

QR CODE BASED TOLL RESERVATION SYSTEM

Pallavi Maladkar¹, Bhargavi Dhade², Vrushabh Jain³, Darshan Kaduskar⁴, Radhika Dawle⁵

¹Lecturer in Computer Engineering, Pimpri-Chinchwad Polytechnic, Nigdi, Pune, India

²Third Year Diploma Student in Computer Engineering, Pimpri-Chinchwad Polytechnic, Nigdi, Pune, India

³Third Year Diploma Student in Computer Engineering, Pimpri-Chinchwad Polytechnic, Nigdi, Pune, India

⁴Third Year Diploma Student in Computer Engineering, Pimpri-Chinchwad Polytechnic, Nigdi, Pune, India

⁵Third Year Diploma Student in Computer Engineering, Pimpri-Chinchwad Polytechnic, Nigdi, Pune, India

Abstract

The toll collection system at present is manual. The major problem of this manual collection is that it is more time consuming and it is more complex. But during rush hours, it is most difficult for drivers to drive from congested places. So, the traffic is also the main issue and challenges to control the traffic into. The main idea behind implementing this project is to automate the toll fee collection in toll plazas of Indian roads. Mobile Toll Application is an automated electronic application whose function is to improve the efficiency of the transaction time at the toll gate, thus reducing queues of vehicles by utilizing the Android OS and the QR Code as media access automatically, so no need to use manual service at toll gates. Along with the increasing number of vehicles in major cities, toll road is an option for smooth transportation to avoid congestion. The increasing use of toll roads will be followed by the increase in highway infrastructure to support optimum service to users. System used here is QR (quick response) code tag system. An embedded system based on the QR code, and application program is developed for automatic toll collection in minimum time to overcome the traffic problem.

Keywords: QR code (quick response), Encryption, Random Key Generation, Database.

1. INTRODUCTION

As India is developing fast there are various automations and technologies that are been used daily. Peoples like to travel explore things, at their travels they come across toll booths.

Time here is the major factor everyone wants to save time. At regular toll booths the manual system is used i.e. one attendant will collect the toll fees another will make the entry of the vehicle; also the attendant should have change whenever needed. But at the costumer side they have to make a queue and wait for their turn to pay the toll fees and pass by. Mean while this process is very long and time taking. Our system reduces this manual process of toll collection and also makes it more secure. Secure by the means of the encryption. There is also pass generation and the scanning of QRcode for any entry of vehicle. There is no documentation of any entry as well the customer also doesn't have to keep the ticket with him/her because the e-ticket will be generated automatically.

Stolen vehicles can also be detected with the help of the police (stolen-vehicle) database and will be directly notified to the police station nearest to the toll booth. The best part of our system is that the data stored within the QRcode will be in the encrypted format, which will make hard for the hacker to get information about any of the customer. Only the toll collector will have the scanning system and he will be accessible to the data of the user/customer. The android (mobile phone) is used to do the scanning of the QRcode. Hence keeps the system safe.

1.1 Quick Response (QR) Code

QRcode is a 2D barcode that is used to store the small amount of text on data. It consists of black modules arranged in a square grid on the camera. Data is extracted from patterns presented in both horizontal and vertical components of the image. It offers a number of such as :-

1. High capacity
2. Less storage space
3. Readable from any direction
4. Structured appending
5. Cost effective over traditional barcodes

2. LITERATURE SURVEY

Mr. V. B. Dharmadhikari has proposed a system Computer Vision Based Vehicle Detection for Toll Collection System Using Embedded Linux. System is based on Computer Vision vehicle detection using Open CV library in Embedded Linux platform. The system is designed using Embedded Linux development kit (Raspberry pi). In this system, a camera captures images of vehicles passing through toll booth thus a vehicle is detected through camera. Depending on the area occupied by the vehicle classification of vehicles as light and heavy is done. Further this information is passed to the Raspberry pi which is having web server set up on it. When raspberry pi comes to know the vehicle then it access the web server information and according to the type of the vehicle appropriate toll is charged. ^[1]

Linda John, Debyani Mitra has proposed a system automatic toll collection using QR code scanning in this system capturing QR code by using web cam and recognizes it. When web cam capturing QR code, and if the QR code is correct means that

person’s vehicle is authorized. Then the barrier is automatically opened and the car is allowed to pass Web cam is video camera, which is used to capture image. [2]

Yudhi Kristanto, Bagus Priambodo has proposed a system Application Design of Toll Payment using QR Code a Case Study of PT. Jasa Marga This paper describe Electronic transaction aims to improve the time efficiency at the toll gates using Android and QR code platform as the automatic media access so that the transaction does not need to be served manually [3]

3. RELATED WORK

There are various projects that are done on this topic which are mainly using IOT. The projects are done using the web cameras which record the number of the vehicle. There are also projects using the different sensors to capture number plate and then add the vehicle to database.

