

# E-Toll System Using RFID

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## ABSTRACT

ETS (E-Toll System) is an electronic Toll Tax collection system by which we can collect the toll tax using RFID card detection related to the respective vehicle holder and hence reducing common problems like Traffic congestion, Pollution caused due to vehicles, Time dilemma, requirement of labours ,etc. There will be RFID tag on every vehicle and whenever vehicle will pass through toll plaza RFID reader will detect tag and required amount will be deducted. Driver don't need to stop to pay the toll as the amount will be deducted from the recharged amount by the user when a vehicle passes through a toll booth, this RFID card is used to track & bill the vehicle owner through a payment gateway.

**Keywords :** Electronic toll Collection ,RFID, User, XAMPP, Vehicle, Tag.

## I. INTRODUCTION

The world is changing furiously, the role of automation in our day to day life is increasing at a very fast rate, hence the consumption of fuel and use of road is increasing proportionally. People charge of using roads as nothing in this universe is free of Cost. This leads to the motive of our project i.e. "The Automation" .We have chosen this topic because digitizing current toll plaza will overcome disadvantages like time delay, traffic congestion etc.

The charge form of manual and semi-manual will not meet demand of the charging management system and may lead to many vehicle blocked at entrances and exits causing huge economic losses when it reached a certain threshold enhancing the convenience and safety of the travelers.The current status of RFID-based ETC system worldwide is described as follows:

**Sanral:-E-toll (in South Africa)** consists of the **electronic toll** collection (ETC) processes employed

by **South Africa's** roads agency Sanral on selected **toll** roads or **toll** lanes, subject to the Sanral Act of 1998.

**FASTag:-FASTag** is an electronic toll collection system in India, operated by the National Highway Authority of India[1] (NHAI). It employs Radio Frequency Identification (RFID) technology for making toll payments directly from the prepaid or savings account linked to it. It is affixed on the windscreen of the vehicle and enables to drive through toll plazas without stopping for transactions.

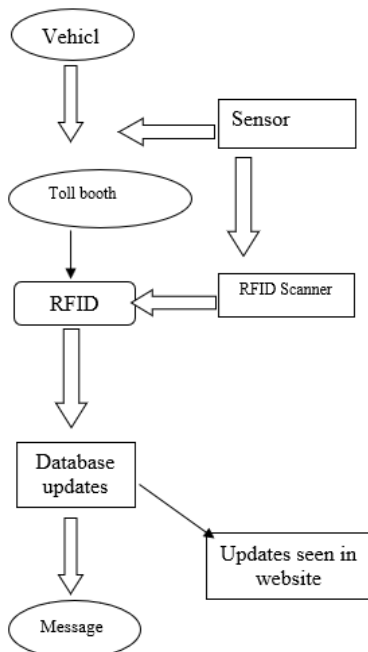
**E-ZPass:-**The E-ZPass Group is comprised of toll entities stretching across 17 states that operate the extremely successful E-ZPass *electronic toll collection* program

## II. OVERVIEW

Our project is based on designing a Website and a Database for automatic toll tax collection on toll booths such that it will overcome the disadvantages of traditional toll collection system and the data maintainability becomes easy for the RTO and the transaction and tax payables becomes transparent to

the users for that whenever a person buys a vehicle as it requires to implement the RFID card on the vehicle we here are talking about the newly bought vehicles but we can also implement these RFID tags on previously bought vehicles, first the vehicle owner need to register their vehicle at the RTO office. RTO people will assign a number plate to it along with that they will give an RFID enabled tag. The RFID will have a unique ID feasible to use with that vehicle only. They will also create an account for that particular card and maintain transaction history in database at this time the data entry of that particular owner will be stored in the database of RTO of the and they will provide a username and a password to the user vehicle needs to deposit some amount to this account. After it has registered the vehicle userID will be generated and once it is generated the user can recharge his/hers card as per the requirement with the help of website we have created. When the transaction is done the software further updates the details in the Centralized database server. It also triggers mechanism to generate the bill and provide the message to the vehicle owner about the transaction.

### III. DATAFLOW DIAGRAM



Following is the algorithm associated with the project:-

**Step 1:** Start

**Step 2:** Sensors will sense the approaching vehicle and send a start signal to RFID scanner.

**Step 3:** Scanner scans the RFID tag.

**Step 4:** userID is compared with the data within the Database

if matches { step5}

else

Traditional/alternate method of paying the toll tax.

**Step 5:** Transaction will be done depending upon the vehicle type.

**Step 6:** Database updates

**Step 7:** if the Transaction is completed successfully then the message will be sent to the registered no.

**Step 8:** END

### IV. HARDWARE SETUP

At the toll booth, Arduino board hardwares are situated which manages the toll total collection process. We have used Arduino Uno which is a microcontroller board based on the ATmega328P. It has 14 digital i/o pins (6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. We simply connected it to a computer with a USB cable.



**Fig1.** Arduino Uno Rev3, Code: A000066

## V. INTERFACING TECHNIQUE

RFID reader and RFID tag comes with a coil in them. We power the RFID reader from power supply for reading purpose. when an RFID tag is shown to the reader, the electromagnetic induction takes place between the coils and this powers chip inside the tag. This chip will send data electromagnetically to the reader. The reader will receive this electromagnetically transferred data and generates the output. Every RFID reader comes with Serial output pins. We can collect the read data through these serial pins using arduino or any other microcontroller.



