IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 6, June 2020

Automatic Traffic Violation Recording and Reporting System

Veeresh Basavaraj Hatti[1], Divyashree N[2], Dakshu BS[3], Anju MS[4]

Assistant Professor, Department of Information Science & Engineering,

Atria Institute of Technology, Bangalore, India[1]

Student, Department of Information Science & Engineering, Atria Institute of Technology, India[2,3,4]

Abstract: The quantity of street mishaps increments and causes numerous issues. Numerous individuals bite the dust and harmed. Likewise, that causes numerous financial, social and mental issues that have negative effect on the improvement of the world. The primary reason for most of these mishaps is because of the infringement of the traffic rules: driving with high speeds, crossing a red-light signal, not keeping adequate separation with the front vehicle in the roadways, driving an inappropriate opposite way, and so forth. As the number of streets and avenues are huge and the all-out length of these streets is long, it is extremely unlikely to completely screen every one of them all the time by Traffic Patrol or camera frameworks. This paper proposes a framework to consequently and self-sufficiently identify and record the criminal traffic offenses without the help of the individual. We propose the advancement of a gadget (on-board unit) that will be put inside the vehicle and be made sure about with the goal that the vehicle's driver can't stop it. This ready unit identifies and records the significant petty criminal offenses carried out by a vehicle progressively whenever in wherever. What's more, we propose a programmed revealing framework to send the submitted petty criminal offenses to the traffic authority frameworks.

Keywords: Raspberry Pi , PWM, PI camera, IR sensor.

I. INTRODUCTION

Obviously vehicles are basic transportation implies in nowadays and later on. They changed our life mode totally and we can't envision the world without vehicles. Their costs are turning out to be chirp and the extravagance they have made them increasingly more appealing to purchase new ones regardless of whether you have at least one. Thus, the quantity of vehicles that flow on the streets increments essentially a seemingly endless amount of time after year. Simultaneously, the quantity of street mishaps increments with a frightening rate.

Street car accidents are one of the world's biggest open injury avoidance issues. As per the World health Organization in excess of a million people are murdered on the world's streets every year [1][2]. In 2005, there were practically 6.5 million car crashes in the United States. The expense of these accidents is more than $230 billion. Just about 3 million individuals were harmed and more than 45,000 kicked the bucket. On an average, an individual dies in a car crash every 12 minutes – that is roughly 123 passing for each day [3].

The main cause of the accidents is because of surpassing the appraised speed limits, which establishes 34.25% of the total number of accidents. It is clear now that surpassing the evaluated speed restrains and abusing the traffic light signals comprise around 40 % of the accidents. The reasons for the accidents because of the none-regard of the traffic safety rules like overtaking a vehicle from the wrong side and not keeping necessary security separation between the vehicles comes up to be total 21%.

Presently, in the wake of examining this data, it is clear that these causes are because of the none-regard of the traffic rules. If each driver is complied with the forced standards, the volume of accidents will diminish drastically. Be that as it may, with all the work of the administrations to prevent the accidents, there are a few of difficulties that make the quantity of criminal traffic offenses on the rise. The significant test is the absence of traffic watches or cameras, with the expanding number of lanes and streets where the extent of the quantity of cameras to the streets is extremely low. We accept that the genuine number of traffic violation submitted without being recorded is immense contrasted with those recorded by the traffic patrols.

As quoted from Georgia Cities Newspaper website [4] “In Tifton,the city installed a traffic camera at the beginnig of 2007. The number of accidents dropped from 793 in 2006 to 581 in 2007 and accidents with injuries in Tifton droppe d 27 percent after their intersection camera installation. The cameras are introduced distinctly on the convergences. Yet, imagine a scenario where the cameras were they are installed along all the streets and lanes, sure the accidents will decline excessively or disappear. This certainty is affirmed in [5].

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 6, June 2020

One technology to fight the traffic violations is by using cameras installed on the traffic lights [6][7][8]. The goal is just to detect the red-light crossing violations. In other cases, they can be installed on the roads and equipped by radar-based speed detector [9] to record the excess-speed traffic violations.

