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ONLINE TOLLGATE PAYMENT AND AUTOMATIC GATE OPENING SYSTEM

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ABSTRACT:

Tollgate payment systems have been of great assistance in lessening the overall congestion that has become a part of the metropolitan cities these days. It is one of the uncomplicated ways to manage the great run of traffic. At present, manual toll collection is most widely used collection method in India. Due to manual intervention, the processing time to tollgate is highest. Traffic congestion lead to huge economic loss in terms of fuel wastage. In this toll payment system user does not want to wait to pay the toll. Online Toll Payment System is an android application which is developed for lessening the over congestion in toll plazas that has become part of the metropolitan cities these days. In this toll payment is done by number plate detection. As the vehicle passes the amount is directly deduced from the mobile wallet.

Keywords: Tollgate, Online payment, Traffic.

1. INTRODUCTION:

1.1 Project Overview

Along with the growing number of vehicles in major cities, Toll plaza is an option for smooth transportation. The increasing use of toll roads will be followed by the increase in highway infrastructure to support optimum service to users. Improvement in transportation systems result into the good lifestyle in which we achieve extraordinary freedom for movement, immense trade in manufactured goods and services, as well as higher rate of employment levels and social mobility. In fact, the economic condition of a nation has been closely related to efficient ways of transportation. Increasing number of vehicles on the road, result into number of problems such as congestion, accident rate, air pollution and many others. All economic activities for different tasks use different methods of transportation. For this reason,

increasing transportation is an immediate impact on productivity of nation and the economy. Toll collection is a technology allows the automated electronic collection of toll costs. Fast transportation system and rapid transit system are important for economic development of any nation. Mismanagement and traffic congestion results in wastage of time, loss of fuel and money, there is a need for fast, efficient and economical toll management system. The monitoring and controlling toll becomes a major problem nowadays. To have proper toll management there are several techniques are available. But no technique is perfect itself as the real-time situation is continuously changing and the no system is suitable to adopt the change continuously.

There is two standard toll collecting system such as

1) Manual: It requires manpower to control the toll in which a person collects the toll and issue the receipt.

2) Smart card system: The person needs to show the smart card to the system installed at the toll tax depot to open the barrier.

We proposed a system for online collection of toll & automatic gate opening system that aims to achieve goals:

- Detection of number plate.
- Online payment of toll.
- Gate opened automatically for toll paid vehicles.

This proposed system can be done by using machine learning for number plate detection. The camera is installed in the particular area where all the lanes are visible just above the toll booth. The captured image of number plate is compared with the paid database of the vehicles, processed and gate is opened accordingly

1.2 Motivation

In the existing system the manual method of toll collection is very complex to the user and it is very time consuming process. In automatic toll collecting method maintenance of RFID tag is very expensive. As toll collection is inevitable, the main motive of our project is to reduce traffic congestion through online toll collection process and automatic gate opening system. It is easy to operate and also maintenance is less expensive compared to other methods.

1.3 Objective

The project proposed a system for reducing traffic congestion by online toll collection process & automatic gate opening.

- In this system the toll is paid online through android application.
- The camera placed at the toll booth detects the number plate.
- To identify the registered vehicles, image from the camera is compared with the database.
- As the vehicle passes by the toll amount is directly deduced from the mobile wallet.
- After the payment the camera passes the signal to the bluetooth module placed on the gate and the gate is opened.

2. LITERATURE REVIEW:

This paper talks about the various techniques used for managing toll payment in order to reduce the traffic congestion.. The framework is intended to screen the wellbeing level of toll collection; it could identify the vehicles that have not paid the toll.

2.1 Automated Toll Booth and Tracking System for Theft Vehicle Rama B. Takbhate,Prof. S. D. Chavan

In this paper the image of the number plate and class of vehicle, the respective information will be processed for toll collection system, to make more efficient and perfect. As of now, at each toll both the vehicle has to

stop for paying the toll. We are trying to develop a system that would pay the toll automatically and reduce the queue at the toll booth. For the purpose of auto system, the image of the vehicle number plate and its class is important. In this system a high resolution camera is used for capturing the image of the vehicle number plate. The captured image would be converted into the text using ANPR and the toll would be cut from the customer's account and then open the gate. At the same time, while passing the vehicle through the toll plaza, a tracking system will be activated for the theft vehicles. If the vehicle is stolen and an entry is being made in the central database by the police, a silent alarm would buzz which would indicate the operator at the toll booth that the vehicle is a stolen vehicle. For the identification, the information of the vehicles, registered against the number plate, stored on the central database, through the RTO will be used for verification. So for this purpose the captured number will be sent to the server received at the toll.