4. OVERVIEW OF PROPOSED SYSTEM

4.1 Problem Statement

Problems regarding user’s time consumption, Data management were faced. Also, main focus is and vehicle security and keeping user’s data secure.

4.2 Existing System

In existing system both toll collection and stolen vehicle identification is done individually. In existing system vehicle arriving on tollbooth, then the payment is done by cash payment, card payment or pass authentication. This is time consuming process. Because of this, stress on tollbooth increase at the time of rush hours. To identify stolen vehicle, police check the vehicles at check point and tollbooth. This is manual and time consuming process.

4.3 Solution

In this system two types user are present, one is user with smart phone and other one is user without smart phone. User registers on system, after registration QRcode get generated. In the QRcode interface, the users will fill the user data such as user ID, username, and the credit balance amount. User with the generated QR code can show via phone. QRcode contain all the information about vehicle and owner. On tollbooth, toll collector will scan QRcode and identify user and vehicle. Also check user is prepaid user (pass holder) or regular user. If user is regular user then deduct amount according to one way or two way travelling toll charges. Every time after renewing of pass; generate new QRcode. If user is Pass holder he will be allowed to proceed and if user is regular user the respective charges will deduct after scanning of QRcode.

At the same time we identify vehicle is stolen vehicle or not. Made transactions on the QRcode interface and the results that come out will be recorded into the history menu automatically or not. However, the data to be entered into the history interface is user data after the transaction occurred such as user

ID, location of toll gates, the amount to be paid and the date and time of the transaction.

4.4 Architecture of the System

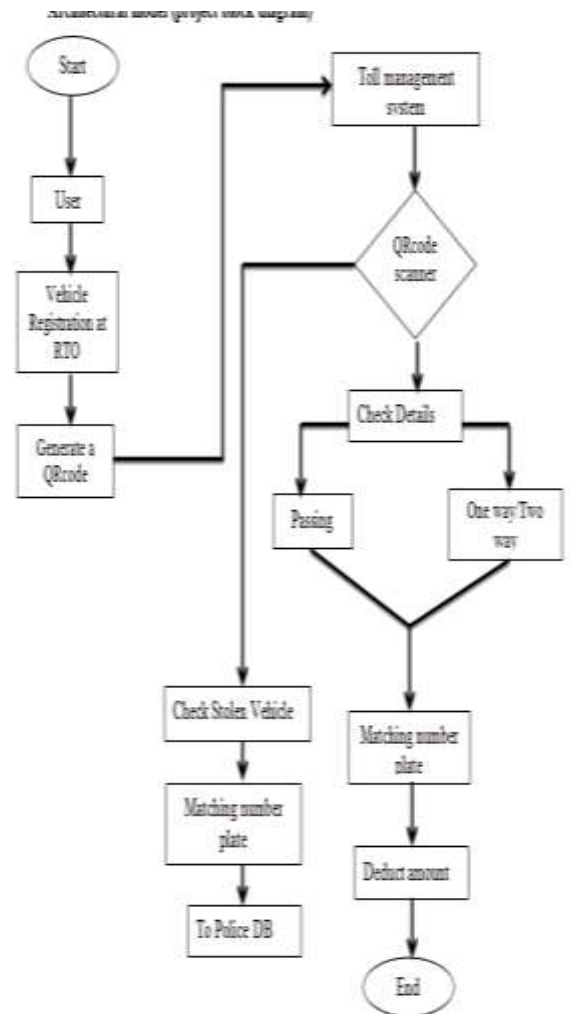


Fig.1. (QRcode Based Toll Reservation)

Fig 4.1: Toll Reservation System

In above architecture diagram user register him/her in to system. With his/her personal details as well as vehicle details. After successfully registration system generate QR-Code separately for every user. If user renew monthly pass then system will generate new QR Code. Toll collector scans QR Code to collect toll. After scanning QR Code system check vehicle is stolen or not by its number plate. If vehicle found as stolen then system will inform to police station. If vehicle is not stolen then system check user is pass holder or non-pass holder user. If user is pass holder then system will allow user for further gurney. If user is a non pass holder then system will ask for one way ticket / two way tickets. According to ticket type and vehicle type toll is calculated. Then toll is paid by online transaction.

4.4.1 The User Side

- This is the first module which consists of two main parts, namely the User Login and if the user is new, User Registration.
- The user have to fill the correct data (bank, personal details) and submit at this page will only be registered.
- Whenever a user logs in from the login page two forms occur (with pass) and (without pass), here these forms are for the users that are for one time journey and other for regular journey.
- User chooses appropriate form and fills the form, (one can book the way for other users also) while filling this form user should enter correct information especially email-Id, because all the information and the main QRcode will be sent to this email-Id.
- When the form is completely filled the conformation mail containing the Encrypted data along with the QRcode is sent to the user's registered mail.
- Usual QRcode contain plain text data which is readable to any Third person Hacker.
- QRcode will contain all the encrypted data i.e. even if the QR code is scanned by any other person or hacker the user information is kept safe.

