

Smart Toll Collection

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Abstract: *These days most highways toll plazas are operated by hand, wherever operator collects money from the driver and provides a receipt. Since this procedure are often slow, we frequently make traffic jams at the toll plazas on busy highways. Smart toll assortment can save time, man power and effort. During this work purpose an occasional value and economical technique known as IoT based toll gate system image processing based Automatic Toll Gate System as a solution to solve the traffic problems and to maintain transparency of the toll collection system. Our aim is to make a digital toll collection system which will be less time consuming and automated monitoring and control of vehicle entry-exit in high way.*

Keywords: Automated Toll Collection System, Image Processing Technology, Traffic Management.

I. INTRODUCTION

An intelligent method of traffic control is an intelligent highway toll collection system. It can be used for several traffic control applications, including automatic toll collection, which combines vehicle detection, picture capture, licence plate identification, and tollgate control with automatic toll collection. The technique of identifying automobiles by their licence plates, known as licence plate recognition or LPR, combines image processing, edge detection, and optical character recognition technology. Because identification solely uses the information from the licence plate.

II. LITERATURE REVIEW

1] S. Dhilip Kumar (2020) As a survey stated almost 15 crores vehicles utilise national highways around India, and if on average each vehicle has to wait idly for 10 minutes in toll booths it results in a loss of Thousand two seventy-two crore a day. The issues involved in manual toll collection involves hurdles like exact change, system malfunction at times, staff changeover per duty and manual imperfections. It is proposed to implement a smart card named INDIA-Pass compatible with other transportation services used in India. But it is highly appreciable to arrive with a solution explicitly for automated toll collection.

One such solution is proposed in this paper, an automated toll collection system with wireless transceiver and cloud-local hybrid database maintenance. In automated toll collection system, the driver does not need to stop at the toll gate and one neither must stand still in a long line to pay his entry fee. Though it sounds simple the proposed method decreases the utilisation of fuel, lessen street blockage, enhance street security, and make travelling a pleasure for all. This paper introduces the idea of gateless computerized ETC (Electronic Toll Collection) utilizing ZIGBEE handset with RFID. ZIGBEE mechanized ETC can eliminate human intervention in manual toll collection and consequently bring down the cost of activity.

2] Rajeev Kumar (2019), In this paper proposes an automatic toll collection system to debit the toll of moving vehicles at a toll plaza in India. An effective approach is presented here to localise the licence plate of vehicles. A database has been created and linked to test the performance of the prototype toll collection system of moving vehicles.

3] Veena Sundareswaran (2020)

The number of vehicles, names of the vehicle owners, unique identity numbers of the owners, and the value of the associated bank account are all included in this paper's database by the authors. The findings indicate a considerable decrease in the length of the queue for vehicles, fuel waste, and pollutant emissions at a toll plaza. The system may be utilised in the future to prevent theft.

4] Drs. K. Balamurugan, S. Elangovan, and R. Mahalaxmi As of 2019, R. Pavithra the design and analysis of an automatic checkpoint and fast track toll system employing an RFID and GSM module with a security system are covered in this study. This study suggests using an extremely flexible electronic toll payment system that automatically verifies when a vehicle has successfully passed a toll. In this study, an Arduino microcontroller with built-in GPS and GSM was used. This ideology can lessen the labour-intensive problem of frequently delaying an edit action at the checkpoint. Different controllers are used in the arm in this suggested system. mechanism for collecting toll money automatically on roads.

The importance of motorway travel and the manual toll collection system has increased on today's road network. In today's road network, motorway transit has grown in importance, and the manual toll collection method has become obsolete due to a variety of flaws. The use of an automated toll collection system eliminates the need for drivers to stop at a window or lose time standing in queue to pay their toll. This decreases fuel usage, lessens traffic, and improves road safety. In essence, an Automated Electronic Toll Collection (ETC) system is made to collect tolls continuously, which has grown to be a crucial component of an intelligent transportation system. The idea of using an automated ETC system is presented in this work. This effort removes the need for drivers to manually pay tickets and collect toll fees from toll authorities, respectively. Data can be quickly communicated between drivers and toll authorities, removing the possibility of human error, and allowing for effective toll collection.

5] Ms. Galande S.D. and others, 2021 The development of an automatic toll collecting system employing RFID is the main objective of this research and development work, according to the publication's author. Create an automatic toll plaza that uses a GPS technology to reduce wait times and operate ceaselessly. Tran score technology is used by the ETC system, which is based on the E- PASS system. Receiver reads it automatically, deducting the money from the account. The development of sustainable technology to lessen traffic congestion and conserve energy and time has the greatest impact.

6] Miss Anusha S and colleagues, (2019) The author of this article described an automated tollgate system that accepts online payments and uses image processing. Travellers regularly pay the government a sum of money in the form of tax at tollgates. The toll gates on the national roads are where drivers must wait in queue to pay a fee to use the road. This will result in a break in the travel and time loss. This technology, which will automatically collect toll taxes from people using image processing and online payment of the money, was offered as a solution to the waiting issue. The number plate image will be taken and compared with the database in an image processing system. The camera will be positioned at the tollgate in order to take a picture of the licence plate. Additionally, there will be an online payment tax where money will only be deducted if the user registers. Because of this, using tollgates is more convenient for the general population.

