

# Smart Toll and Penalty Collection System using on QR-Code

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**Abstract**— In some countries like India need a significant improvement in infrastructure such as Roads or Highways. Construction of these highways is a costly affair, which can't be invested by the government alone. Normally Public private partnerships are made to construct such a huge projects. The investment on these projects can be regained by collecting toll from the passengers who use the roads. The toll collection system, especially in India faces some problems such as long queue lines, escaping from toll plazas etc. These systems can service only 300 vehicles per hour, and if more than that number of vehicles arrives at that plaza, server traffic jams may occur. With the increase in the number of vehicles on road, there has been a marked increase in the number of crimes involving vehicle theft. In spite of several stringent laws being in place and security measures taken by car manufacturers, thieves still find a way to remain one step ahead and vehicle theft is still among one of the most reported crimes worldwide. Due to the expensive nature of motor vehicles, there is ample incentive for petty thieves to attempt thefts. To solve both problems we propose QR Code base toll collection system. QR Code is generated at the time of registration of vehicle in this proposed system. On toll collection booth we collect toll as well as identify vehicle is stolen or not. Second module is to give easy work to traffic police to collect penalty through qr code.

**Keywords:** Transitive Control; Urban Mobility, QR Code, Penalty Collection, Toll Plaza

## I. INTRODUCTION

If you will probably travel along highways and interstates that allow you to travel faster and have fewer, if any stops. Of course, certain types of roads have occasional stops where you have to pay money to travel on the road. These types of roads are called toll roads. Sometimes they also go by other names, such as toll-way. To travel on a toll road, you have to pay a fee or penalty — called a toll. Sometimes you have to stop every so often to pay additional tolls to keep traveling on the toll road. Most roads are built with local, state or national government money raised from taxes. Tolls are like a tax that applies only to the users of the toll road. Toll roads allow new roads to be built and maintained without raising taxes on the general public. A toll road doesn't always stay a toll road forever, though. Sometimes tolls are removed on roads once the cost of construction has been recovered from the tolls collected. You'll know you're on a toll road when you encounter a toll plaza. A toll plaza is a gated area where you have to slow down or stop to pay a toll to continue traveling on the road. There are usually many available lanes with toll booths to keep traffic moving as quickly as possible. Some lanes may have people working the toll booths, so that you can pay with change or cash. These lanes are getting slower and slower day by day because number of vehicle gets increase rapidly. To solve this problem we are use QR Code. QR is short for Quick Response Codes. They are used to take some information from a transitory media and put it in to your cell phone. You may soon see QR Codes in a magazine

advert, on a billboard, a web page or even on someone's t-shirt. Once it is in your cell phone, it may give you details about that business or details about the person wearing the t-shirt, show you a URL which you can click to see a trailer for a movie, or it may give you a coupon which you can use in a local outlet. The reason why they are more useful than a standard barcode is that they can store much more data, including URL links, geo coordinates, and text.

In this project we are going to use QR Code to store all information of vehicle as well as vehicle owner. QR Code will contain vehicle owner name, address, mobile number, email id, owner driving licenses number, vehicle number, vehicle type, user type like pass holder/ non pass holder, is it stolen or not etc. Toll collector and traffic police will scan the QR Code to vehicle authentication and toll collection as well as penalty collection.

## II. PROBLEM STATEMENT

### A. Problem Statement:

The common proposal for collecting tolls was to have the driver stop and pay a toll to collector sitting in a tollbooth. A manual lane can process approximately 100 vehicles per hour. So there is multiple lanes on toll booth. These increase the labor cost, fuel consumption, required time, financial loss. To find the stolen vehicle police need to search separately. Hence we proposed a system Toll and Penalty Collection Based on qr-code.”

### B. Motivation of the Project

Indian National highways these days get to be one of the busiest roadways in India. The central point incorporate the expanding number of vehicles along government courses and the expanding populace in significant urban areas and towns of India. This is the motivation behind implementing propose system. Where QR Code is used to store the information. These QR Code is used to collect toll and identification of vehicle. Toll will collect by simply scanning QR Code by toll collector. This will reduce the time required for toll collection at toll plaza.

### C. Goals & Objectives

- To provide easy and better way to toll collection system.
- Collection of toll and vehicle identification is done at the same time because of this time delay get eliminate.
- System maintain stolen vehicle database. Every single vehicle cross check with this databased.
- To reduce traffic at toll plaza.