4.4.2 The Toll Collector Side

- The Toll collector has his own login page.
- When he logs in he'll be able to see the total amount collected from the day he selects.(this will be on the web page.
- While that on android the Toll collector will be using same login credentials.
- At android he will scan the QRcode of the user and the entry will be directly done in the system.
- If the vehicle is been registered by the police as a stolen vehicle hen a quick notification will be sent to the nearest police station notifying the vehicle was here.
- If the toll collector doubts about the vehicle, he can register as well check the stolen vehicle database.

4.4.3 The Police Side

- Here, in this module, the stolen vehicles will be registered.
- If any notification about the stolen vehicle that will be seen in this module.
- Initially while registration of new police station the (Google Map) will be provided, here the police have to put the latitude and longitude of the police station.
- This latitude and longitude will allow calculating the nearest police station and notifying them.

4.4.4 The Admin Side

- The Admin will be the head of all this system.
- Admin is the one who will put new toll booths in the system.
- He also will be able to see what is the actual cash collected at every toll booth.
- He can also update the data if needed.

- He will set the amount of the (Fees) cash that will be taken from each vehicle.
- The admin can also look after how many users have registered to the system.

5. ADVANTAGES

1. Combination of authentication and toll collection process improve the system efficiency of existing system.
2. Required time for toll collection gets reduce.
3. Easily authenticate vehicle by scanning QRcode.
4. Automatic payment makes system more transparent.
5. Reduction of traffics.
6. No paper work needed (Receipts)
7. No change problem (Digital payment).

6. FUTURE SCOPE OF THIS PROJECT:

1. Time consuming toll collection process.
2. Transparency of system is less. (In the term of hackers the crucial data is secure).
3. Need combination of toll collection and stolen vehicle identification process.

7. CONCLUSION

Hence, as above mentioned we propose that this project of the QRcode based system is effective way to store information also effective way to handle stored data. We propose effective and transparent toll collection system. Toll collector just need to scan QRcode; 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. This feature will track stolen vehicle. Using this application can reduce the number of traffic jam in the toll road. QR code provide easy recognition, storing of large amount data in small space, less cost for generation and scanning is easy to understand.

Automatic Toll Collection Using QR Code Scanning provide flexibility, reliability and easy Somebody said that nothing is better than giving the best services to the customers.

ACKNOWLEDGEMENT

Here we express our sincere thanks to our project guide Ms. Pallavi Maladkar and HOD Prof M.A.Malkar for their constant support and for providing platform. We are also thankful to all other researchers for their publications.

REFERENCES

- [1] Mr. Abhijeet Suryatali and Mr. V.B. Dharmadhikari "Computer Vision based vehicle Detection for Toll Collection System Using Embedded Linux" 2015 ICCPTS <http://www.sooxma.com/docs/Abstracts/Computer%20Vision%20Based%20Vehicle%20Detection%20for%20Toll%20Collection%20System%20Using%20Embedded%20Linux.pdf>

- [2] Linda John, "Automatic toll collection using QRcode scanning", march 2016 ijrets.
- [3] Yudhi Kristanto, Bagus Priambodo "Application Design of Toll Payment using QR Code"
- [4] The Time's of India paper April 20, 2012 "Now Road toll can be paid without stopping at Toll Plazas".
- [5] The Time's of India paper May 28, 2012 "High-Tech number plates for 20 lakh vehicles soon".
- [6] Tom Petruzzelis, "TELEPHONE PROJECTS FOR THE EVIL GENIUS",BPB PUBLICATIONS.
- [7] Klaus Finkenzeller, "RFID Handbook: Radio-Frequency Identification Fundamentals and Applications". John Wiley & Sons, 2000..
- [8] H. Vogt. Efficient Object identification with passive RFID tags. In F.Mattern and M. Naghsinesh, editors, International Conference on Pervasive Computing. Volume 2414 of Lecture Notes in Computer Science, pages 98-113, Zurich, August 2002. Springer-Verleg.
- [9] Cheol Oh, Stephen G. Ritchie Jun-Seok Oh, R.Jaykrishnan, "Real- Time Origin-Destination [OD] Estimation via Anonymous Vehicle Tracking", September 2002 The IEEE 5th International Conference on Intelligent Transportation Systems – Singapore
- [10] Muhammad Adnan Elahi, Yasir Arfat Malkani and Muhammad Fraz," Design and Implementation of Real Time Vehicle Tracking System", 2nd International Conference on Computer, Control and Communication, Pakistan, 2009
- [11] P. Salunke, P. Malle, K. Datir and I. Dukale, "Automated Toll Collection System Using RFTD", IOSR 1. of Com put. Eng., vol 9, issue 2, pp. 61-66 (January-February. 2013).