# Toll Payment System

A PROJECT REPORT

Submitted by

**A.MOHITH**
**19MIS1007**

in partial fulfillment for the award of the degree of

Master of Technology

in

Software Engineering (5 Year Integrated Programme)


**School of Computer Science and Engineering**
Vellore Institute of Technology
Vandalur - Kelambakkam Road, Chennai - 600 127

November - 2023


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# DECLARATION

I hereby declare that the project entitled Your **Toll Payment System** submitted by me to the School of Computer Science and Engineering, Vellore Institute of Technology, Chennai, 600 127, in partial fulfillment of the requirements of the award of the degree of Master of Technology in Software Engineering (5 year Integrated Programme) and as part of SWE3004 – Software Design and Development Project is a bona-fide record of the work carried out by me under the supervision of Prof.**Dr.Alok Chauhan.** I further declare that the work reported in this project, has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma of this institute or of any other institute or University.

Signature of Candidate

Place: Chennai
Date:


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# CERTIFICATE

This is to certify that the report entitled **Toll Payment System** is prepared and submitted by **A MOHITH (Reg. No. 19MIS1007)** to Vellore Institute of Technology, Chennai, in partial fulfillment of the requirement for the award of the degree of Master of Technology in Software Engineering (5-year Integrated Programme) and as part of SWE3004 – Software Design and Development Project is a bona-fide record carried out under my guidance. The project fulfills the requirements as per the regulations of this University and in my opinion meets the necessary standards for submission.

| Guide/Supervisor | HoD |
|---|---|
| Name: Dr. Alok Chauhan<br>Date: | Name: Dr. Nisha V M<br>Date: |
| Examiner | Examiner |
| Name:<br>Date: | Name:<br>Date: |

(Seal of SCOPE)

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A.MOHITH
19MIS1007

# Abstract

The problem statement for this project is that as we can see that so many people are traveling in their vehicles. As we traveling, we can find the number of toll gates on the way. This project would help us by paying the amount for toll gates online. We can pay the amount online before we head for the journey.We find it very difficult to wait in the queue for such a long time. At present, manual toll collection is the most widely used collection method in the world. Due to manual intervention, the processing time at toll plazas is highest. Traffic congestion at Toll plazas leads to a huge economical loss in terms of fuel wastage and also causes pollution. The Fastag has existed already but the fastag has some disadvantages like issues with RFID failures, once the owner is linked to fastag account, so incase the owner sells the vehicle, it is not clear whether a new owner will be able to drive the car with the same fastag or not. there were many instances of charging the double amount of the original amount due to some technical issues. In this system, we updated that we should not need RFID. the vehicle number is enough for verification. Once we paid money if we did not travel, the amount will be refunded to our account automatically. If we lost our vehicle we can complain in this system, it is very useful to track the vehicle. Expanding the use of toll payment systems to reduce human intervention and vehicle congestion during toll collection is a step in the right direction as it helps increase mobility and reduces time, which is significant while transporting perishables. This will not only help the government to reduce time consumption but also ensure transparency and enhance data collection. This system will work accurately 99.9%.

# Contents

# Introduction:

## 1.1 Background

The toll plaza collection system will be useful to the user who travel through the tolls by paying the amount to the tolls before head for the journey for a particular toll or for all tolls from one place to destination.

First the user will give the travelling details of vehicle number, vehicle type and the destination. After the travelling details the user will give toll details of for which toll the user want to pay or for all tolls and the user can pay amount for single trip or return trip also available.

If the user paid for the tolls, then at the tolls the payment will be verified using rfid scanner (qr code)

## 1.2 Statement

we can see that so many people are traveling in their vehicles. As we traveling, we can find the number of toll gates on the way. We find it very difficult to wait in the queue for such a long time. At present, manual toll collection is the most widely used collection method in the world. Due to manual intervention, the processing time at toll plazas is highest.Traffic congestion at Toll plazas leads to a huge economical loss in terms of fuel wastage and also causes pollution.This project would help us by paying the amount for toll gates. We can pay the amount before we head for the journey. In this system user will give their travelling details then they select the tolls which they want to pay then they will make payment. This process will happen before they head for journey. If the user wants to move from one place to another they can pay for all tolls or they can pay for particular tolls in this system.

## 1.3 Motivation:

The motivation for this project is that as we can see that so many people are traveling in their vehicles. As we traveling, we can find the number of toll gates on the way. We find it very difficult to wait in the queue for such a long time. At present, manual toll collection is the most widely used collection method in the world. Due to manual intervention, the processing time at toll plazas is highest. Traffic congestion at Toll plazas leads to a huge economical loss in terms of fuel wastage and also causes pollution.

## 1.4 Challenges:

**Privacy and Security**:

Protecting user data and ensuring the security of payment transactions are crucial. Researchers should focus on developing robust encryption methods and privacy-enhancing technologies to safeguard personal information and prevent fraudulent activities.

**Fraud Detection and Prevention:**

Identifying and preventing toll evasion, counterfeit payments, and other fraudulent activities is an ongoing challenge. Research can lead to the development of advanced fraud detection algorithms and technologies.

**Congestion and Traffic Flow:**

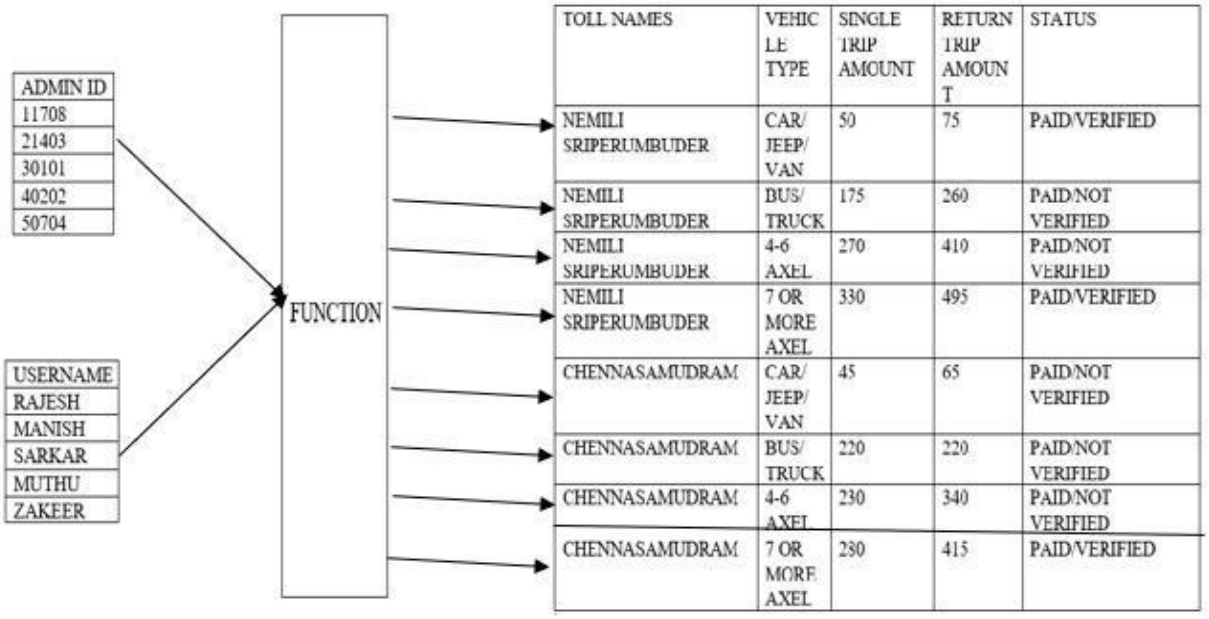
Toll collection can lead to congestion and traffic bottlenecks. Research can focus on developing smart traffic management and congestion reduction strategies, including dynamic pricing and variable toll rates to optimize traffic flow.

