RFID Based Traffic Control and Toll Collection

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ABSTRACT-This paper present intelligent system to collect the toll at toll plaza and to overcome with the problems of existing system. In earlier toll collection system the vehicles need to stop to pay the tax manually. In proposed RFID Based Toll Collection System used for toll collection without making traffic congestion and waiting in long queue to save the time. In this system RFID Tag is identified by the radio frequency identifier which is mounted on the vehicle.For every RFID tag there is unique identification number. This will be assigned by RTO or traffic governing authority. According to this RFID number it store, all information related to owner of vehicle as well as the amount paid in advance for the toll collection is get detected. Whenever the vehicle passes the toll booth, the fix tax amount will be deducted from account and balance is updated. This system has wide scope in future.

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I. INTRODUCTION

Nowadays, huge traffic causes congestion commonly around the tollplaza. Proposed system is designed to solve this problems. This system is composed of several subsystems like RFID technology, computer databases and some device. This system can bring the several sectors for toll gates as saving time and reducing the manpower. System uses Radio Frequency Identification (RFID) tags which can be either active or passive. Passive RFID tags are not having their own power supply: the minute electrical current induced in the antenna by the incoming radio-frequency scanner provides power for the tag to send a response. Due to power and cost concerns, a passive RFID tag can be used.In active RFID tags have a power source, and have longer ranges and large size of memories than passive tags, it also store additional information. The tag types do not affect their abilities to collect data at traveling time; the necessary RFID number are transmitted from the RFID reader place on roadside at toll plaza.The aim of project is to design a system, which automatically identifies vehicles using RFID which is installed on vehicle at manufacture time. On toll plaza vehicles passes through toll predetermined amount is automatically deducted from its bank account. If ID is in defaulters list i.e. complaints it in police station about loss of vehicle or something for security purpose and it will get automatically caught. But, If RFID tag number is not in the complaints list then on toll collection for that vehicle system perform simple operation to deduct balance and move vehicle forward.

This system can be developed using java script, web design, cloud database, required hardware devices and associated devices. The system is connected with the PC using the RS232C cable interface in the embedded system. This system allow to read as well as write data to/from a database that is from the account.

II. EXISTING SYSTEM

A. AUTOMATED TOLLPLAZA SYSTEM USING RFID

In [1], the author mentioned that the micro simulation model for the automated toll plaza system using RFID technology. The 8051 is micro-controller used for controlling the system. Peripheral Interface Controllers - Peripheral Interface Controllers (PIC) is used to get signal to PC via RS-232 cable. In this system, the micro-controller act as main part of the system because of the signal is sent to PC and the output result is displayed on the LCD display. And then micro-controller sent the signal to opening the traffic gate. The author also described the GSM modem design to update the information about the database of user account.

B. RFID BASED AUTOMATIC TOLLGATE SYSTEM (RATS)

In [2], the author explained that the RFID based automatic toll gated system. The frequency 928 MHz is used for the communication of RFID system with the control system. The microcontroller was programmed with the C programming language. For communication between RFID and PC as well as PIC Visual Basic was used. The toll database system was developed using Microsoft Access. The RS-232 serial bus is used for the connection between PIC and PC.

C. Toll Collection System by using RFID & Cloud Computing

In [6] this paper author explained that how vehicle are identified and how information about owner of that vehicle is store on cloud securely. It uses RFID to detect the vehicle and read all information which are in RFID tag and store this on cloud by using cloud computing concept.

III. PROPOSED SYSTEM

The current toll collecting system is on the basis of manual transaction. On toll plaza each vehicle has to stop and pay road tax manually. It causes traffic congestion at toll plaza, increase in pollution, and wasting time of people. We are proposing system in it no need to stop vehicle at toll plaza, vehicle will detect automatically by using the RFID tag which is place on vehicle. After detecting RFID tag, fix amount of money is deducted from his account.