2.2 The Survey on Automated Toll System for Number Plate Detection and Collection Ankita Bhore, Prof. Gunjan Agre

The proposed Survey on Automated Toll System for Number Plate Detection and Collection is done for overcoming the toll booths manual system in today's days. The survey is on the money corruption, vehicle congestion, time consumption and the stolen vehicle detection. The mentioned problems are the biggest issues at toll booths. Today's tollbooths in India follow the manual process of toll charge payment. The survey is done to make such type of system which deduct the toll tax automatically and no wait for paying toll charge. By making the survey for automatic toll collection first the toll booths are works collectively with four main admins that are Super admin that is Government, Toll admin, RTO admin, and Police admin. These admins having particular work to done. The survey is basically base on the protocol of the system and not the real time implementation. The work of all the admins are as, Super admin having work to collect the correct count of money from toll admin, Toll admin having work to generate the report of the toll tax, RTO admin having work to register each and every vehicle pass through the toll booth, Police admin having work to register the stolen vehicle with their FIR number and detect the stolen vehicle.

2.3 Number Plate Detection with Application to Electronic Toll Collection System Kannan Subramanian

This Paper describes a new approach of tagging of number plate for collection of Toll with application to Automated Toll System. In this system we detect the location of number plate of vehicles with the help of template matching and extract number from number plate and process it for collection of toll. The number plate is tagged in the database with the user's personal information, bank account and vehicle details. Toll is automatically deducted from users bank account or credit card and notification is provided to the user by sending SMS or Mail. Users have to follow standard rules for number plate design prescribed by the toll. Manual toll facility will be provided for unregistered vehicles and in case of system failure. This system can be implemented in different places such as Clubs, Restaurants, Companies, Parking areas etc. The main goal is to create automation in traffic management without much change in current system and should be less expensive.

3. PROBLEM DEFINITION:

3.1 Existing System

In today world the transportation is important and backbone of any county's Economy. The amount of traffic in recent years is increasing due to the increasing number of vehicles. There are certain types of roads

where you have to pay money to travel on the road which is called Toll Roads. To travel on that road, you need to pay a tax called a toll tax. Toll tax is applied only to the users of the toll road. Sometimes there may also be more than one Toll Plaza on one particular toll road. All highway toll plazas are manually operated, where an operator collects cash from the driver and provides a receipt. This procedure can be slow, which often results in traffic jams at the toll plazas on busy highways.

3.1.1 Conventional System

At present the conventional toll plazas are working manually. This method of toll collection is time consuming. The conventional way of collecting the toll from the vehicle owners or the drivers is to stop the car at the Toll Plaza and then pay the amount to the toll collector by the side of the toll booth, after which the gate is opened either mechanically or electronically for the driver to get through the toll station. These halts, on seemingly well laid roads, and sudden breaks, results in wastage of precious fuel. Another issue is that one needs to handle cash and even wait for getting the change. After paying the toll tax, a receipt is provided which one needs to preserve when the ticket purchased is a two-way ticket. Possibility that one may escape the toll plaza without paying is also there.

3.1.2 Electronic Tolling System

Electronic Toll Collection is a system enabling collection of toll payments electronically allowing for near-nonstop toll collection and traffic monitoring. Under the system, a RFID chip-embedded sticker is put on the vehicles allowing deduction of money at toll plazas automatically. RFID utilizes electromagnetic fields to consequently distinguish and track labels appended to objects. The labels contain electronically put away data. Detached labels gather vitality from a close-by.

3.1.3 FAST tag

It is easy to utilize, reloadable label which empowers programmed reasoning of toll charges and gives you a chance to go through the toll square without ceasing for the money exchange. FASTag is connected to a prepaid record from which the pertinent toll sum is deducted. The tag utilizes Radio-Frequency Identification (RFID) innovation and is joined on the vehicle's windscreen after the label account is dynamic. FASTag is an ideal answer for a bother free stumble on national interstates. FASTag is an electronic toll collection system in India, operated by the National Highway Authority of India.

	Conventional Systems	RFID	FASTag
Time consumption	High	Avg.	Avg.
Fuel wastage	High	Low	Low
Traffic	High	Avg.	Avg.
Payment Mode	Cash/Debit Card/Credit Card	Online	Online
Processing	High	Avg.	Avg.

Table 3.1: Comparison of various systems

3.1.4 Drawbacks

While they do help manage the toll collection, there are some disadvantages for Fasttag and RFID. FasTag charge is high for multi-axle vehicles – Multi-axle vehicle owners are hesitant to opt for FasTag as the toll charges for such vehicles are quite high. A truck requires more than Rs. 2,000 for 10 trips while a car can make 10 trips at a much lower value. This gives people the ideas for deploying car tags in trucks. FasTag may not be approved When there is no amount in the account, no

credit is given to the users. Then the user has to pay in cash. Moreover, at times, the RFID scanner goes through technical issues, leaving a FasTag user in a fix to pay the toll amount in ca.FasTag can be stolen or lost since the FasTag comes in a tag form, it can easily be stolen or lost. FasTag can be wrongly charged due to technical flaws.It can also face malfunction or damage. Privacy is a concern with the use of RFID on products as it can be easily tapped or intercepted.RFID systems are often more expensive than barcode systems. RFID technology is harder to understand and less reliable.

4. SOFTWARE DESIGN:

4.4.1 Block Diagram

The block diagram gives an overview about the system.