# CHAPTER -2

# PLANNING & REQUIREMENTS SPECIFICATION

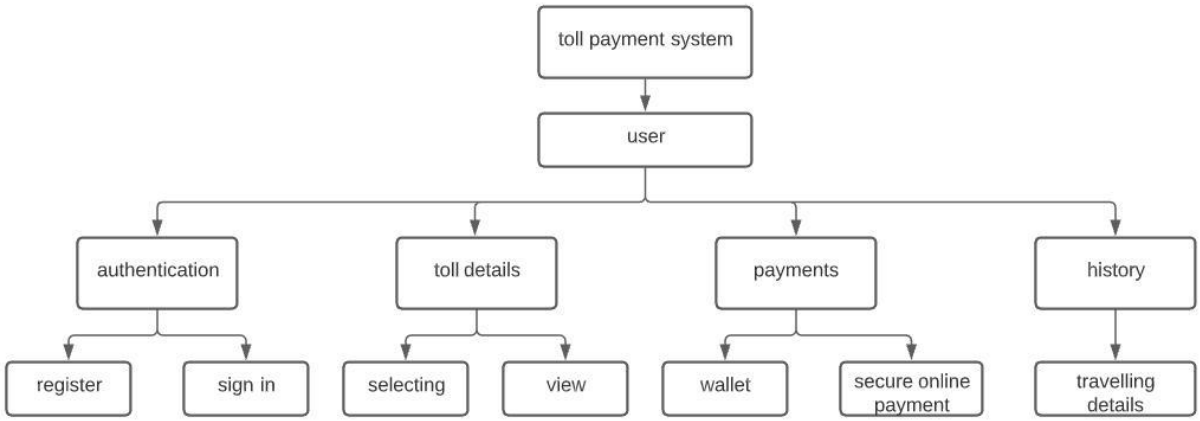
## 2.1 System Planning

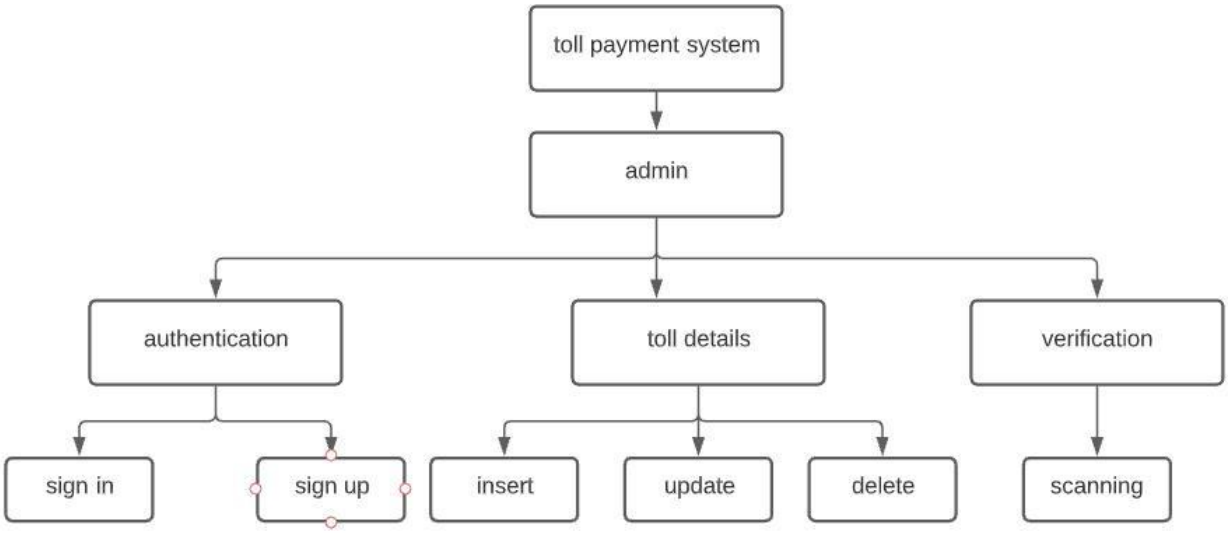
### Back End Module Diagrams:




| TOLL NAMES | VEHICLE TYPE | SINGLE TRIP AMOUNT | RETURN TRIP AMOUNT | STATUS |
|---|---|---|---|---|
| NEMILI SRIPERUMBUDER | CAR/ JEEP/ VAN | 50 | 75 | PAID/VERIFIED |
| NEMILI SRIPERUMBUDER | BUS/ TRUCK | 175 | 260 | PAID/NOT VERIFIED |
| NEMILI SRIPERUMBUDER | 4-6 AXEL | 270 | 410 | PAID/NOT VERIFIED |
| NEMILI SRIPERUMBUDER | 7 OR MORE AXEL | 330 | 495 | PAID/VERIFIED |
| CHENNASAMUDRAM | CAR/ JEEP/ VAN | 45 | 65 | PAID/NOT VERIFIED |
| CHENNASAMUDRAM | BUS/ TRUCK | 220 | 220 | PAID/NOT VERIFIED |
| CHENNASAMUDRAM | 4-6 AXEL | 230 | 340 | PAID/NOT VERIFIED |
| CHENNASAMUDRAM | 7 OR MORE AXEL | 280 | 415 | PAID/VERIFIED |

## Front End Module Diagrams:



## 2.2 Requirements

### 2.2.1 User Requirements

**Admin**

**Authentication**

Authentication is to validate the user's credentials and create the user and admin.

**Toll modification**

The admin will be having the function to change the change details of tolls.

**Rfid verification**

The admin will scan the qrcode and verify the user's payment.

**User**

**Travelling details**

The user will give the vehicle, start and destination places with which type of details.

**Toll details**

After giving the travelling details here the details of the tolls.

**Payment**

The payment will be done using the wallet or through the online mode.

**Record**

Records will store the details of the users, tolls and payment details.

**Theft detection**

If the user raised the complaint when they lost vehicle, then if that vehicle crossed the toll, then the vehicle detected and notified the user.

**Refund**

If the user not crossed the toll within 24 hours the amount will be credited to user's account.

### 2.2.2 Non-Functional Requirements

Scalability

Performance

Security

Performance

Usability

Availability

## 2.3 System Requirements

### 2.3.1 HARDWARE REQUIREMENTS:

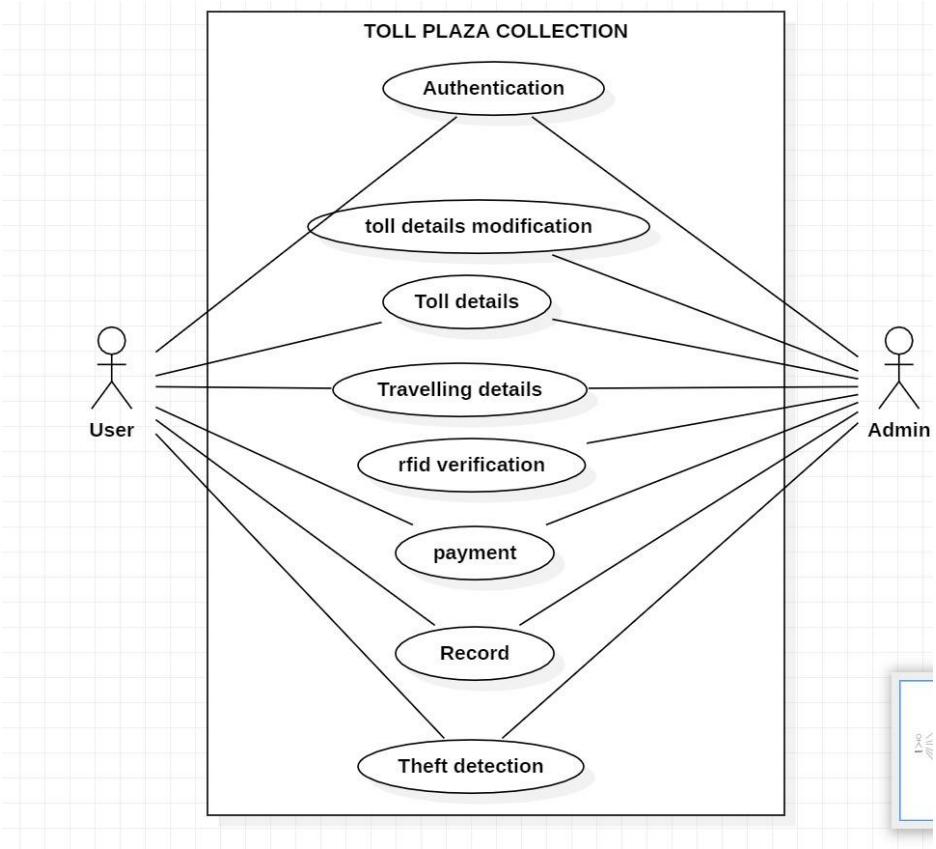
- Rfid scanner
- Computer
- Micro controller