Fig 2. Interfacing RFID with Arduino

## VI. DATABASE

Database is the Heart of our project. We have used MY-SQL for database query generation and updates as it can handle huge volume of data. we have connect MySQL database on different servers such as local host server and cloudways. We have used PHP my admin control panel so that we can manage our database buy localhost / myPHPadmin (or just by clicking admin in xampp user interfacrle).

The MYSQLi procedural Query is written as follows:-

```
$servername="localhost";
```

```
$username="username";
```

```
$password="password";
```

```
$db="dbname";
```

```
//create connection.
```

```
$conn=mysqli_connect($servername, $username,  
$password, $db);
```

```
//check connestion
```

```
If(!$conn){
```

```
die("connection failed:".mysqli_connest_error());}
```

```
echo"connected successfully";
```

To create database PHP connection first we have to create a new PHP file and name it as db\_connection.php and save it we need to create this database so that if we have to create multiple files in which we need to insert data or select items from the database you dont need to write a code for thedatabase connection every time we just need to have to include it by using PHP custom function called include on the top of our court and its function and use it(include'connection.php').For creating the database connection on cloudways we have used mysqli\_connect this function returns a pointer also known as a database handle to the database connection then we will add our database credentials. There are three Data information's stored in the database as follows:-

1.Admin's Database:-Administrator database consists of all the details of central database and all toll plazas under Construction.I.e. RTO's Database.

2.Central database:-Centralized system is heart of database. Central database consist records of toll plazas in work. This central database managed by administrator.The Customer must register themselves into this account system. This account information about the users is stored into The RTO database. When the registered customer passes through the particular toll plazas then, automatically toll will be deducted from customer's account.This deduction will be updated by central database

3. Integrated database:-Integrated database is disconnected to the central database This database will update automatically. RTO database includes all Registered vehicles and the details of vehicle such as vehicle owner, vehicle number, license number, account ID, account balance, current charges, etc. As the scanning of the RFID is done the database is updates the data stored in the rfid is in the format of string and the value of users unique id is also in the form of string format so that the comparison becomes easier. The current time and date will be stored with the particular transaction.

## VII. THE WEBSITE

The website is for the users to check whether their registration s successfully completed or not. It is a multipurpose website so that the users can know everything related to their transaction such as the require amount of toll tax , how many toll booths have the vehicle arrived and what is the balance amount present in the ID. User can recharge with help of this website which is user friendly and easy to access.

It is designed in such a way that user will know the route and the simplest way to reach the destination also he/she can keep the trace of his vehicle in case it is stolen .

To create the website we used XAMPP web development kit by Apache as it makes easy to run PHP(Personal homepages)script locally. We have placed our files in HTDocs. And then using the address "localhost/file\_name" open it in the browser. For the server space we connected the server with a high speed internet connection with a dedicated ip address. We have purchased the domain name and configured name servers such as ns1.mydomain.com and ns2.mydomain.com this will allow the users to point their domains to our web servers. Using the Apache server software, PHP programming environment and MYSQL database. For an administration software we have use C panel and

web host manager that will allow the quick and easy setup for our website on our server and also it will perform administrative tasks along with limit control and configuration for the users.

We have displayed the amount of recharge in in the form of packages.

For accepting the payment we have used a PayPal account for credit card payments it is the most effective and easiest way to accept the payments through the credit cards it also allows the purchases using the debit card when the transaction is successful the billing will be generated.

## VIII. RESULT AND CONCLUSION

In this report, the conclusion that came out is that, to implement modern system of toll collection new technique RFID came into light. The RFID safety is key important o this project. This project is reliable and easy way to pay toll as compared to manual one. Project is all about automated toll system which will overcome disadvantages of current toll system. Our project helps driver to pass through toll without stopping his vehicle to pay the toll tax. RFID tag on each vehicle will be detected by RFID reader and amount will be deducted. Open Road Tolling System[2] and Automated Toll system[3] these are two previously implemented projects similar to our project. We have studied them and we are trying to overcome disadvantages of these two. The project if implemented by government then toll system will be fully automated and one who is passing through toll don't need to wait for a long time this will also reduce pollution, traffic and accidents.

## IX. FUTURE SCOPE

We are planning to create an mobile application for ease of use for the users. We are also planning to deduct the chalan for not following the traffic rules

such as not wearing the seat belts and helmets, over speeding, Rash driving ,Alcoholic sensors and theft alarm etc. for that we are implementing a high megapixel camera which will keep clicking the pictures of all the vehicles that are visiting through the toll plaza.It will send that picture to the administrator and he will recognize whether the driver is following the rules correctly or not i.e. wearing seatbelts and helmets,Also there will be sensors implanted as rollers before the toll plaza which will sense the speed of the vehicles if it is higher than the desired limit additional charges will need to pay these charges will be decided by the Ministry of road and transportation as per their norms.

In case if any stolen vehicle will go through the toll plaza immediately the message along with the image of the vehicle will be sent to the user along with the time and the location of the plaza so that the owner can get the update of his vehicle.

If there is no desired amount in the account of the card holder traditional method can be used.

## X. REFERENCES

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