

Auto Fine Generation System for Traffic Violation Detection

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Abstract - With the world's population increasing the number of vehicles being used on an everyday basis has been increasing dramatically. Owing to this scenario, vehicular traffic is the most prudent and something that must be identified at the earliest to the benefit of the general public and also the traffic personnel. The serious eventuality may result in traffic jams and the key to fix the said problem can be found in order to handle the current situation. This paper aims at incorporating a solution for traffic violation detection at the signal using Radio Frequency Identification Technology (RFID).

Key Words: RFID Reader, RFID tags, GSM, Renesis Micro-Controller.

1. INTRODUCTION

Nowadays expeditious growth in population is a norm and people are investing more for their comfort. As a result, the number of automobiles being used is also dramatically increasing. Nowadays expeditious growth in the population has led to increasing in the usage of automobiles. As a consequence of the above scenario traffic and hence the traffic violation drastically increases.

In this paper, we use modern technologies like RFID and IoT to identify the vehicles committing certain traffic violations and penalize the violator. The suggested approach is quite coherent, and more efficient since it avoids the ambiguity of having several models with different objectives. Instead, we concentrate on a single approach for the detection of a particular violation committed.

We use RFID technology for the said approach. Here RFID readers and tags are used to detect the violation. In this system, RFID technologies are used to monitor real-time traffic information. The technology used records the information of those vehicles violating the traffic rules and hence a message is sent to the mobile number accompanied with the respective vehicle.

After generating the data using the mentioned methods, it is made accessible to the general public so that they are aware of the fine incurred. We use this technology in the real-time traffic management system.

According to the traffic rule, vehicles are said to be stopped at the stop line near the zebra crossing when the

signal turns red, sometimes people who drive the vehicle surpass the stop line and jump the signal.

In some scenarios, people purposefully stop the vehicle on the zebra crossing while the zebra crossing is meant for pedestrians to cross the road, so this incorporates one of the major violations of the traffic rule.

2. LITERATURE SURVEY

[1] Authors "Mr. Pranod K Charles, Srilekha Govvala, Anjali palavayi, Rupa Bandaru, Yamini Gurram" have implemented Advanced Traffic Violation Penalty System Using IoT and Image Processing Techniques. In this paper, Strassen's and Winograd's convolution algorithm for raspberry pi is used. The project deals with providing instantaneous penalty messages to violator about their violation. The camera is used to identify the violators and license plate recognition. Further it can be enhanced using some new technologies like image processing techniques.

[2] Author "Mr. Arun Yadav" have implemented RFID future of red light violation detection system. This paper discusses the various implementations of existing detection systems and proposes the radio frequency identification-based solution to overcome some limitations and improve the accuracy of RIVDS. This system possesses serious threats to the data security measures. Implementation of secure processes such as certificates for authentications should be used.

[3] Authors "Salam A.W Al-Abassi, Mohammad Sharba, and Karrar Al Bayati" have implemented Smart Prepaid Traffic Fines System Using RFID, IoT and mobile app. This system uses Arduino UNO micro controller which in-turn helps the microcontroller to get activated and communicate with the main processing unit. The data is fetched by the help of RFID which reads the tag that is attached to the vehicles. Data is then transferred to the server and processed according to the pre-defined traffic rules.

[4] Authors "Mr. B. Malakonda Reddy, Ch. Sravya, A.Sahithi, K.Indu, N. Sai Kumar" have implemented AUTOMATIC PENALTY ASSORTMENT SYSTEM FOR TRAFFIC LIGHT VIOLATION. The purpose of the project is to properly track traffic signal violation with the help of cameras using RFID tag and infrared sensors. This document shows the entire traffic light handling system using the latest technologies. The system works with red light.

[5] Authors "Vijayaraman P, P Jesu Jayarin" have implemented Intelligent Traffic Management using RFID Technology. In this paper a smart method is implemented to overcome the traffic jam and related problems. This system provides a proper solution for the mentioned problems and further the system is divided into several modules which provide a clear solution and benefits of the method proposed. The system concentrates on several advantages and can be enhanced using new technologies.

[6] Authors "Suyash Bharambe, Omkar Dixit, Sushant Wavhal, Sapna Golhar" have implemented Automated Penalty Collection for Traffic Signal Violation using RFID. The method used in this system that is the RFID tags which are placed on the vehicles, which aids in proper traffic management, which in-turn reduces the traffic related issues. The drawbacks of this system include the high expenses in adopting this system, it also requires an advanced image processing technique with adequate software background.