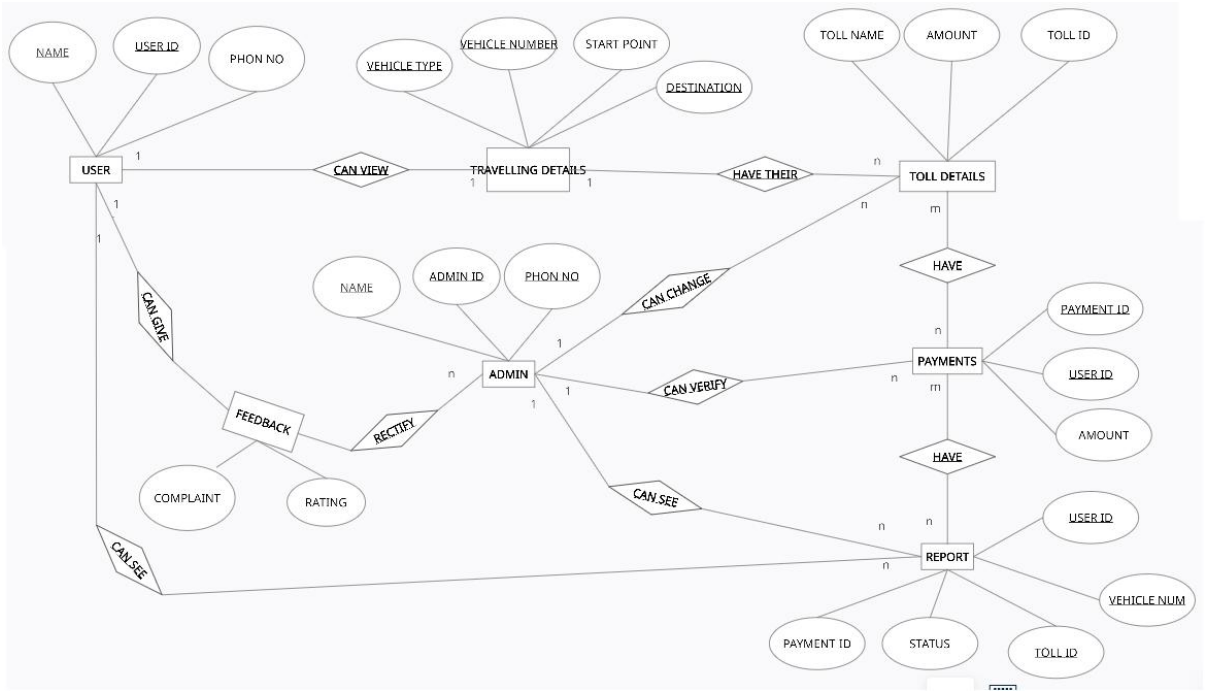
### 2.3.2 SOFTWARE REQUIREMENTS:

- Operating system(windows)
- Xampp server
- NetBeans IDE

# CHAPTER – 3

# SYSTEM DESIGN

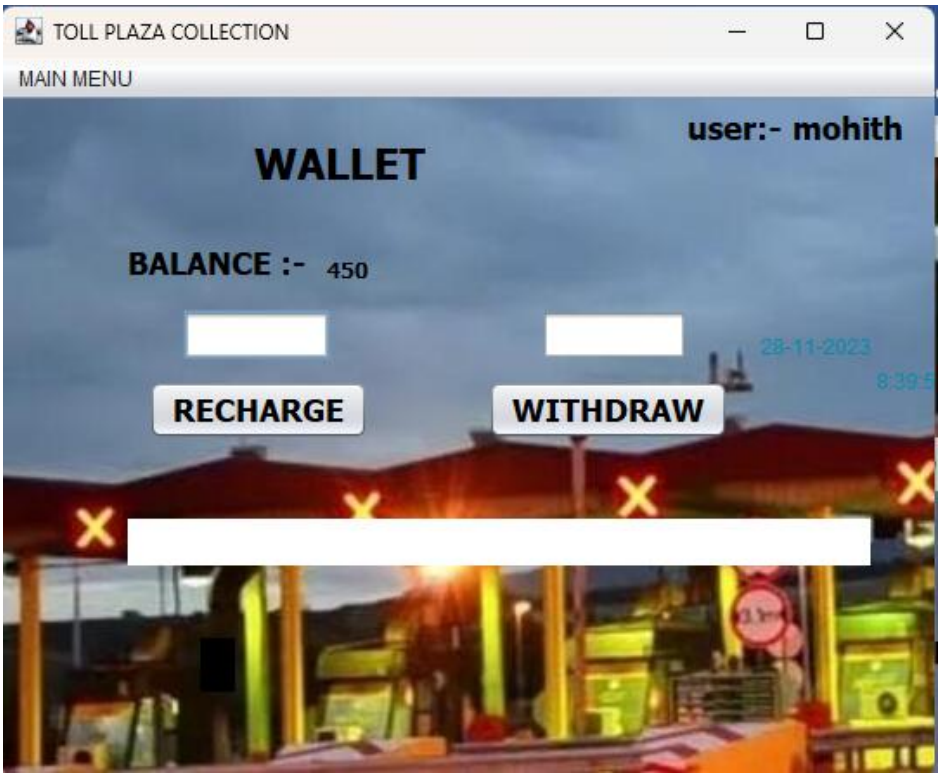


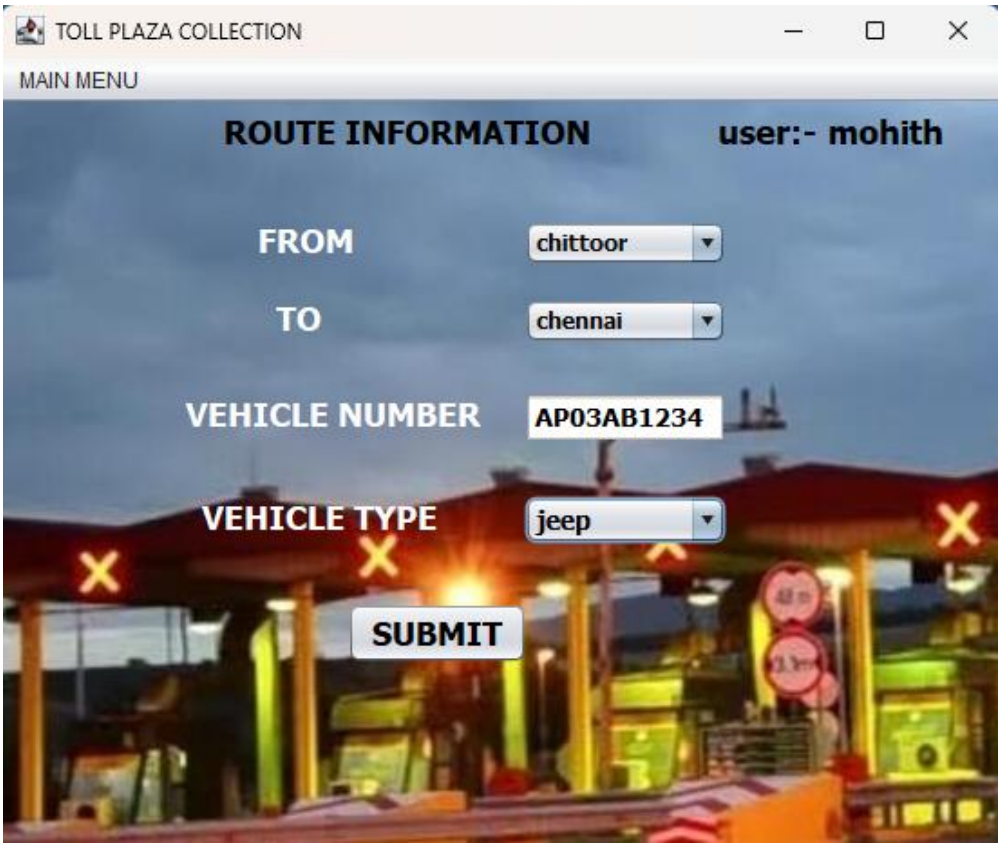

NAME
USER ID
PHON NO
USER
1
CAN VIEW
VEHICLE TYPE
VEHICLE NUMBER
START POINT
DESTINATION
TRAVELLING DETAILS
HAVE THEIR
TOLL NAME
AMOUNT
TOLL ID
TOLL DETAILS
n
m
HAVE
CAN CHANGE
CAN GIVE
NAME
ADMIN ID
PHON NO
ADMIN
PAYMENTS
PAYMENT ID
USER ID
AMOUNT
CAN VERIFY
FEEDBACK
RECTIFY
COMPLAINT
RATING
CAN SEE
CAN SEE
REPORT
USER ID
VEHICLE NUM
PAYMENT ID
STATUS
TOLL ID

