

QR Code Based Automated Toll Collection System

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Abstract: Developing countries similar India needs a significant development in infrastructure such as Roads or Highways. Structure of these highways is a costly affair, which can't be capitalized by the government alone. Normally Public private companies are made to construct such a huge schemes. The money spent on these schemes can be regained by gathering toll from the travelers who use the roads. The toll collection system, particularly in India faces some difficulties such as long queue lines, escaping from toll plazas etc. These systems can facility only 300 vehicles per hour, and if more than that number of vehicles reaches at that plaza, server circulation jams may occur. With the increase in the amount of vehicles on road, there has been a clear increase in the number of crimes connecting vehicle theft. In spite of several stringent laws being in place and safety measures taken by car manufacturers, thieves still find a way to continue one step ahead and vehicle theft is still between one of the most described crimes worldwide. Due to the exclusive nature of motor vehicles, there is ample motivation for petty thieves to attempt thefts. To solve both problem we propose QRCode base toll group system. QRCode is generated at the time of registering of vehicle in our future system. On toll collection booth we collect toll as well as classify vehicle is stolen or not.

Keywords: URL, infrastructures and commercial

1. Introduction

If you're driving a long distance and are trying to get nearby as quickly as possible, you will probably travel along roads and interstates that allow you to travel earlier and have fewer, if any stops. Of course, certain types of roads have occasional stops where you have to pay money to transportable on the road. These types of roads are called toll roads. Occasionally they also go by other names, such as toll-way. To tourism on a toll road, you have to pay a fee called a toll. Occasionally you have to stop every so often to pay additional tolls to save traveling on the toll road. Most roads are constructed with local, state or national government money raised from taxes. Tolls are like a tax that removes only to the users of the toll road. Toll infrastructures allow new roads to be built and kept without raising taxes on the general public. A toll road doesn't always break a toll road forever, though. Sometimes tolls are uninvolved on roads once the cost of building has been recovered from the tolls collected. You'll know you're on a toll road when you meeting a toll plaza. A toll plaza is a gated area where you have to measure down or stop to pay a toll to stay traveling on the road. There are typically many available lanes with toll booths to keep traffic touching as quickly as possible.

Some lanes may have people working the toll stands, so that you can pay with change or cash. These lanes are receiving slower and slower day by day because amount of vehicle get increase fast. To solve this problematic we are going to use QR Code. QR is short for Quick Reply Codes. They are used to take a piece of info from a transitory media and put it in to your cell phone. You may rapidly see QR Codes in a magazine advert, on a billboard, a web page or level on someone's t-shirt. Once it is in your cell phone, it can give you details around that commercial (allowing users to search for nearby locations), or particulars 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 voucher which you can use in a local outlet. The aim why they are more useful than a standard barcode is that they can store (and digitally present) much more data, with URL links, geo-coordinates, and text.

2. Literature survey

A. Automated toll collection system using GPS and GPRS

Author: Sudheer Kumar Nagothu

Developing countries like India needs 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 arrive at that plaza, server traffic jams may occur. To solve this we are proposing to create geo-fences 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.

B. Automated toll collection with complex security system

Author: P. Kamalakannan; M. Balaji; A. Avinash; S. Keerthana; R. Mangayarkarasi

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 [1]. A Micro controller consists of a powerful CPU tightly coupled with memory RAM, ROM or EPROM), various I / O features such as Serial ports, Parallel Ports, Timer/Counters, Interrupt Controller, Data Acquisition interfaces-Analog to Digital Converter (ADC), Digital to Analog Converter (DAC), everything integrated onto a single Silicon Chip. The Microcontroller is connected with personal computer through RS232 data adapter

C. Automated fault detection in violation enforcement cameras within Electronic Toll Collection systems

Author: Anurag Ganguli; Ajay Raghavan; Vladimir Kozitsky; Aaron Burry

Electronic Toll Collection facilities offer travelers the ability to pay toll electronically, most commonly via Radio Frequency Identification (RFID) transponders placed within the vehicle. ETCs are complex systems comprising of a multitude of sensing and electronics equipment. To prevent violation, photo enforcement cameras are used to capture license plate images of the violating vehicle. To ensure adequate image quality and integrity of these cameras, it is standard maintenance practice to manually review camera images on a periodic basis. The manual review process can be expensive, error prone and may involve only a fraction of the images actually captured. To address this problem, we present algorithmic tools that can be used to automatically review images to detect any potential camera faults, thus, reduce human workload and increase maintenance efficiency. Wherever possible, we use no-reference or reduced-reference approaches for fault detection

D. Secured short time automated toll fee collection for private group transportation

Author: Jayapriya CT; Y. Bevis Jinila

Automated toll fee collection in Indian road has been widely anticipated. This has been a challenge because of cost and efficiency of these systems. 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. If more than one vehicle belonging to a particular organization is present nearby toll then these vehicles are clustered to reduce the number of transactions made. One vehicle is elected as a cluster head and this vehicle represents all the cluster members and an ID based multi signature scheme is used for authentication. Experimental evaluation and analysis shows that the cluster based scheme performs better compared to non-cluster approaches.

E. Open road tolling in India by pattern recognition

Author: Dipti Jadhav; Manoj Sabnis

Modern amenities, fast data transfer and minimum delay have now become the basic requirements of all the services. This has now come in a large way in transport services also. One such service offered to transport system is toll collection. Initially toll collection was manual but now due to development in various fields it is slowly moving towards automation. The system discussed in this paper is a full automated toll collection system. Number plate recognition is used increasingly nowadays for automatic toll collection, secure parking and law enforcement. 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. The proposed Number Plate Recognition (NPR) techniques consist of two modules: histogram based number plate localization and number plate recognition using template matching. This approach has an advantage of being simple & faster. This has come up in a large way in foreign countries, but not in India to that extent here it is still at the level of idea.

3. Problem statement

The most common method for collecting tolls was to have the driver stop and salary a toll collector session in a tollbooth. A manual lane can process approximately 100 vehicles per hour. So there are multiple lane on toll booth. These increase the labor cost, fuel consumption, required time, financial loss. To find the stolen vehicle police need to search separately

4. System architecture

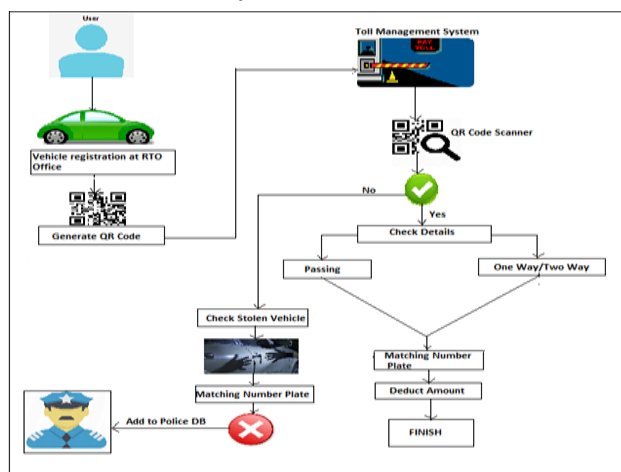


Fig. 1. System architecture

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 will scan the QR Code to vehicle authentication and toll collection.

5. Conclusion

QR-Code 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 QR-Code; all other operations are done automatically. Automation toll collection reduce the time required for toll collection. Also propose system is capable of identify vehicle is stolen or not. This feature will track stolen vehicle.

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