II. PROPOSED SYSTEM

Here the proposed framework is a finished programmed process where this framework accomplishes all the work without requiring any human intervention. The proposed framework includes AI module that will recognize the number from the caught picture which is then consequently sent to RTO module utilizing Wi-Fi. This permits the police to focus on other stuff instead of investing energy in looking for a traffic violators. This proposed framework is quick, less mind boggling and no human mediation is required.

A. Architecture Diagram

The figure shows the proposed framework engineering chart which comprises of Traffic infringement module, Machine Learning Module, RTO module that contains different parameters, for example, Pi Camera, IR sensor, LED (Traffic Light), DC Motors, KNN calculation, Email.

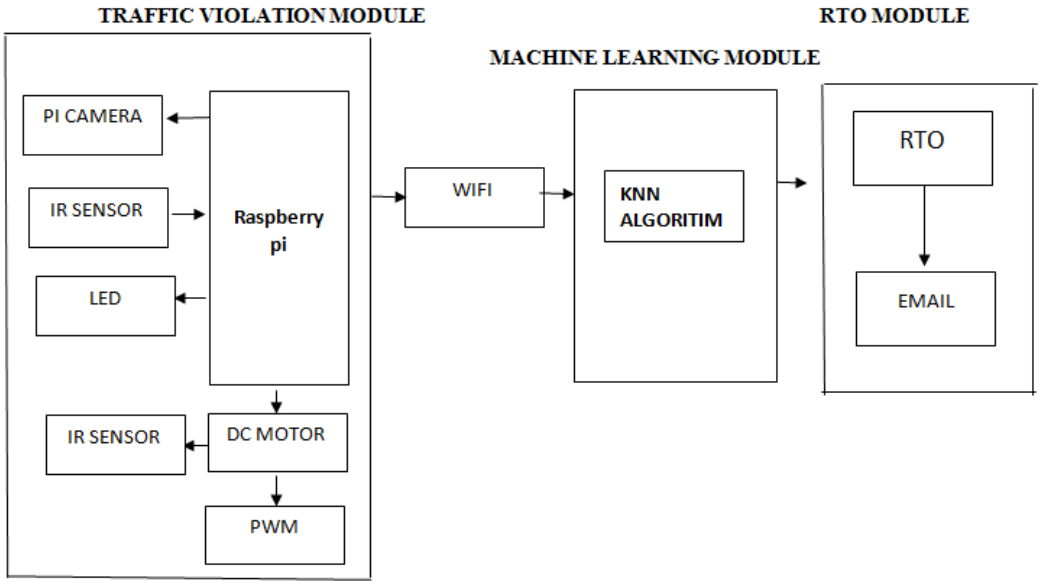

Fig.1 Architecture Diagram

The architecture diagram mainly consist of three modules:

- Traffic Violation Module
- Machine Learning Module
- RTO Module

It's a tiny credit card size computer in addition of a keyboard, mouse, display, power supply, USD card with installed LINUX distribution. It works as a low-cost server to handle light internal or web traffic.
PI-CAM: It connects to a computer and internet and captures picture or motion video of user or another object and it allows face to face communication.

The proposed system has several parts: the on-board unit that detects the violations and stores them into its memory; the violation reader that can read the committed violations wirelessly; and an infrastructural wireless network to enable automatic violation reading from the on-board units and send them to traffic authorities. If this system is implemented and deployed, no minded driver would commit a traffic violation. This is turn will reduce significantly the traffic accidents. The framework creates e-challans with photograph proof, which is then sent to the violators through SMS, E-Mail. The point of this activity is to give a protected driving condition to drivers, help people on foot in going across the street securely and improve consistence with street traffic rules. If violators can afford to avoid payment, the number of violations will increase rapidly, enforcement loses its effect and road safety suffers.

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 6, June 2020

B. Flowchart

The flowchart shows the step by step process taking place in the Proposed System.