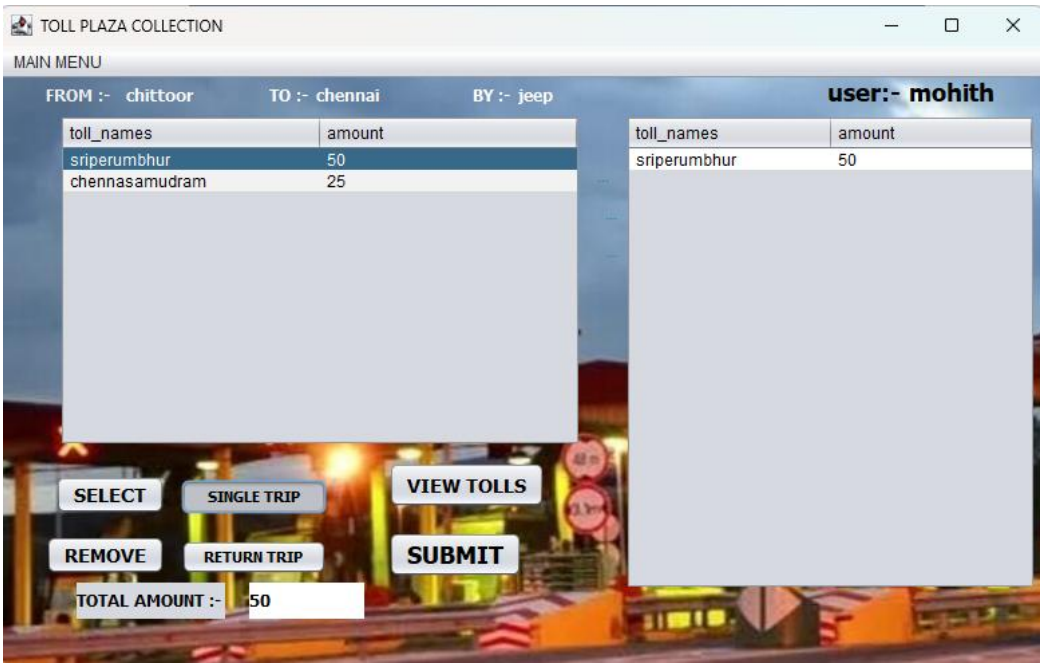
# CHAPTER – 4

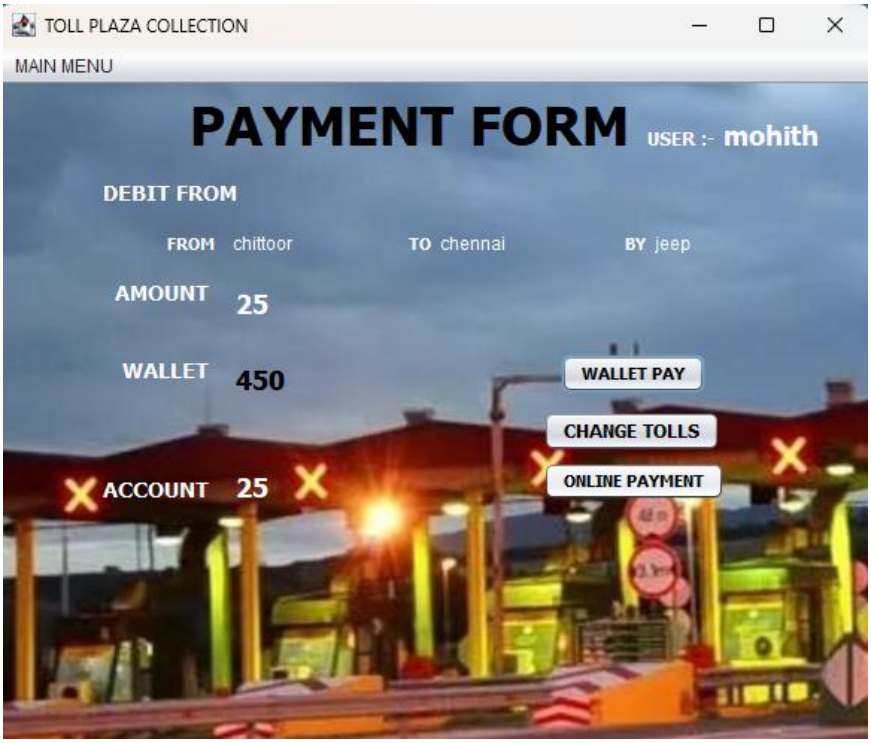
# IMPLEMENTATION OF SYSTEM

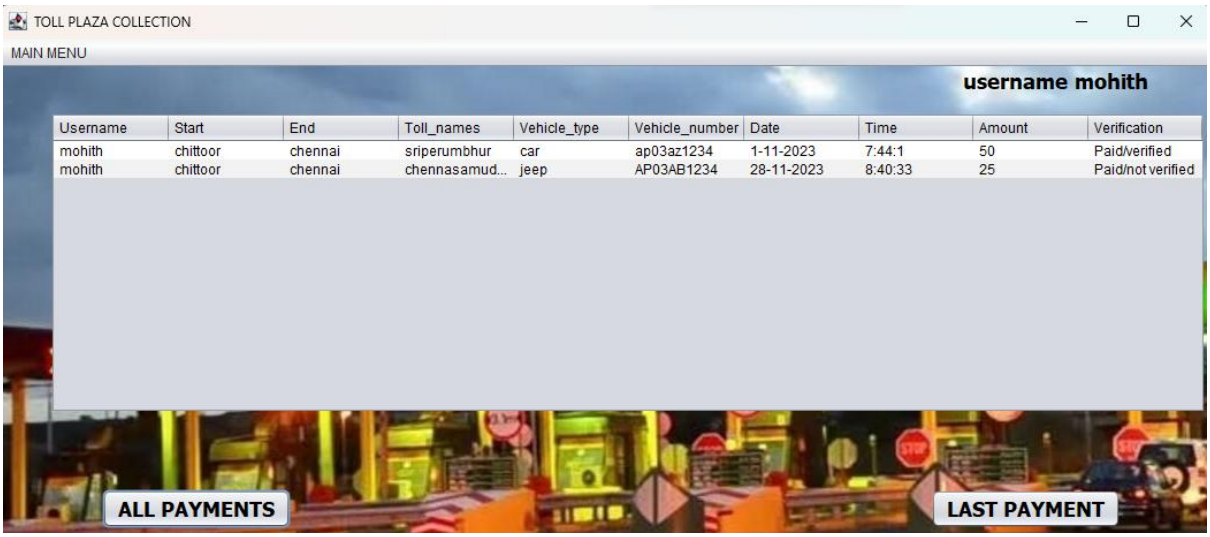

TOLL PLAZA COLLECTION
<<
SIGN IN
USERNAME
mohith
28-11-2023
8:39:9
PASSWORD
*********
LOGIN
REGISTER
FORGOT PASSWORD

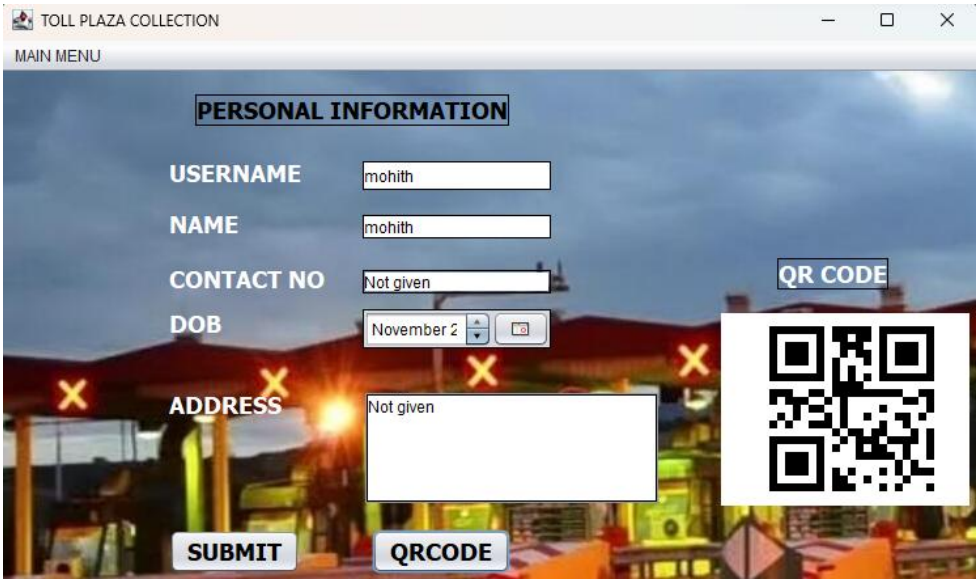

TOLL PLAZA COLLECTION
MAIN MENU
user:- mohith
WALLET
BALANCE :- 450
28-11-2023
RECHARGE
WITHDRAW

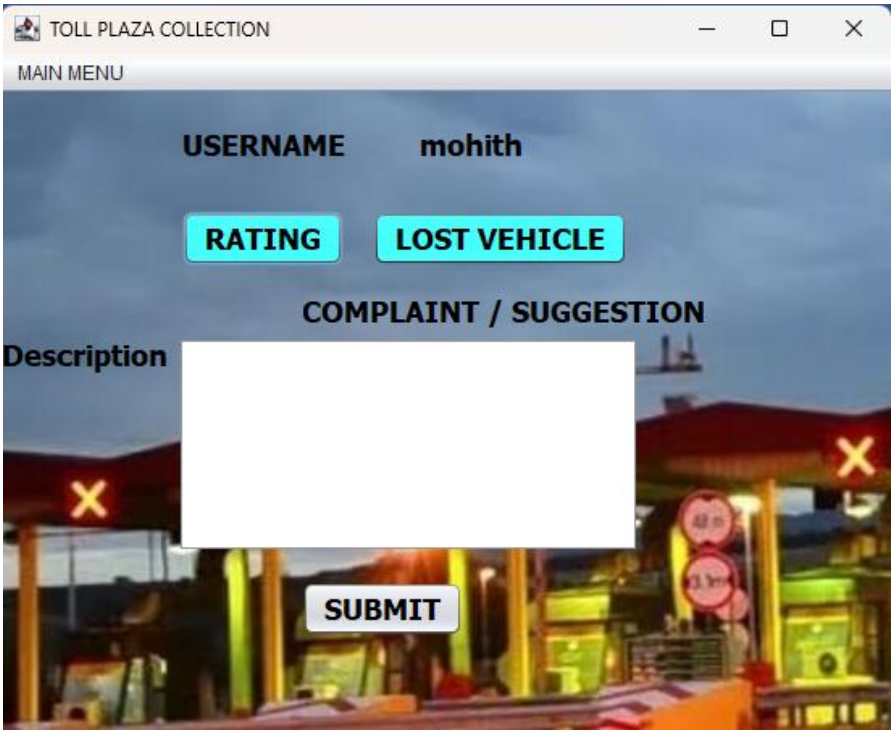

TOLL PLAZA COLLECTION
MAIN MENU
ROUTE INFORMATION
user:- mohith
FROM
chittoor
TO
chennai
VEHICLE NUMBER
AP03AB1234
VEHICLE TYPE
jeep
SUBMIT

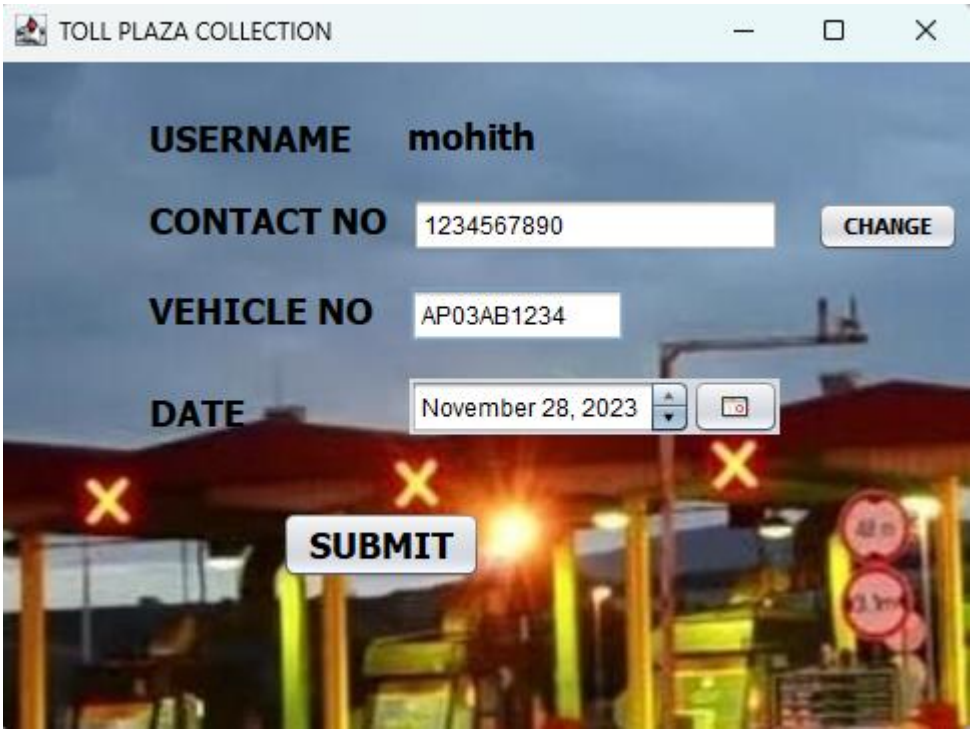

TOLL PLAZA COLLECTION
MAIN MENU
FROM :- chittoor
TO :- chennai
BY :- jeep
user:- mohith
toll_names
amount
sriperumbhur
50
chennasamudram
25
toll_names
amount
sriperumbhur
50
SELECT
SINGLE TRIP
VIEW TOLLS
REMOVE
RETURN TRIP
SUBMIT
TOTAL AMOUNT :-
50


TOLL PLAZA COLLECTION
MAIN MENU
PAYMENT FORM
USER :- mohith
DEBIT FROM
FROM chittoor
TO chennai
BY jeep
AMOUNT
25
WALLET
450
WALLET PAY
CHANGE TOLLS
ACCOUNT
25
ONLINE PAYMENT

