

## ELECTRONIC TOLL COLLECTION SYSTEM USING RFID AND GSM

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**Abstract**—This paper focuses on an electronic toll collection (ETC) system using radio frequency identification (RFID) technology. The proposed RFID system uses tags that are mounted on the windshields of vehicles, through which information embedded on the tags are read by RFID readers, The proposed system eliminates the need for motorists and toll authorities to manually perform ticket payments and toll fee collections, respectively..

**Key words**—Toll booth, RFID, GSM.

### I. INTRODUCTION

An Automated Toll System is used for toll collection without making traffic congestion and waiting in long queue with help of RFID technique. Also, by using this system, it will save time, i.e. by avoiding long queue as no need to stop the vehicle and no need of manual transaction.

The current system for collecting toll is on the basis of manual transaction. In this each vehicle has to stop at the toll plaza for payment and there can be a problem of exact transaction. It causes traffic congestion, increase in pollution, and wasting time of people. In Automated Toll System no need to stop vehicle at toll plaza, it will detect the RFID tag, which is mounted on vehicle. After detecting RFID tag, the database on the administrators screen will appear and the balance from the customer's account will get deducted. So there will not be any problem as mentioned above. An RFID tag is installed on each vehicle with read/write memory. A reader device reads this data when near to toll system from the vehicle and compares it with the data in the computer database, toll collection is taken and nails goes down and gate get open .[1]

The entire system is developed as an embedded system using micro-controller and associated devices. The system is connected to a PC using the RS232C interface in the embedded system. This allows the system to read and write data from/to a database that is from the account.

### II. LITERATURE SYRVEY

The current system for collecting toll is on the basis of manual transaction. In this each vehicle has to stop at the toll plaza for payment and there can be a problem of exact transaction. It causes traffic congestion, increase in pollution, and wasting time of people.

The paper presents a solution for these problems a rises due to current collection system. Basically there are several ways to provide better solutions using electronic technology. few among them are by using Barcode reader system, image processing technology, weighing system, GPS technology, RFID technology etc.this paper provide the solution for given problem using RFID technology generally known as an Automated/ Electronic Toll Collection System.

#### Open toll System

In an open toll system, not all patrons are charged a toll. In such a system, the toll plaza is generally located at the edge of the urban area, where a majority of long distance travelers are committed to the facility, with a minimum likelihood of switching to the parallel free route, or at the

busiest section of the toll way . Patrons are identified by their category and pay a fixed toll for it. The local traffic around the plaza either gets rebate or can use a service lane.

### Closed toll System

In a closed toll system, patrons pay the toll based on miles of travel on the facility and category of vehicle. There are no free-rides. In a closed toll system, plazas are located at all the entry and exit points, with the patron receiving a ticket upon entering the system. Upon exiting, patron surrenders the ticket to the collector and is charged a prescribed fee based on category of vehicle and distance travelled. It has just two stops for the vehicles whereas open system can have multiple stops. But closed system is expensive to construct than open system.

## III. PROPOSED SYSTEM

The project works fine with this design with some limitations. The design gives better solution for the present working system without hammering the present toll collection scenario. there are some considerations that we tried to maintain as it is.

- 1.Different charges for different type of vehicles.
- 2.Provision of discount for return/re-entry.
- 3.concession to the VIP vehicles such as President of India, MLA's, MP's State/central Government vehicles, Local vehicles.

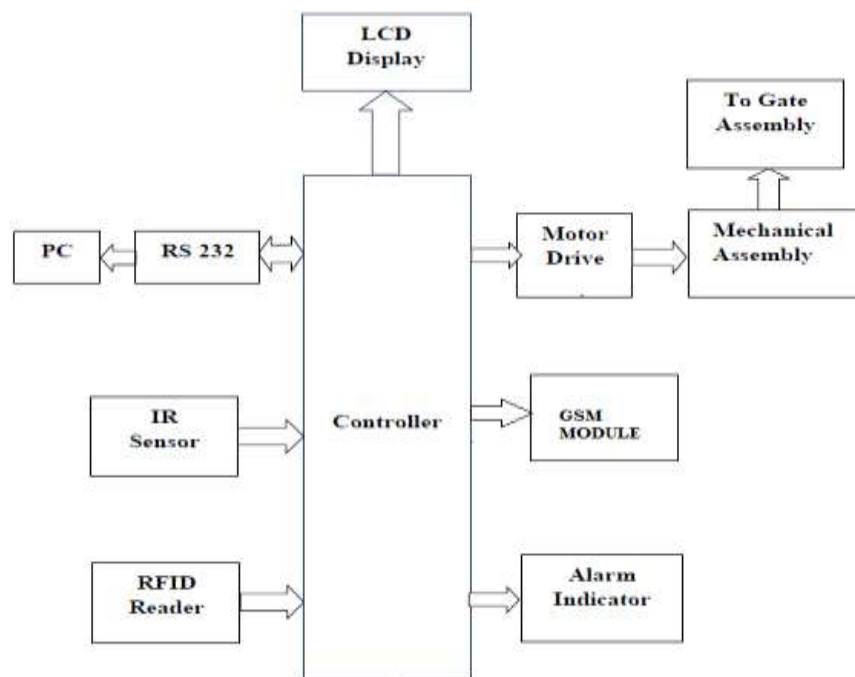


Figure 2. Block diagram

### A.VEHICLE IDENTIFICATION AND DETECTION

Each vehicle in system is attached with RFID tag. The brief information about RFID is given below.

A basic RFID system consists of three components: a) An antenna or coil

b) A transceiver (with decoder)

c)A transponder electronically programmed with unique information.

Automatic vehicle identification tags can be further broken down into distinct tag types based on the degree to which they can be programmed and the type of power source.

Type I: The information stored in these tags is fixed (read only), and the tags do not have any processing capabilities.

Type II: These tags contain an updateable (read/write) area on which the antenna/reader may encode information such as point of entry, date/time of passage, etc.

Type III: (also called Smart Tags) are used in conjunction with an in-lane RF antenna/reader to communicate identifying information about the vehicle, customer, and account balance information to the toll system.

## **B. AMOUNT DEDUCTION AND MESSAGE SENDING**

After identification of vehicle particular amount from user account is get deducted. The different charges for different vehicle are deduced according to data available in the system. There are several parameters are considered that are mentioned above. After deduction the available data is get updated. Message is send to the person about amount deduction. Also we are using LCD to display the message at toll booth.

## **IV. RESULT**

The results of proposed system are practically implemented. there are various ways that we can show the expected results.

Results of the designed system are attached below.

1)The image shows the welcome message on LCD.



2) one of the result shows that passed vehicle is truck and due is Rs. 150.



3) After deduction of sufficient balance the LCD shows Transaction is successful.



4) The system provides registration for unregistered vehicle.

## **V.CONCLUSION**

The proposed ETC system discussed in this work applies passive RFID technology. By doing so, increased efficiency will be guaranteed since RFID is known as a highly stable technology. With the elimination of human interaction in the entire toll collection process, we can create a better ETC system to be implemented in India. It can also significantly improve the efficiency of toll stations and the traffic abilities of the toll road.

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