- Start the process
- The Raspberry Pi 3 processor is used.
- IR sensors emits IR rays.
- Cars block this radiation when they pass red light.
- Then the process gets activated.
- PI camera captures image of the car that blocked the light.
- KNN algorithm extracts number plate from the image captured by pi camera.
- Sends this to RTO module which then matches to the owner of the vehicle.
- Send the traffic violation to that concerned person.
- When car crosses IR right which activates process and dc motors.
- If rpm is more than the set threshold value then it means that the vehicle is speeding.
- Which then again captures image of the vehicle.
- KNN algorithm extracts number from number plate and sends to rto module.
- The cycle repeats.

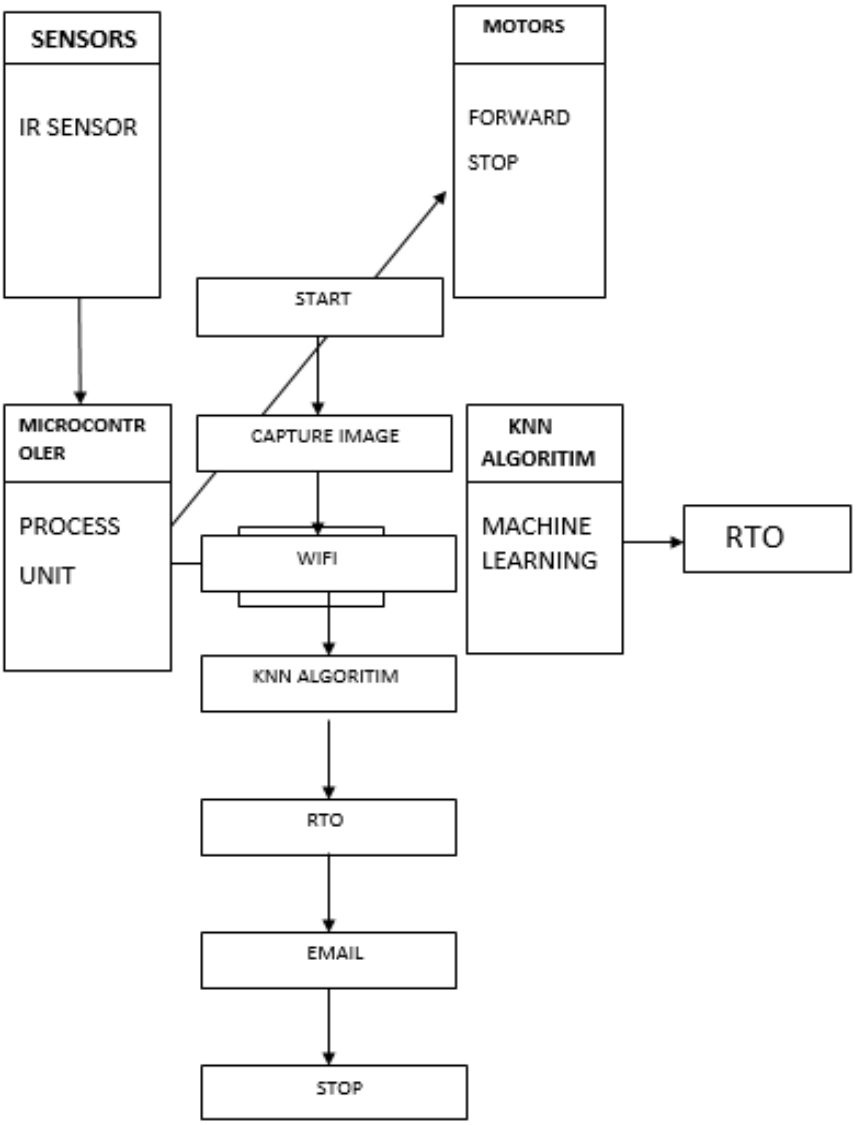

Fig 2. Figure showing the workflow of the system.

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 6, June 2020

III. RELATED SURVEY

[1] Road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. Of all the systems with which people have to deal every day, road traffic systems are the most complex and the most dangerous. Worldwide, an estimated 1.2 million people are killed in road crashes each year and as many as 50 million are injured. Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new commitment to prevention. Nevertheless, the tragedy behind these figures attracts less mass media attention than other, less frequent types of tragedy.