## III. RELATED WORK

“Sudheer Kumar Nagothu Automated toll collection system using GPS and GPRS. In this paper proposing to create geofences using GPS by giving latitude and longitude of the corner of the toll plaza. By comparing the position of the vehicle and toll plaza, the owner of the vehicle can be charged from the account.

P. Kamalakannan; M. Balaji; A. Avinash; S. Keerthana; R. Mangayarkarasi, “Automated toll collection with complex security system”. The paper is concerned with automated toll collection system using the active RFID tags; vehicles are made to pass through a sensor system that is embedded on the highway just before the tollgate. The system will electronically classify the vehicle and calculate the exact amount to be paid by the vehicle owner, ensuring no pilferage of the toll amount. Vehicle owners, who frequently pass through tollgates, are required to have a prepaid smartcard, which will deduce the appropriate amount, by using an automated smart card reader.

Anurag Ganguli; Ajay Raghavan; Vladimir Kozitsky, Aaron Burry “Automated fault detection in violation enforcement cameras within Electronic Toll Collection systems”. Electronic Toll Collection facilities offer travelers the ability to pay toll electronically, most commonly via Radio Frequency Identification (RFID) transponders placed within the vehicle. To prevent violation, photo enforcement cameras are used to capture license plate images of the violating vehicle. Thus, reduce human workload and increase maintenance efficiency. Wherever possible, we use no-reference or reduced-reference approaches for fault detection.

Jayapriya CT; Y. Bevis Jinila, “Secured short time automated toll fee collection for private group transportation”. This paper presents automated toll fee collection system in more efficient, faster, low cost and in very secure manner. Normal cameras are used to capture vehicle number plates and vehicle numbers are retrieved. Using the retrieved vehicular id the details of the owner and linked bank accounts are collected from database. The toll fee is deduced from bank account if amount is available else manually paid.

Dipti Jadhav; Manoj Sabnis, “A Open road tolling in India by pattern recognition”. Open Road Tolling uses video evidence to identify vehicle usage of a toll facility without the use of toll booths for toll collection without having to stop or even slow down to pay the toll. The application utilizes image processing and pattern recognition methods for Open Road Tolling. This paper presents Open Road Tolling (ORT) using number plate recognition.

#### IV. PROPOSE SYSTEM

We Proposed system contain combination of toll collection and vehicle identification system. User registers on system, after registration QR code get generated. QR code contains all the information about vehicle and owner. On tollbooth, toll collector will scan QR code and identify user and vehicle. If user is regular user then deduct amount according to one way or two way travelling toll charges. At the same time we identify vehicle is stolen vehicle or not. Final module is traffic police in that existing system there is and separate hardware device to check details through number plate and collect penalty. Hence we proposed an system to generate secure QR Code in that information stored in encrypted format and at traffic police scan QR Code through his/her mobile phone and check details and collect penalty.

#### V. METHODOLOGIES USED

Problem with physical toll plaza is there will be physical scan vehicle to collect toll while trying them. There are multiple solution is available for this:

- 1) First is, scan QR Code using camera processing, in that we performing the virtual QR Code on static image.
- 2) Second one is virtual QR Code using the image processing, in that we performing the virtual QR on the live vehicle data. So, we are using second solution that is our system, we are performing the processing on information feed.

#### VI. SYSTEM ARCHITECTURE

When any user buy a new car, first of all he to register that on rto-department. In registration form information included such as vehicle owner name, address, number, vehical information such as Number plate, model number. With the help of this information rto-Department form an qr-code and it get eliever to the uer.

When any car pass the tollboth the qr coe get scan. The toll collector check the details in database and collect the toll, at the same he also check it is an stolen or not.

The second module is, if any user break the traffic rule, then police also collect the penalty through scanning qr-code. This is an helpful to avoid corruption.

