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AUTOMATED PENALTY COLLECTION FOR TRAFFIC RULEVIOLATION AND PAYMENT OF TOLL COLLECTION USIN GRFID

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***Abstract*—Today in the 21st century everyone needs anything at an instant point of time. We can see that the world is run with the help of the smart devices and the sophisticated gadgets, which has led to a huge digital transformation. Well, we know that it is easy to obtain a driving license in India. Also, the punishment given to the drivers who are errant are light. Most of the drivers are ready to give bribe and the rash drivers mainly the young ones are free to go. People are not bothered to follow the rules and signals. India ranks number one in terms of number of accidents as per the latest data. According to the experts from National Transport Planning and Research Centre (NTPRC), 30% and 20% of the accidents occur in the National and State Highways. On an annual basis, India constitutes 11% of the accidents in the world leading to more than 1,50.000 deaths and nearly 4,50,000 injuries. Well, there are always solutions for any type of problem and in some ways we resolve. We could use RFID active tags which is mandatory for every vehicle to mount on the front glass of the vehicle. This could help to track the vehicles movement and helps in simplifying the traffic management. Implementation of this system could help in reducing the accident count in Highways and also helps in avoiding bribe on the other hand.**

***Index Terms*—RFID fastag, National Highway, Traffic rule violation, VIS, RPRS, EPS, Penalty collection**

I. INTRODUCTION

India is the second largest economy in terms of population and it one of the fastest growing economies in the world. But there is very much slow growth in the infrastructure due to very low space and high space constraints. As the population count increases the number of vehicles has also increased leading to heavy road congestion and traffic violations. Compared to developed countries India has a non-lane and disordered type of driving on the roads. Due to these there are many serious issues related to increased traffic violations such as accidents, time wastage, and many health- related problems. The primary objective of this paper is to collect the traffic challan fees through the RFID tags in the toll collection booths in the National and State highways. The project proposes the deployment of RFID tags in the car and the RFID reader at the toll booth in highways. The RFID tag will be having a very unique ID in the tag and this tag will be used to detect the vehicles that violates the traffic rules and the toll fee collection would be also collected at the toll booth using this RFID Tag. At the time of purchase of RFID tag the owners KYC will be verified and it will be linked to the bank account of the owner. Whenever a car violates the traffic rules the Vehicle Identification System and Registration plate recognition system captures the details about the vehicle and traffic challan along with the toll fee will be collected by the RFID reader from the RFID tag. The amount will be automatically deducted from the owner's bank account. If the account has insufficient bank balance, other ways would be adopted to collect the fees. The project mainly focuses on automation of penalty charges for traffic violation which helps in reducing bribing as well as reduce in the traffic violationin the highways.

Fig. 1. RFID Tags

RFID Introduction and Working of RFID

RFID is short form for "Radio Frequency Identification". It refers to a technology wherein a digital data is being encoded in the RFID Tags. These RFID tags are being captured bya RFID Reader through radio waves. This RFID is exactly similar to the barcoding which are used in retail stores, from which the data collected in stored in a database. The RFID technology, mainly consists of three components: an antenna, the tag reader named as Transceiver and the tag which is the RFID transponder. The RFID tag consist of microchip that is embedded in it that stores and process the information and an antenna would be used to receive and transmit the signals from the RFID Reader. As the

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RFID reader reads the tag the information will be sent to the system database were all the information are stored. In the Toll booths in highways the NHAI uses the active tags in which it has its own battery that will help in broadcasting signals for a long distance. This type of tag will also help in carrying bulk information to the database.

II. RELATED WORK:

In India, traffic congestion has become a serious problem that is faced by the people on the roads. Exponential growth in the urban areas has led to increase in the number of vehicles inwhich mainly the middle-class people contribute significantly to the number of vehicles [1]. [2] There are many papers that have done as part of the research study on automated collection of penalty charges of traffic rule violation. Priority based traffic lights controller and sensors is being discussed to provide clearance to emergency vehicles on the roads. This system has benefits for these types of vehicles but even thoughthere are some drawbacks. Firstly, installing sensors on all the roads is very expensive especially when taking the case of an economically backward country like India. Secondly, the communication through these sensor networks won't be much reliable. Finally, these sensors would need high cost for maintenance and these won't be robust in terms of Indian weather.

In [3], using traffic light control system is proposed. This system helps in detecting image of the vehicle. There will be aimage sequence that will be captured by the camera and it will help in detecting the vehicle easily. This system has more efficiency in image processing of the vehicle detection which is a better method to control the state of traffic in the traffic lights. These systems use actual traffic images than those systems used as the sensors. Even though this system is useful, some drawbacks are still present. As this system is beingproposed to the traffic light signals, while installing in the national highways it won't be able to capture the image of the vehicle in very poor weather conditions like heavy rain, wind. In this system there is no intelligent image processing technique, which will require to hire a person who has a strong software background. Hence, this system cannot be used in National Highways since there is no 24x7x365 days full time surveillance.

Need of the Project

The need of the project "Automated Penalty collection for Traffic rule violation using RFID "is because presently, the police have to catch hold of the drivers who violate the rules bythemselves, which may injure them as well. Fine is been given manually which is paid through cash or digitally, the major population does not know the charge of a specific violation. Police may take the benefit of charging the fellow drivers and fine them even if there is no violation has been occurred. Taking an example when a person violating signal may charge Rs 1000 instead of Rs 500. In the current situation after being caught, the police may take fewer amounts than the actual finein the forms of bribe.