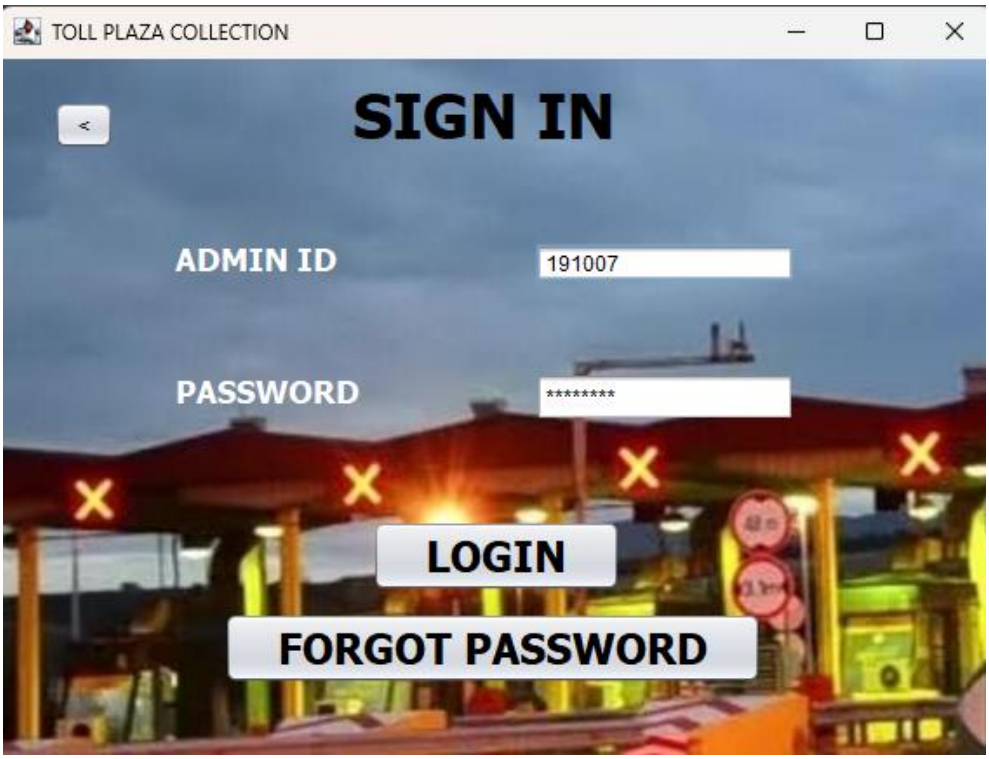

TOLL PLAZA COLLECTION
MAIN MENU
username mohith
Username Start End Toll_names Vehicle_type Vehicle_number Date Time Amount Verification
mohith chittoor chennai sriperumbhur car ap03az1234 1-11-2023 7:44:1 50 Paid/verified
mohith chittoor chennai chennasamud... jeep AP03AB1234 28-11-2023 8:40:33 25 Paid/not verified
ALL PAYMENTS
LAST PAYMENT

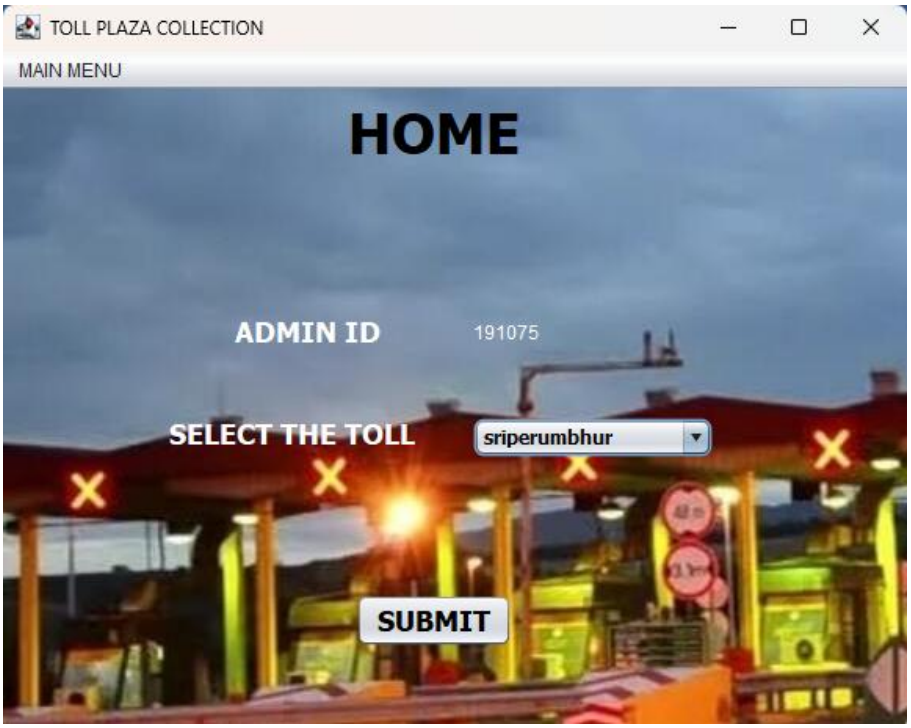

TOLL PLAZA COLLECTION
MAIN MENU
PERSONAL INFORMATION
USERNAME
mohith
NAME
mohith
CONTACT NO
Not given
DOB
November 2
ADDRESS
Not given
QR CODE
SUBMIT
QRCODE