[2] Approximately 1.3 million people die each year on the world's roads, and between 20 and 50 million sustain non-fatal injuries. The Global status report on road safety is the first broad assessment of the road safety situation in 178 countries, using data drawn from a standardized survey. The results show that road traffic injuries remain an important public health problem, particularly for low-income and middle-income countries. Pedestrians, cyclists and motorcyclists make up almost half of those killed on the roads, highlighting the need for these road users to be given more attention in road safety programs. The results suggest that in many countries road safety laws need to be made more comprehensive while enforcement should be strengthened. The Global status report on road safety results clearly show that significantly more action is needed to make the world's roads safer.

[3] A recent study conducted in Europe discovered that 80% of drivers involved in traffic accidents believe someone else is at fault, and 5% take responsibility for their actions, while the other 15% represent varied combined responses. While distractions can cause accidents – cell phone conversations, sipping coffee, applying make-up – the biggest cause of vehicle accidents is speeding, though aggression is quickly becoming a significant cause as well. They are quick to assure that aggressive behaviours (tailgating and speeding are among them) are not at all akin to road rage, which is a specific condition. Law enforcement officers are also generally quick to remind us that the chance of a motor vehicle accident increase by 50% once the sun goes down.
If reading all these numbers seems grim, consider this: if 100 accidents are caused by poor driving, there is a 14% chance that if the driver not at fault is insured, the other driver is not.

[4] Speed cameras can reduce crashes substantially reviewed 13 safety impact studies of automated speed enforcement internationally, including one study from a United States jurisdiction. The best-controlled studies suggest injury crash reductions are likely to be in the range of 20 to 25 percent at conspicuous, fixed camera sites. Covert, mobile enforcement programs also result in significant crash reductions area-wide Prior reviewers also concluded that, although the quality of evidence was not high, speed cameras and speed detection technologies are effective at reducing traffic crashes and injuries Recent crash-based studies from the United States have reported positive safety benefits through crash and speed reductions from mobile camera enforcement on 14 urban arterials in Charlotte, NC and from fixed camera enforcement on an urban Arizona freeway.

[5] A vision-based traffic accident detection algorithm is suggested and developed in which this system for automatically detecting, recording, and reporting traffic accidents at intersections. A system with these properties would be beneficial in determining the cause of accidents and the features of an intersection that impact safety. This model first extracts the vehicles from the video image of the charge-couple-device camera, tracks the moving vehicles (MVs), and extracts features such as the variation rate of the velocity, position, area, and direction of MVs. The model then makes decisions on the traffic accident based on the extracted features. In a field test, the suggested model achieved a correct detection rate (CDR) of 50% and a detection rate of 60%. Considering that a sound-based accident detection system showed a CDR of 1% and a DR of 66.1%, our result is a remarkable achievement.

[6] This study compares the red-light running violations on approaches with and without red-light cameras at the same interactions. The presence of the red-light cameras significantly lowered the red-light running violations. High volume approaches without cameras had an approximately eight times higher rate of violations than high-volume approaches with cameras. The number of violations on low-volume approaches was five times higher than those on high-volume approaches.

[7] We have rules to govern traffic to ensure a smooth movement of traffic. We need to make sure that traffic violations do not occur and also penalize the offenders. We are considering the aspect of over-speeding for our implementation and would like to do our bit to supervise such an action. We receive the traffic surveillance
video input from a camera. We have implemented a system which measures the number of vehicles and also checks for speed limit violation. The system has an accuracy of 98.96% for vehicle count detection and an accuracy of 98.14% for speed violation detection. We use the concept of multiple reference lines for identifying vehicles. Using the total duration of frames the took to cross the reference lines we determine the speed and hence the possibility of a traffic violation. It

also helps in providing an idea regarding the traffic in any area of interest.