Working of the Proposed System

The **Fig.3** shows the proposed system which consists of RFID tag which is deployed on the car. Each RFID will have aUnique ID. The RFID reader will be also deployed in the Toll fee collection point. The RFID Tag consists of the details of the owner related to the owner's vehicle. The details consist of car owners name, contact number, email address, license number, RTO area, car number, car model and also the bank account details are already stored in the database. The traffic penalty fine will be also stored in the database. The **Fig.4** shows the flow of the overall system in a model. Taking the scenario, suppose a car travelling in the National Highway drives at more the limit speed these two systems will capture the details of thevehicle in the National Highway. These systems include the VIS, RPRS, and the EPS system.

Vehicle Identification System (VIS)

VIS primarily captures pictures of vehicles that violates the traffic rules on the road with the system or network of RFID and camera. The captured images then used for various purposes like

- The Registration Recognition Plan Subsystem uses the captured images for the extraction of vehicle number.
- The number will be stored with the timestamp and it will further used as a proof in case of any breach of security againstthe vehicle owner.

Registration Plate Recognition System (RPRS)

The purpose of this system is to synthesise the image taken by the VIS system and by this it extracts the registration number of the vehicle in the registration number plate. The unique identity of the vehicle is understood by the registration numberof the vehicle.

Electronic Penalty System (EPS)

After the extraction of the registration number from the registration plate using the RPRS system, the EPS system willsearch for the RTO area of the vehicle. This helps to find the owner details and a certain amount penalty will be imposed and it will be deducted from the bank account. An SMS will be sent to the owners registered mobile number after the deduction of penalty charges from the bank account along withthe toll fee from the toll collection centre. These transactions will save in a database for future reference. These whole data will be stored in large centralized database.

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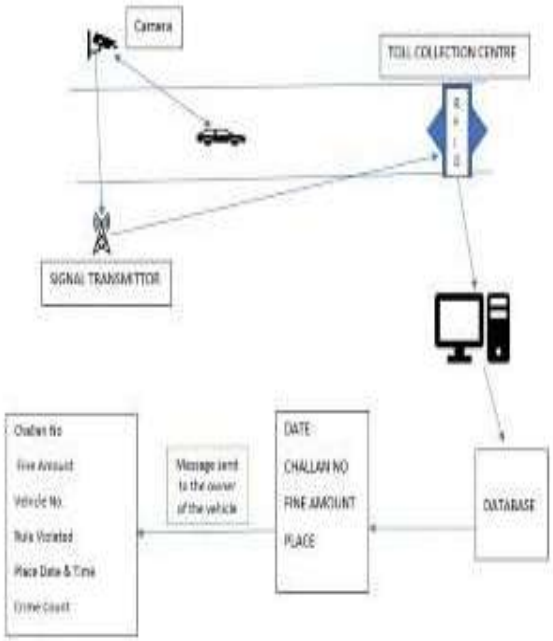

Fig. 2. Proposed System

Sample Message content

1) Challan No
2) Fine Amount
3) Vehicle No
4) Rule Violated
5) Place
6) Date & Time
7) Crime Count

If there is insufficient bank balance in the bank account of the owner at the time of time penalty deduction from the account. Alternative ways like visiting the person to collect the fine is also possible or pay manually through the website.

If the person exceeds the limited legal action, his/her license for a temporary period. Thus, this helps in normalising the traffic rules. This also helps the cops to manually check in the National Highways and also helps in saving time of the cops. This automated system will help to follow the traffic disciplines and collect the penalty fines easily. It will also help in minimizing the accidents which are caused due to violation of traffic rules. By impose of this system will help the IT graduates for monitoring the work flow, maintenance of the database of the transactions etc.

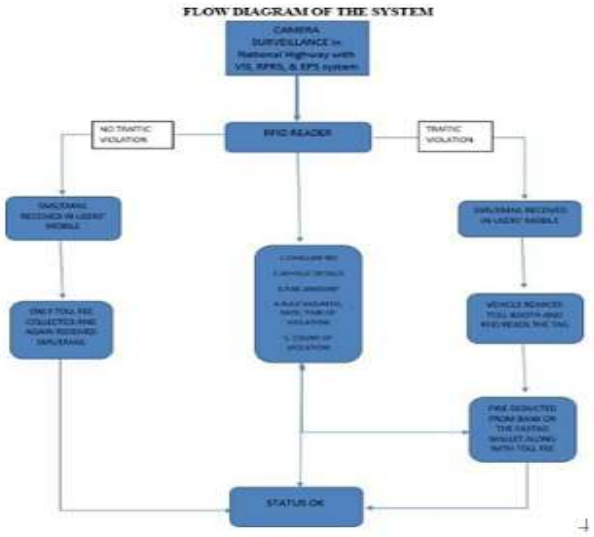

Fig. 3. Flow diagram of System

III. RESULTS

1) This proposed system creates a safe and smart environment which includes:

- The money deduction from the bank through automated fine collection system using RFID for traffic rule violation.
- Complete wash out of bribes leading to complete legal cash flow through bank accounts.

2. The vehicle accidents in the national highways will decrease substantially and this will make the people to oblige to the traffic rules to be followed maintaining a road disciplinein the National Highways.

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