From the current problem section it can be seen that existing technologies are insufficient to handle the problems of traffic control and toll collection system.RF Transmission tag contains a unique ID is provided for each vehicle. This unique ID can be assigned to the vehicle at the time of vehicle manufacture, all information related to the vehicle is store on tag. RFID reader reads all information stored on the tag when tag are near to toll system reader reads RFID from the vehicle and compares it with the database on the cloud, and identify the vehicle.

If RFID number is in complaint list in police station about lost vehicle or something for security purpose that time vehicle is detected and it will get notify to police station to catch the vehicle which do not allows to pass the toll booth. But, if RFID number of vehicle is not in complaint list toll get collected . The entire system is developed using java interface using required devices. The devices are connected to a PC using the RS232C interface.

The goal are to implement this system that leads to:
• Saving the time at toll plaza for toll collection and reduce fuel consumption.
• Reducing traffic congestion and increases security concerns.
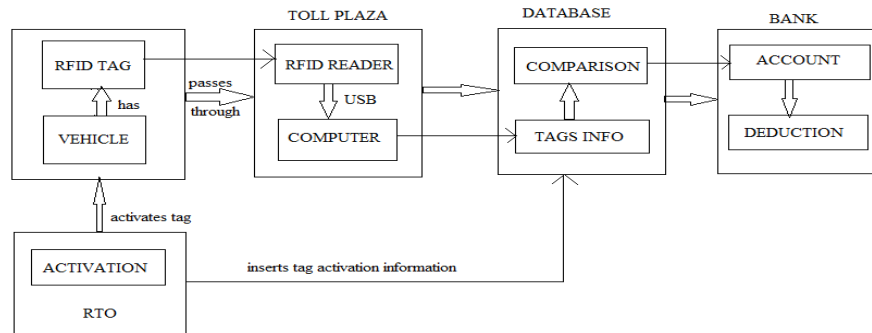
IV. SYSTEM ARCHITECHURE

Figure 1. System Architecture

V. ALGORITHM FOR SYSTEM

```
if ( tag registered )
        {
(Checked owner of vehicle)
        If (amount balance > required)
        {
                (Deduct amount balance)
                (store all information)
        }
        Else
        {
                (Notify to owner)
         }
Else
{
        (Register first)
}
```
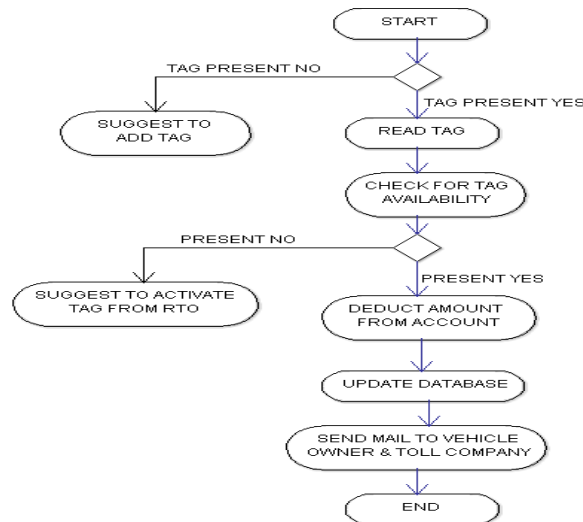
Figure 2. Flow chart

VI. CONCLUSION

As the entire system is automated it uses less human interaction. For the defaulter vehicle it get notified. Also the user can get updates about status using web application. This system can reduce the congestion so emergency vehicles like ambulance, fire truck can reach the destination earlier.

Designed a system to give complete solution for toll plaza which help to

1) Collect road tax as well as reduce traffic congestion.

2) It helps to minimize time as vehicles move forward in queue on toll plaza to pay the tax. this system can be used at high density population areas as well as it can help to reduce the manpower.

3) Also helps in fast transportation system.

At the same time, it will show:

    1. Total cost of that road.

    2. And the remaining balances after each transaction.

    3. The duration of toll plaza.

VII. REFERENCES

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