7] (2019) SabbirAhmedt. In order to address traffic issues and preserve system transparency, the RFID-based Automated Toll Collection System is introduced in this study. The proposed system attempts to create a digital toll collection system that can end delays on toll highways, bridges, and tunnels without using currency or needing vehicles to stop. This study focuses on an electronic toll collection system that recognises a vehicle used just for toll collection by using radio frequency identification (RFID) technology.

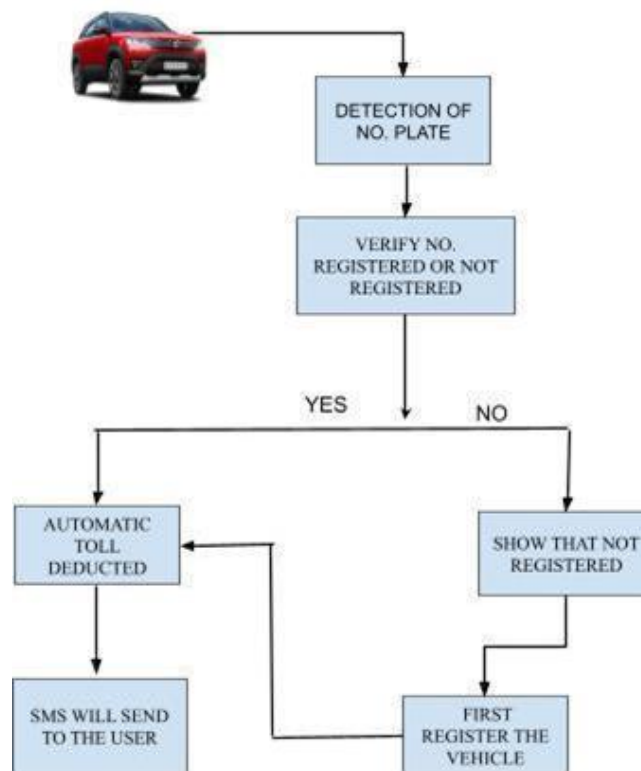
The proposed RFID system makes use of tags that are attached to the digital licence plate of the vehicles, allowing RFID readers to access the data stored on the tags. With this technology, it is possible to lessen the need for vehicle owners and toll authorities to physically distribute tickets and collect tolls. It is also possible for vehicle owners and toll authorities to conveniently share information regarding toll payments. As a result, with less manual labour and human mistake, toll payment transparency may be guaranteed. As a result, designing a smart transit system will be simpler.

III.METHODOLOGY

The Smart Toll Collection system is an automated toll collection system that aims to provide a seamless experience for users passing through toll booths. This is a python-based pursuing image processing technology. The paper will be developed using the Anaconda IDE. The system will use predefined photos to detect the number plate of the vehicle

passing through the toll booth. The system will then use image processing techniques to recognize the number plate, and if the number plate is registered in the system, the toll fees will be automatically deducted from the user's account. Users will be able to register their vehicles by providing their registration number, name, and car type on the web-based platform.

The system will validate the registration number, and if it is valid, the user will be registered, and the registration details will be stored in the database. If the number plate of a passing vehicle is not registered in the system, the system will detect it and print "NOT REGISTERED" in the console. The user will be required to register their vehicle before they can pass through the toll booth. The system will be integrated with an SMS API for sending messages to the user regarding the toll fees deducted from their account.



IV. SYSTEM REQUIREMENTS

Hardware Requirement

- 1.CPU i3 processor
- 2.RAM 4GB
- 3.OS windows 8
- 4.ROM 250GB

Software Requirement

- 1.Python Version IDE

V. IMPLEMENTATION

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C:\Users\aleen\Downloads\New folder\final_code.py (24)
File Edit Shell Debug Options Window Help
Python 3.8.0 (tags/v3.8.0:fa9194d, Oct 14 2019, 19:37:50) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
***** RESTART: C:\Users\aleen\Downloads\m6\New folder\final_code.py *****
TN 87 B 4578

License plate is: TN 87 B 4578

Vehicle Registered
+91766602492
  
```

```

Python 3.8.0 Shell
File Edit Shell Debug Options Window Help
Python 3.8.0 (tags/v3.8.0:fa9194d, Oct 14 2019, 19:37:50) [MSC v.1916 64 bit (AMD64)] on win32
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License plate is: TN 87 B 4578

Vehicle Registered
+91766602492
  
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VI. CONCLUSION

This toll collection approach will save time, effort, and manpower. The database contains information on how many vehicles pass through the toll gate. how many vehicles that pass through the toll gate stay in the data. Additionally, the car is being watched for accidents and its authorization. The information about all the toll gates will be updated on the web app that was sent to the relevant authority.

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