPM’s Bhivarabai Sawant Institute of Technology and Research Savitribai Phule Pune University

ABSTRACT:

IoT based vehicle speed detection is the system control at particular type of road is also necessary to avoid made up to provide the road safety. Its mechanism enables accidents. For this, there is no any system to control the speed to detect the speed of the vehicle and if the vehicle crosses of vehicle. That's why, there is need to invent such system the speed limit then the notification sent to the authority or which control the speed of vehicle automatically at given limit the vehicle owner. The purpose of our system is to track the at particular limiting distance. If this concept methodology vehicle speed and take the action if rule broken. Main system is possible, the problems related to traffic as well as advantage of this is in the precaution of the road safety from accidents due to collision will be controlled. Now it is possible rush drivers.

Keywords: RFID TAG, RFID Reader, Arduino, IOT vehicle speed.

INTRODUCTION

Most of the road accidents occur due to over speed and rash driving of vehicles on public roads. The accidents rate has increased as increase in no vehicles on road. Usually drivers drive the vehicles by ignoring speed limit in public areas and drive vehicles at high speed. Even though the traffic police cannot control these. Also it is not possible to monitor those areas at all time to regulate their speed Research on fully and partially automated roadway systems is being conducted in most developed countries. The new technologies are unlikely to be introduced in upcoming two decades. These systems offer excellent opportunities to control vehicle speeds and movements in order to avoid accidents but they rely, of course, on sophisticated features built into the roadway and vehicle. Progress with these systems should be monitored but they are unlikely to offer any significant short term solutions. But various types of accident are occurred on express highway road, highway road, off road just because of small uncertain activities. Rash driving, system failure, collision due to obstacles, exiting speed control limit etc. are just some causes of accidents. For prevention of this accident, government made some rules. Such as helmet, seat belt compulsion etc. Speed
to control or set the speed of vehicle at a given limit on the roads like highways, school zones, hospital zones...etc. express high ways and any area where the speed limit is desired by the technique suggested in methodology described in this project. In our country mostly 60 km/hr. limit for high ways and below 80km/hr. limit for express highways. Thus this project paves way for controlling the speed of the vehicles within certain limit in those restricted zones without the interruption of the drivers. In this project, the proposed methodology is suggested that one such kind of speed control system based on radio frequency detection for highway and restricted zones.

1.1 Objective:
   The main goal of this project is to develop of an IOT base system to help the Traffic police as well as the vehicle owner to control or to an action against rash driving by detecting the speed of the vehicle.
   The precaution of the road safety from rash drivers.

1.2 Motivation:
   The road accidents are also touching all time high rates. In a dubious distinction for the country, World Health Organization (WHO) has revealed in its first ever global status report on road safety that more people die in road accidents in India than anywhere else in the world, including the most populous China. WHO, in its report, states that road fatalities will become the biggest killer by 2030. The statistics for India are chilling. At least 13 people die every hour to road accidents in the country. Technology can play a very significant role in bringing the chaos under control. A little intuitive yet
contextual analysis and large scale adoption of innovative technology to tame this "epidemic" should be one of the first priorities of a responsible scientist.

1.3 Existing System:

Radar has been used to monitor vehicle speed since the end of World War II and is now the only tool widely used to detect the vehicle speed by police. But the use of radar in speed detection has its limits. When the radar gun is located at the side of the road or above the road, the cosine error becomes a significant factor affecting its accuracy. And another disadvantage is that radar sensor can only track one vehicle at any time.

RELATED WORK

2.1 Literature Survey:

1. IoT based framework for Vehicle Over-speed detection, Mohammad Ahmar Khan, Sarfraz Fayaz Khan, 2018 1st International Conference on Computer Applications & Information Security (ICCAIS), DOI:10.1109/CAIS.2018.8441951, IEEE

In this paper a smart vehicle over speeding sensor is employed and is combined with IoT in order to decrease the vehicle’s speed at particular places like accident prone zones. If this smart sensor technology is used the safety parameters, then avoidance of accidents may be attained. The system sends the data wirelessly. If the over speeding vehicle is detected, then the sensor alerts by sounding an alarm. The purpose of the proposed sensor is to decrease high death rates because of accidents in Middle East countries and in Oman.