[7] Authors "T. Ramaswamy, T. Charandeep, CH. Sai Santhosh, M. Rohith Goud" have implemented Signal Violation Vehicle Detector using IOT. The proposed method detects the traffic congestion and vehicles that violate the traffic rule. Smart car parking allowance and automatic toll collection is done. Traffic management and data collection is done using several sensors like IR sensors, wireless networks, RFID and other techniques. The proposed idea is not fully automated there is some human interaction is needed in this project so to overcome this problem some new technologies like artificial intelligence can be used to enhance this system.

[8] Authors "Dr Geetha S, Sathish Kumar S, Pradeep R, Pradeep S" have implemented Smart Traffic Control System using RFID. This paper provides management of Traffic with the help of RFID tag and RFID reader which are placed at traffic junctions. It also helps in managing the traffic lights in accordance to the traffic congestion on the road. This system can be enhanced by testing in various conditions.

[9] Authors "Ranjith A, Revathi A, Dr. S. Lakshmi, Porchelvan M, Ponmuthuram R, Vinod Kumar T" have implemented Red Signal Violations and Development of Prototype for Automated Enforcement System. This paper explains about how to control traffic using RFID technology and image processing. Also this system concentrates on the vehicles jumping red signal violation committed.

Further for the enhancement of this system can be done by introducing this system with lab-based experiments to understand in a better way. Most of this system lags in various conditions like identifying the particular vehicle when there is traffic congestion. So enhancement is needed for this system which helps in using this system in an efficient way.

[10] Authors "Angel Deborah Suseelan, S Milton Rajendram, Rajalakshmi Sivanaiah" have implemented RFID-Based Traffic Violation Detection and Traffic flow Analysis System. This paper we presents an intelligent traffic violation detection and traffic flow analysis system (TVDTFA) to monitor and measure red light jumping. This system is based upon Radio Frequency Identification (RFID) technology for identification of vehicles on the road. Traffic violation detection algorithm is based upon the information retrieved from vehicle and type of signal from traffic light. In real time environment, if the average road lane is 3.5m, then approximately two 125 Hz readers are required for one road lane. Many vehicles may be moving nearby and possibly blocking or attenuating some of the RFID signals, especially with large vehicles like trucks. A possible solution is the use of RFID readers of higher frequency range since their reading range is high.

Adopting this system results in benefits and advantages over other technologies being used. This system helps the general people in believing the purpose served by this system and also makes the society modernized.

3. METHODOLOGY

An effective and coherent solution is given in the proposed system. A disciplined form of traffic management can be implemented. RFID Technology is used. It concentrates on activating the RFID sensors based on traffic signals. Handling and detecting traffic violations manually is quite cumbersome especially while considering the density of traffic. Furthermore, it requires a lot of work which is time-consuming. So a lot of automated systems are being used in the recent past.

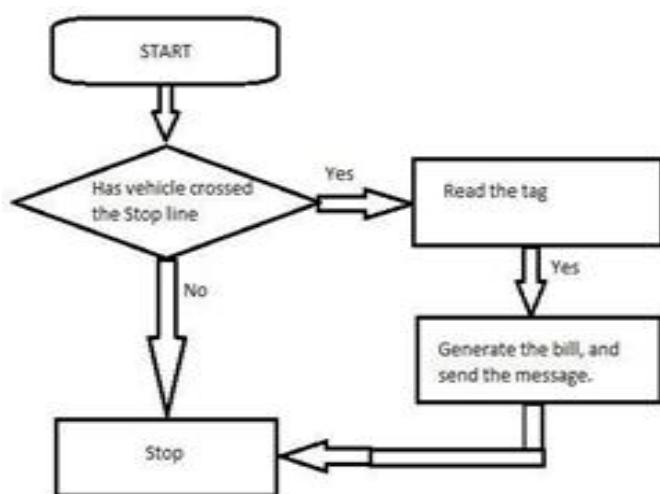


Fig -1: Level Diagram

The traffic violation we are concentrating in the system is the ignorance of the red light by the vehicles when the red light is implemented. The vehicles are supposed to stop when

there is a red signal, but certain vehicles jump the signal so such an offence is penalized in our proposed system.

Let us consider the white strip of line before the zebra crossing as the "stop line". The RFID readers are placed on this stop line. RFID asset tracking is a way of automating the management and locating the process of physical assets. It works by loading an RFID tag with data and attaching it to a relevant asset. This data can include anything from name, condition, amount and location.

