

# Smart Toll and Penalty Collection System

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**Abstract** - Developing 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 money spent 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 our 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 smart application.

**Key Words:** Dynamic pricing; dynamic shuttle; dynamic traffics; Mobility on Demand (MoD); transitive control; urban mobility, QR Code, Penalty collection, toll plaza, etc.

## 1. INTRODUCTION

If you're driving a long distance and are trying to get there as quickly as possible, 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 going to use QR Code.

QR is short for Quick Response Codes. They are used to take a piece of 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 (allowing users to search for nearby locations), 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 (and digitally present) much more data, including URL links, geo-coordinates, and text.

In our 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, etc. Toll collector and traffic police will scan the QR Code to vehicle authentication and toll collection as well as penalty collection.

## 2. PROBLEM STATEMENT

### 1. Problem Statement:

The most common approach for collecting tolls was to have the driver stop and pay a toll 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 Smart Toll Collection and Penalty Collection System"

### 2. Goals & Objectives:

- Develop effective and fast toll collection system. Effective in term of, it eliminate financial leakage.
- Fast means toll collector just scan QR-Code to identification of vehicle and toll collection.
- 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 database.
- To detect stolen vehicle easily.
- To provide easy and better way to toll collection system.
- To avoid paperless work, time consumption, cashless work.
- To reduce time at tollbooth and traffic police.
- To reduce work of traffic police and easily collect penalty without any hardware device.

### 3. 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.

### 4. SYSTEM ARCHITECTURE:

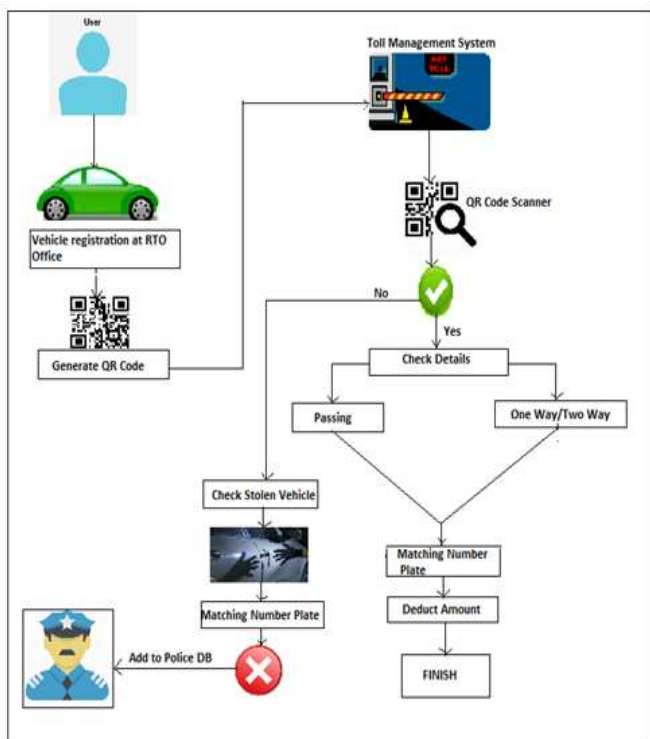


Fig -1: System Architecture

### 5. CONCLUSIONS

QR-Code is effective 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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