1. Design of System

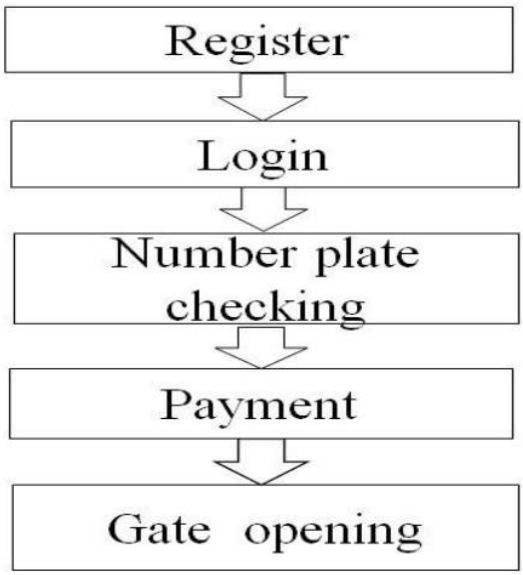

Figure 4.1: System design

1. User registers their personal details and vehicle details.

2. User can login with a username and password.

3. After login user can set vehicle details, wallet updation.

4. Detection of number plate.

5. Payment is done.

6. Gate is opened for paid vehicles

2. Gate opening

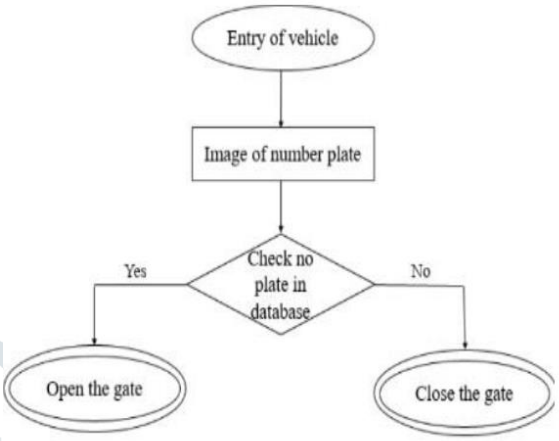

Figure 4.2: Gate opening

When the vehicle approaches the toll gate the camera captures the image of the number plate. It is then compared with paid database. If the data matches then the gate is opened automatically.

4.4.2 Data Flow Diagram

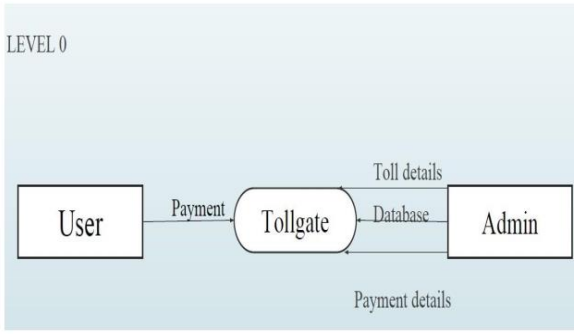

Figure 4.11: Level 0

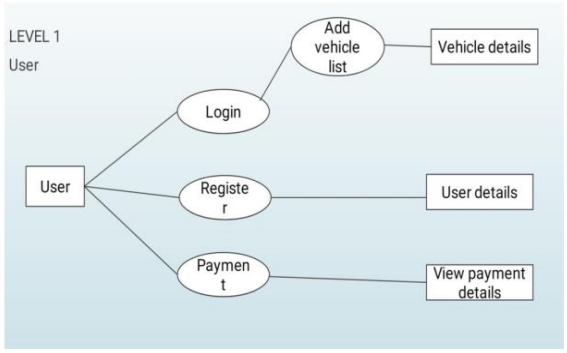

Figure 4.3: User Level 1

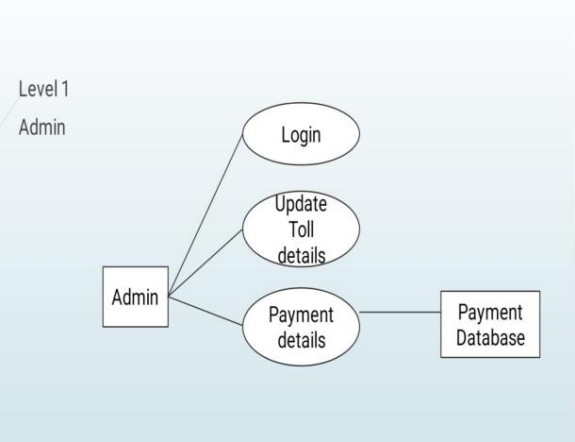

Figure 4.4: Admin Level 1

5. CONCLUSION:

One of the most important impacts of technology is the development of sustainable technologies that reduce the traffic conjunction and that need of future generation, save energy and time. Our project mainly impact full in these aspects, by saving the time on the toll, and also for to save fuel and by regulating the pollution and usage of vehicle at toll gates; as shown it makes the toll collection payment easy. This system guarantees that the average waiting time of the vehicle in front of toll booth will be lesser than the present. The technique used in this project promises to be more effective as compared to the previous system. The advantages of this new method include such benefits low cost, easy setup and relatively good accuracy and speed.

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