Through RFID tags repeatedly pulsating radio waves, an RFID reader is able to capture stored data. Eventually collecting it in a sophisticated asset tracking system where the data can be monitored. This will help to automate the entire tracking system by reducing error-prone methods of pen and paper.

When the offense has been committed the bill for the respective will be generated, a message will be sent to the mobile number accompanied with that particular vehicle.

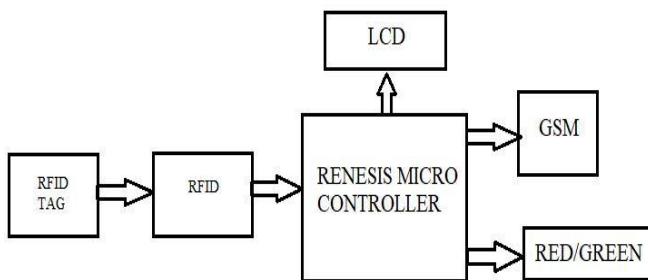


Fig -2: System Architecture

4. DISCUSSION

An increase in traffic is one of the major concerns in society. Especially in a country like India with an ever-increasing population. People are investing more in their comfort, thus many automobiles have come into the picture. Naturally, the number of vehicles is also increasing, thus leading to traffic congestion and several forms of the traffic violation. Traffic violation leads to major accidents and causes serious injuries to the public on the roads so to overcome these situations some of the ideas and technical methods were proposed which help in overcoming this situation the other way round but some of these ideas have major problems and drawbacks which can overcome the drawbacks. Recently in the state of Karnataka, India traffic authorities have implemented and brought into action a huge project which handles traffic and monitors road incidents and also traffic violations. This system which has been proposed by the Karnataka state government has been implemented in major traffic or congested areas where manpower alone cannot be sufficient, so to handle this sort of situation this project is implemented where all the live traffic is recorded through the high definition cameras installed at the major hotspots

like the major signals, crossings, and the diversion roads. The system is built or developed in such a way that it auto-detects the type of violation being done and is recorded and fed into the database. The system is trained in such a way that whenever a traffic violation is detected by the high-definition cameras they capture that particular video clip and send those video clips at some rate of time which is fed into the database. When these video clips are supplied to the system it identifies the type of violation committed and penalizes the vehicle. This system in reality has helped the traffic authority to handle the work in a better way but this system again has major drawbacks which intern makes the general public against the system. The major drawback of this system is the memory part which is the storage capacity of the data sets of every vehicle on time, because this system stores the video clips in the database video processing is a hectic problem where it consumes much of the storage in the database. As the cameras are of high definition then the video quality would be megabytes together if the quality of the cameras to overcome a such problem is reduced then the video or the clarity of the image and the vehicle number plate or any other tags will not be clear and this will become a problem to the system itself to recognize the vehicle and penalize the vehicle which is, in turn, a great loss for the government itself because to build such project huge amount has been spent which will not be profitable anymore. So another drawback of this system is the processing of the video clips, let us consider a scenario where a vehicle speed is faster than the capturing rate of the camera if the vehicle is fast enough even though when a video has captured the visibility of the required data will be less so it is also a serious concern. Another drawback of this system is the angle or the inclination of the cameras and the placement of these cameras in perfect points because to some extent the cameras can capture in some major inclined angle beyond the limit that it cannot capture which will lead to the escape of vehicle even though a system is implemented. Another major concern of this system is the detection of traffic rule violations near the zebra crossing. Let us consider a scenario where a vehicle crosses the stop line which is at the signal and is stopped on the zebra crossing itself, here zebra crossing is meant for the pedestrians to cross the road and the stop line near the traffic signals is an indication or a caution given to the driver or rider of the vehicle not to cross or move beyond that line when the signal turns to red. So people are violating this rule as if some of the daily travelers do not even know that the stop line serves some purpose at the signals and some even though knowing the rule will commit such sort of offense and become a disturbance for the pedestrians on the roads this has to be overcome where the existing system is not able to capture the clips at the signal due to the improper placements of cameras and the angle where the cameras are inclined. This are the methods which are proposed and are being used in the real-time which are not supportive in some of the scenarios discussed.

5. CONCLUSION

In this paper, we have come up with an systematic approach that will automatically penalizes for violation of traffic rule, which will lead to an organized traffic management. This helps in reducing many problems related to traffic and also contributes to efficiently decrease number of major accidents.

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