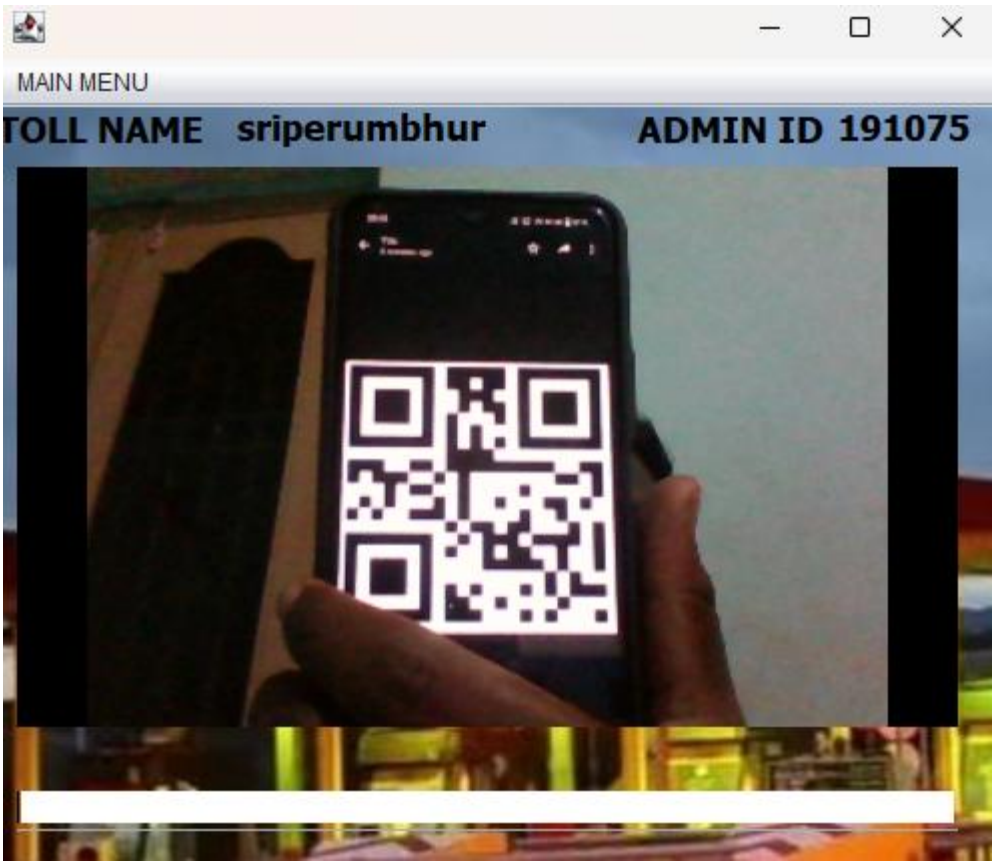

TOLL PLAZA COLLECTION
MAIN MENU
USERNAME
mohith
RATING
LOST VEHICLE
COMPLAINT / SUGGESTION
Description
SUBMIT

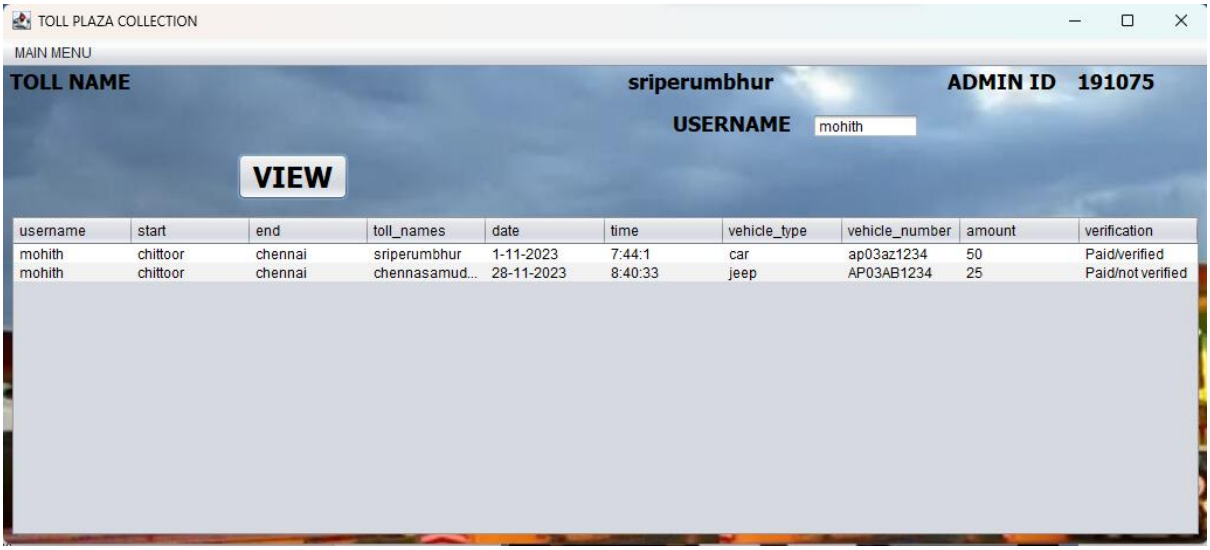

TOLL PLAZA COLLECTION
USERNAME
mohith
CONTACT NO
1234567890
CHANGE
VEHICLE NO
AP03AB1234
DATE
November 28, 2023
SUBMIT

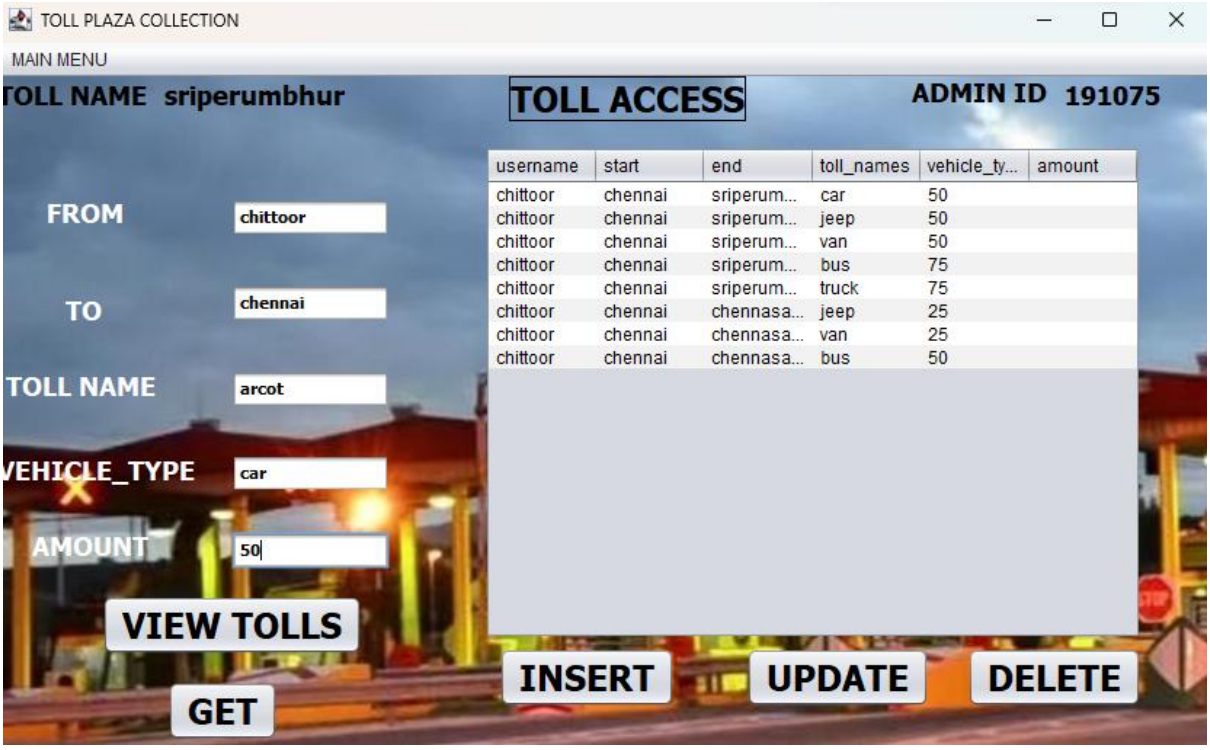
# ADMIN:

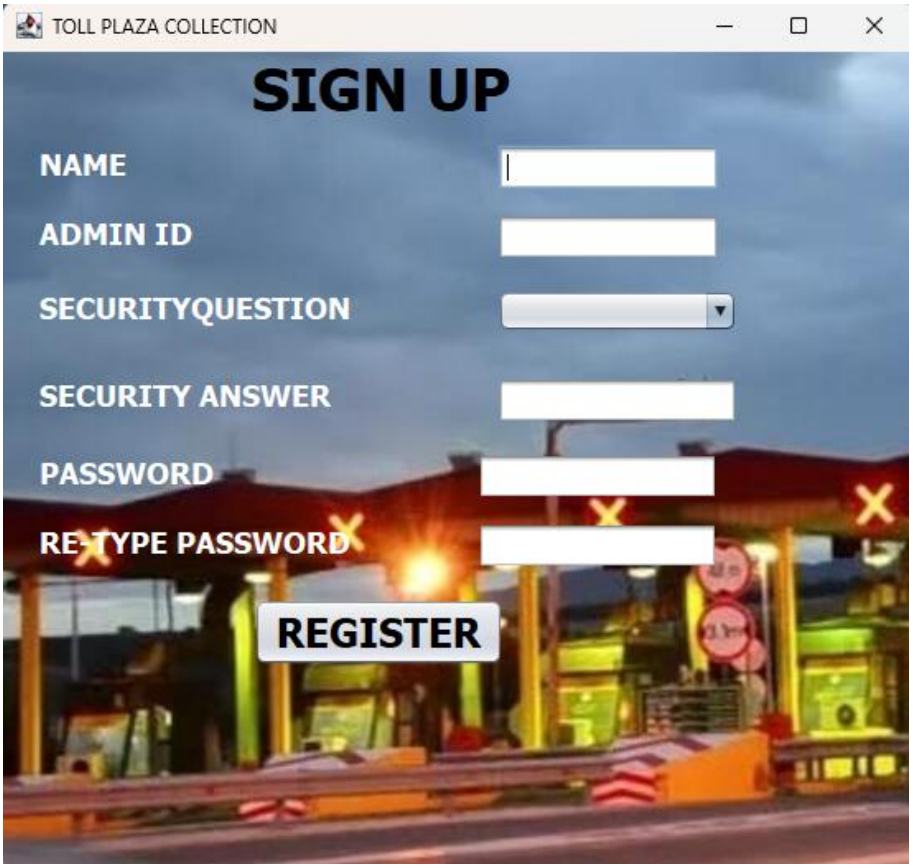

TOLL PLAZA COLLECTION
SIGN IN
<
ADMIN ID
191007
PASSWORD
********
LOGIN
FORGOT PASSWORD

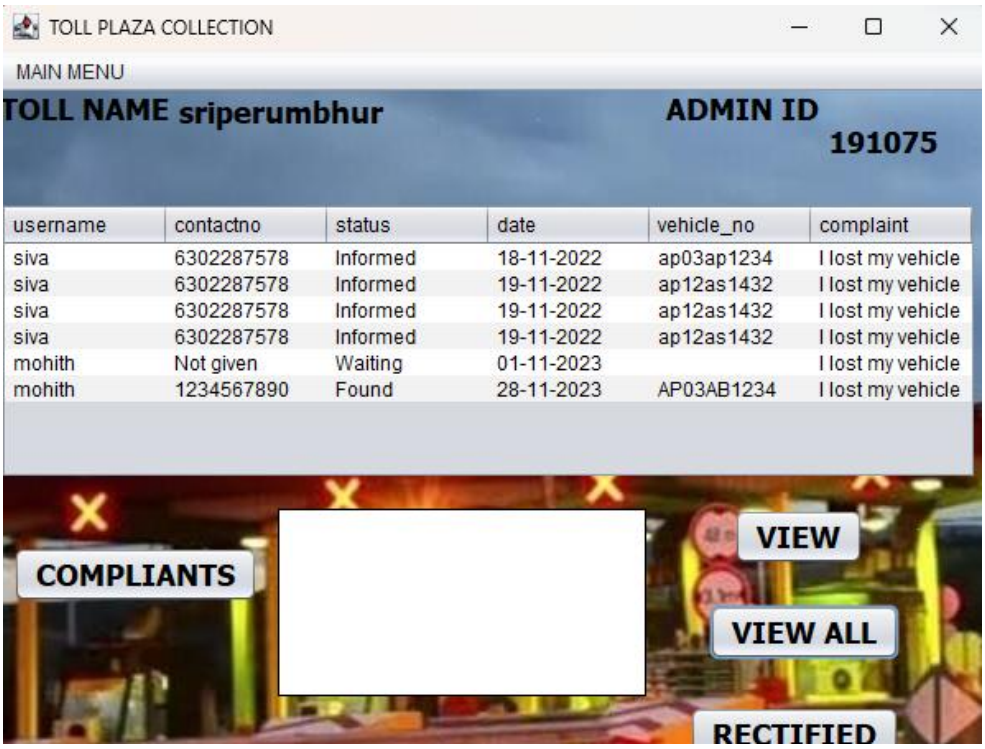

TOLL PLAZA COLLECTION
MAIN MENU
HOME
ADMIN ID
191075
SELECT THE TOLL
sriperumbhur
SUBMIT


MAIN MENU
TOLL NAME sriperumbhur
ADMIN ID 191075


TOLL PLAZA COLLECTION
MAIN MENU
TOLL NAME
sriperumbhur
ADMIN ID 191075
USERNAME
mohith
VIEW
username start end toll_names date time vehicle_type vehicle_number amount verification
mohith chittoor chennai sriperumbhur 1-11-2023 7:44:1 car ap03az1234 50 Paid/verified
mohith chittoor chennai chennasamud... 28-11-2023 8:40:33 jeep AP03AB1234 25 Paid/not verified


TOLL PLAZA COLLECTION
MAIN MENU
TOLL NAME sriperumbhur
TOLL ACCESS
ADMIN ID 191075
FROM
chittoor
TO
chennai
TOLL NAME
arcot
VEHICLE_TYPE
car
AMOUNT
50
VIEW TOLLS
GET
INSERT
UPDATE
DELETE
username start end toll_names vehicle_ty... amount
chittoor chennai sriperum... car 50
chittoor chennai sriperum... jeep 50
chittoor chennai sriperum... van 50
chittoor chennai sriperum... bus 75
chittoor chennai sriperum... truck 75
chittoor chennai chennasa... jeep 25
chittoor chennai chennasa... van 25
chittoor chennai chennasa... bus 50


TOLL PLAZA COLLECTION
SIGN UP
NAME
ADMIN ID
SECURITYQUESTION
SECURITY ANSWER
PASSWORD
RE-TYPE PASSWORD
REGISTER


TOLL PLAZA COLLECTION
MAIN MENU
TOLL NAME sriperumbhur
ADMIN ID
191075
username contactno status date vehicle_no complaint
siva 6302287578 Informed 18-11-2022 ap03ap1234 I lost my vehicle
siva 6302287578 Informed 19-11-2022 ap12as1432 I lost my vehicle
siva 6302287578 Informed 19-11-2022 ap12as1432 I lost my vehicle
siva 6302287578 Informed 19-11-2022 ap12as1432 I lost my vehicle
mohith Not given Waiting 01-11-2023 I lost my vehicle
mohith 1234567890 Found 28-11-2023 AP03AB1234 I lost my vehicle
COMPLIANTS
VIEW
VIEW ALL
RECTIFIED

# CHAPTER – 5
# RESULTS & DISCUSSIONS

In this report we done some literature survey according those papers we got some ideas and we followed Online toll gate payment system using RFID paper, using the methods of that project we came up with the project Toll Plaza Collection, this system will be useful to the user who travel through the tolls by paying the amount to the tolls before head for the journey for a particular toll or for all tolls from one place to destination. If the user paid for the tolls, then at the tolls the payment will be verified using rfid scanner (qr code). If the user not crossed the toll with in 24 hours the user will get the refund amount how much user paid to the that toll. If the user lost vehicle and raised complaint, if that vehicle crossed toll then the user will be notified.

# CHAPTER – 6

# CONCLUSION & FUTURE WORK

## 6.1 CONCLUSION:

The present study has explored the challenges associated with manual toll collection and has proposed an automated system that utilizes QR codes for efficient and streamlined toll transactions. The implementation of this system has shown promising results in terms of reducing wait times, minimizing fuel wastage, and mitigating environmental impact.The success of the QR code-based automated toll collection system lays the foundation for future advancements in the field. However, as technology continues to evolve, it is essential to consider more sophisticated solutions to enhance the overall efficiency and security of toll collection processes.The integration of chip technology within QR codes presents an exciting avenue for future exploration. Embedding microchips within the QR code can offer enhanced security features, real-time tracking, and the potential for additional functionalities. This approach could further streamline the toll collection process and provide a more robust solution for both users and toll operators

## REFERENCES:


[1]. Viji Amutha Mary, Online toll gate payment system using RFID

[2]. Fathima, Jayamala, Keerthika, Online Toll Payment System, July 2018

[3]. Shivani Sharma, Aayushi Shah, Saifalli Shaikh, Harsh Shirke, Gauri Bhange. Toll Booth Collection using Li-Fi, Vol. 7, Issue 5, May 2018

[4] Srisailanath, JhansiRani P. BS Ramya Reddy. Anitha 8 L, Laxmi Swetha Yerramsetty, Smart Toll Payment System Using Android Applications, 2019 IJSRCSEIT, Volume 5, Issue 3, ISSN: 2456-3307

[5]. Dr.G. Suseendran, Dr.D.Akila, Dr.A. Sasi Kumar, Novel Online Vehicle Toll Payment System for Indian National Highways, Volume 8, Issue XII. DECEMBER/2018

[6]. Muddu Basavana Gouda, Mrs. R. Latha, ONLINE TOLL PAYMENT, volume:4/Issue:05/May-2022

[7].Aayushi Shah,Shivani Sharma,TOLLZ-E (Online toll system) using RFID,Issue:30/JUNE-2011

[8] A. Luis Osorio; Luis M. Camarinha-Matos THE EXTENDED "ViaVerde" TOLL PAYMENT SYSTEM,Issue:07/Jan-2021

[9].Rugnesh Rameshram Kanojia,Prof. Sujata Pathak Secured Vehicle Toll Payment System using NFC,Issue:15/Nov-2019

[10].Ahmad Fali Oklilas, Fitriyani, Ahmad Zarkasi ,Automatic Toll Road Payment System Security Using (RFID) with the Blow fish method,Issue:25/May-2021

[11].Rugnesh Rameshram Kanojia,Prof. Sujata Pathak Secured Vehicle Toll Payment System using NFC,Issue:15/May-2012

[12].Ajinkya R. Algonda,Hybrid Solution for E-Toll Payment,Issue:06/April-2020

[13].Ganesh K. Andurkar Title:-Smart Highway Electronic Toll Collection System,Issue:05/june-2016