2. Research on Speed Detection Method of Tracked Vehicle Automatic Driving System, Zhao Han Qing, Zhao Wei, 2018 International Conference on Artificial Intelligence and Big Data, 978-1-5386-6987-7/18/$31.00 ©2018 IEEE

In this paper The tracked vehicle autopilot system is a high-precision motion control system and many modules require high-resolution, stable and accurate speed feedback over a wide range of speeds. Based on the analysis of several common encoder-based speed measurement methods, an improved M / T speed detection method is proposed. Advantage TMS320F28377 dual-core parallel operation, while the encoder to detect the speed feedback signal is a full cycle of the number and the non-full-cycle length of the sampling period, in order to improve the accuracy of detecting the rotational speed; Finally, through the real car test to verify the improved M / T speed detection method accuracy.


This paper presents a new method based on digital image processing to realize the real-time automatic vehicle speed monitoring using video camera. Based on geometric optics, it first presents a simplified method to accurately map the coordinates in image domain into real-world domain. The second part is focused on the vehicle detection in digital image frames in video stream. Experiment shows it requires only a single digital video camera and an onboard computer and can simultaneously monitor vehicle speeds in multiple lanes. The detected vehicle speed’s average error is below 4%.

4. Solar-Powered Automated Road Surveillance System for Speed Violation Detection, Turgay Celik and Huseyin Kusetogullari, IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 57, NO. 9, SEPTEMBER 2010

In this paper, a real-time solar-powered road surveillance system is proposed to detect and report moving vehicles that violate the speed limit. The system is designed to operate as a standalone with no connection to the
main power line and the wired communication networks. It is powered by a battery array that is charged through solar panels. The data communication with the authorized remote station is achieved via wireless communication technology.

3. PROBLEM STATEMENT

3.1 Problem Statement:

Calculating the speed of the vehicle using the RFID tag and RFID reader with Arduino microcontroller and also the components should work properly to achieve the road safety.

4. PROPOSED SYSTEM

In our proposed system we are going to detect the speed of the vehicle and then display the details of that vehicle like, owner of that vehicle, vehicle details, speed details on a server so that RTO officers can take the further action against that vehicle.

Vehicle speed detection system is made of following blocks
- Microcontroller
- WIFI Module(ESP 8266)
RFID tag contains the vehicle information and is mounted on the vehicle, when a vehicle on the road come across the RFID reader then the tag is sensed by reader at the same time the timer of the Arduino is started and when the vehicle passes the RFID reader the tag is sensed once again and the timer is stopped, and the data is send to the server via Wi-Fi module, after processing the data the speed is calculated and if the vehicle is crossed the speed limit then the further action is taken by the officers. Here the input is the tag information and output is the speed of vehicle as well as the vehicle details stored on the tag which is mounted on the vehicle.

4.1 What is RFID?
Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. RFID tags are used in many industries, for example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets allows for positive identification of animals.

4.2 RFID Reader:
A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader.

3. OTHER SPECIFICATIONS

5.1 Advantages:
- Road Safety is enhanced with this proposed system.
- The vehicle is identification is made possible due to RFID Tag
- Low Cost and Effective System.
- Road Accidents can be reduced due to this Easy Maintenance

5.2 Applications:
This proposed system can be used for the road safety application
- At Highways
- Speed limiting roadways
- Internal City Road Lanes
- Public Places
- Railway Crossing Lines Way
4. CONCLUSION

A cost effective system which is based on IOT is proposed and we hope that it will be successfully develop and used in the vehicle speed detection, this is flexible and portable so that can be easily installed and used in anywhere for the purpose of the vehicle speed detection. This system will definitely help in detecting the rush driving vehicle at real time so that there is a chance in reducing the road accidents by taking a action against these vehicle.

7. REFERENCES

7. High-frequency RFID tag survivability in harsh environments, Alfonso Gutierrez ; F. Daniel Nicolalde ; Atul Ingle ; William Hochschild ; Raj Veeramani ; Clive Ho,