[8] The number of road accidents increases and causes many problems. Many people die and injured. In addition, that causes many economic, social and psychological problems that have negative impact to the development of the world. The main cause of the majority of these accidents is due to the violation of the traffic rules: driving with high speeds, crossing a red-light signal, not keeping sufficient distance with the front vehicle in the highways, driving in the wrong reverse direction, etc. As the number of roads and streets are very large and the total length of these roads is very long, there is no way to fully monitor all of them all the time by Traffic Patrol or camera systems.
This paper proposes a system to automatically and autonomously detect and record the traffic violations without the help of the human being. We propose the development of a device (on-board unit) that will be placed inside the vehicle and be secured so that the vehicle's driver cannot stop it. This on-board unit detects and records the major traffic violations committed by a vehicle in real time at any time in any place. In addition, we propose an automatic reporting system to send the committed traffic violations to the traffic authority systems.

[9] In order to improve reliability, security on roads or exploitation of automatic guided transports, many sensors are being developed to equip vehicles. Research has been carried out at INRETS and IEMN on low cost microwave collision avoidance sensors for metro guided transports and for road vehicles. For this goal, an original radar system has been designed in our laboratories. It is based on cooperative collision avoidance radar which uses a transponder inside targets. The proposed system is made of a couple of microwave transmitting and receiving equipment fixed on each vehicle, one ahead and the other behind. In order to avoid interferences between the transmitted and the received signals, two duplex frequencies of 2.2 and 2.4 GHz are used respectively for download and for uplink. The system is based on pseudo-random sequences combined with a correlation receiver and has a broadband of about 50-100 MHz. This bandwidth has been exploited to establish a high data flow communication between sensors. The aim of this paper is to describe the mock-up realized and technical solutions developed using spreading spectrum techniques to allow multi-user access and to combine the two desired main functionalities, localization and communication, inside a unique cooperative radar system. The system performances have been evaluated in terms of BER using simulations and main results will be presented.

IV. CONCLUSION

In this paper, an autonomous system for traffic violation detection and recording is proposed. The most critical violations can be detecting. We have shown how to detect the speed limit, not keeping the minimum safety distance, moving in the wrong reverse direction violations. Some other kinds of traffic violations can be detected. In addition, a simple intelligent traffic signal is proposed to enable detecting red-light-crossing violation. The proposed system has several parts: the on-board unit that detects the violations and stores them into its memory; the violation reader that can read the committed violations wirelessly; and an infrastructural wireless network to enable automatic violation reading from the on-board units and send them to traffic authorities. If this system is implemented and deployed, no minded driver would commit a traffic violation.

ACKNOWLEDGMENT

We would like to take this opportunity to thank our guide **Mr. Veeresh Basavaraj Hatti**, for giving us all the help and guidance needed. We are grateful to him for his kind support and valuable suggestions.

REFERENCES

[1] Ector machines, regularization, optimization, and beyond. MIT press, 2001. K. Xie, "Automatic Utility Meter Reading," 2010.
[2] T. D. Duan, T. H. Du, T. V. Phuoc, and N. V. Hoang, "Building an automatic vehicle license plate recognition system," in Proc. Int. Conf. Computer. Sci. RIVF, 2005, pp. 59-63.
[3] M. Yu and Y.D. Kim, "An approach to Korean license plate recognition based on vertical edge matching," in Systems, Man, and Cybernetics, 2000 IEEE International Conference on, 2000, vol. 4, pp. 2975-2980: IEEE.
[4] N. Dalal and B. Triggs, "Histograms of oriented gradients for human detection," in Computer Vision and Pattern Recognition, 2005. CVPR 2005. IEEE Computer Society Conference on, 2005, vol. 1, pp. 886-893: IEEE.
[5] J. D. Gibbons and S. Chakraborti, "Nonparametric statistical inference," in International Encyclopedia of statistical science: Springer, 2011, pp. 977-979.
[6] World Health Organization, Department of Violence & Injury Prevention & Disability (VIP), "World report on road traffic injury prevention (2004)". (http://whqlibdoc.who.int/publications/2004/9241562609.pdf)
[7] Car insurance list. http://www.carinsurancelist.com/car-accidentstatistics.htm
[8] M. Hollander, D. A. Wolfe, and E. Chicken, Nonparametric statistical methods. John Wiley & Sons, 2013.