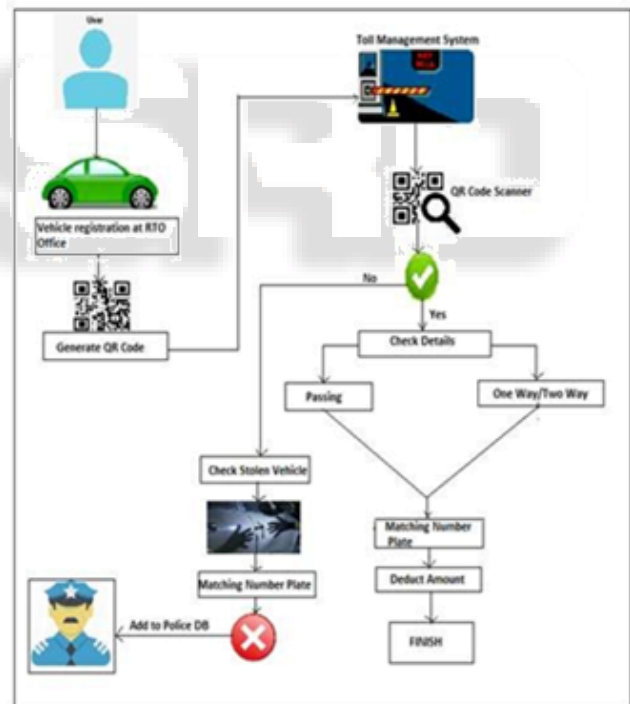


Fig. 1: System Architecture

#### VII. OUTCOME

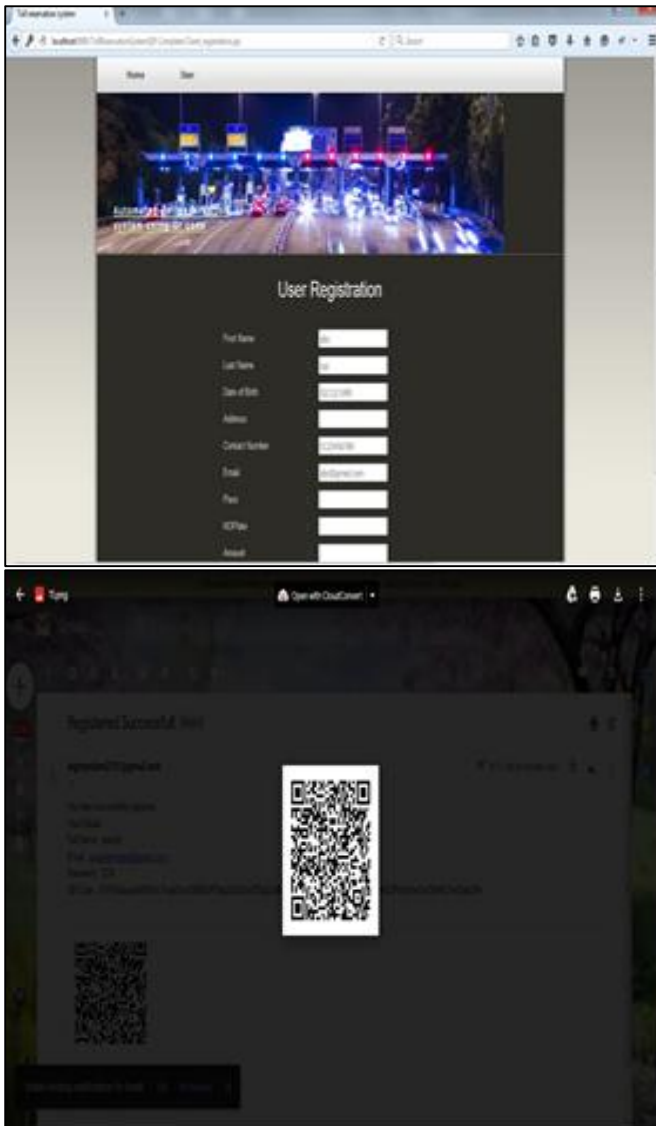
- 1) Increased revenue
- 2) Great increase in online Toll Penalty Collection.
- 3) Less physical efforts.
- 4) Reducing the heavy traffic on toll plaza.

#### VIII. RESULT

- 1) User fill an registration form and get Qr code.
- 2) Toll collector scan the qr code and collect the toll.

3) Traffic police also take an penalty through Qr code.

A. User Application:



### IX. CONCLUSIONS

QR-Code is accurate way to store information also effective way to handle stored data securely. We propose effective and transparent toll collection system. Toll collector just need to scan QR-Code; all other operations are done automatically. Automation toll collection reduces the time required for toll collection. Also propose system is capable of identify vehicle is stolen or not and penalty collection. This feature will track stolen vehicle. Finally at traffic police can scan QR Code and collect penalty through his/her android phone.

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