IOT Based RFID Gate Automation System

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ABSTRACT: Automatic Toll Tax systems have really helped a lot in reducing the heavy congestion caused in the metropolitan cities of today. It is one of the easiest methods used to organize the heavy flow of traffic. When the car moves through the toll gate on any road, it is indicated on the RFID reader that it has crossed the clearing. The need for manual toll based systems is completely reduced in this methods and the tolling system works through RFID. The system thus installed is quite expedient reducing the time and cost of travelers since the tag can be deciphered from a distance. As we all know that transportation is the backbone of any country's economy. Improvement in transportation systems result into the good lifestyle in which we achieve extraordinary freedom for movement, immense trade in manufactured goods and services, as well as higher rate of employment levels and social mobility.In fact, the economic condition of a nation has been closely related to efficient ways of transportation. Increasing number of vehicles on the road, result into number of problems such as congestion, accident rate, air pollution and many other problems.

KEYWORDS: RFID, RFID Reader, Metropolitan.

I.INTRODUCTION

As people all know that transportation is the backbone of any country's economy. Improvement in transportation systems result into the good lifestyle in which people achieve extraordinary freedom for movement, immense trade in manufactured goods and services, as well as higher rate of employment levels and social mobility. In fact, the economic condition of a nation has been closely related to efficient ways of transportation. Increasing number of vehicles on the road, result into number of problems such as congestion, accident rate, air pollution and many other. All economic activities for different tasks use different methods of transportation. For this reason, increasing transportation is an immediate impact on productivity of nation and the economy. Reducing the cost of transporting resource at production sites and transport completed goods to markets is one of the important key factors in economic competition. Automatic toll collection is a technology allows the automated electronic collection of toll costs. As it is studied by researchers and also applied in various expressways, bridges, and tunnels require such a process of Automatic Toll Plaza. ATP is capable of determining if the vehicle is registered or not, and then informing the management center about to process violations, debits, and participating accounts .The most excellent advantage of this ATP system is that it is capable of eliminate congestion in toll plaza, especially during those seasons when traffic seems to be higher than normal.

The Benefits of this System [1] are:

• Shorter queues at toll plazas by increasing toll booth service rates.

• Faster and more efficient service

• The ability to make payments by keeping a balance on the card itself and

• The use of postpaid toll statements

• Other general advantages include minimization of fuel wastage and reduced emissions by reducing

deceleration rate, waiting time of vehicles in queue, and acceleration. For Toll Operators, the benefits include:

• Lowered toll collection costs

• Better audit control by centralized user account

II.SYSTEM MODEL AND ASSUMPTIONS

In this project, the collection of toll amount is automatic without human intervention.There will be no delay in the collection of amount, when the vehicle approaches the toll booth Sensor senses the presence of vehicle and sends the command to raspberry to perform necessary action, if the balance is below than prescribed level then there will be an alert message to the vehicle owner through GSM, so for every time use of RFID cars the message will make an alert to the vehicle owner. By using this smart electronic toll booth system the time of user can save and can use that time for some other valuable works. To analyse the toll booth managing system using different RFID cards this system use RASPBERRY pi3 model B board along with LINUX operating system and to get messages tothe vehicle owner regarding his transactions to his mobile using TWILIO cloud.

III.EFFICIENT COMMUNICATION

Here the proposed system uses the Raspberry pi controller which is the heart of the project. Where IR sensor is used to sense the car. When IR sensor senses the presence of car then It will passes the information the RFID reader to scan the card. When user scans the card then reader will checks the details which is stored in tag. If the details matched then system will asks to enter the password. If the password matches then it will automatically detects the amount formthe account. If the password was not matches then it will automatically sends the message to the register mobile number like unauthorized person accessing your card please alert. It was also sends the message like how much amount in the account. Amount detected from the account. Remaining Balance in the account. If the balance is not available in the account then it automatically sends the message to the register mobile number. If any unauthorized card is scanned by the RFID Reader the it will buzzer alarm.

IV.SECURITY

It is low cost, high security, far communication and efficiency, etc. ... Electronic toll collection system using RFID is an effective measure to reduce management costs and fees, at the same time, greatly reduce noise and pollutant emission of toll station.The Electronic Toll Collection system in expressway based on RFID, a design scheme was put forward. It is low cost, high security, far communication and efficiency, etc. It not only improve the passage ability of expressway but also improve the technology level of charge. Electronic toll collection system using RFID is an effective measure to reduce management costs and fees, at the same time, greatly reduce noise and pollutant emission of toll station. In the design of the proposed Electronic toll collection (ETC) system, real time toll collection and anti-theft solution system have been designed. This reduces the manual labour and delays that often occur on roads. This system of collecting tolls is ecofriendly and also results in increased toll lane capacity. Also an anti-theft solution system module which prevents passing of any defaulter vehicle is implemented, thus assuring security on the roadways.

V. RESULT AND DISCUSSION

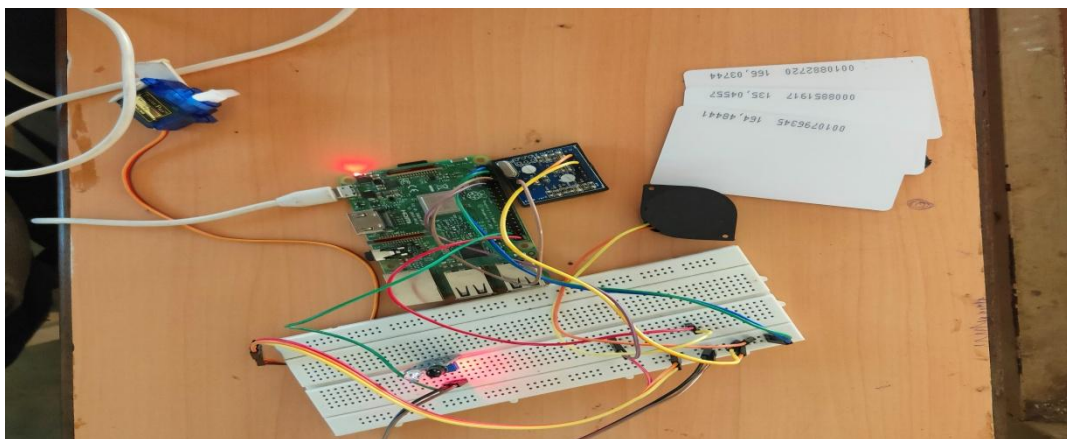In the fig 1, it shows the interfacing of Raspberry pi model B board with RFID Reader,Servo Motor,Buzzer

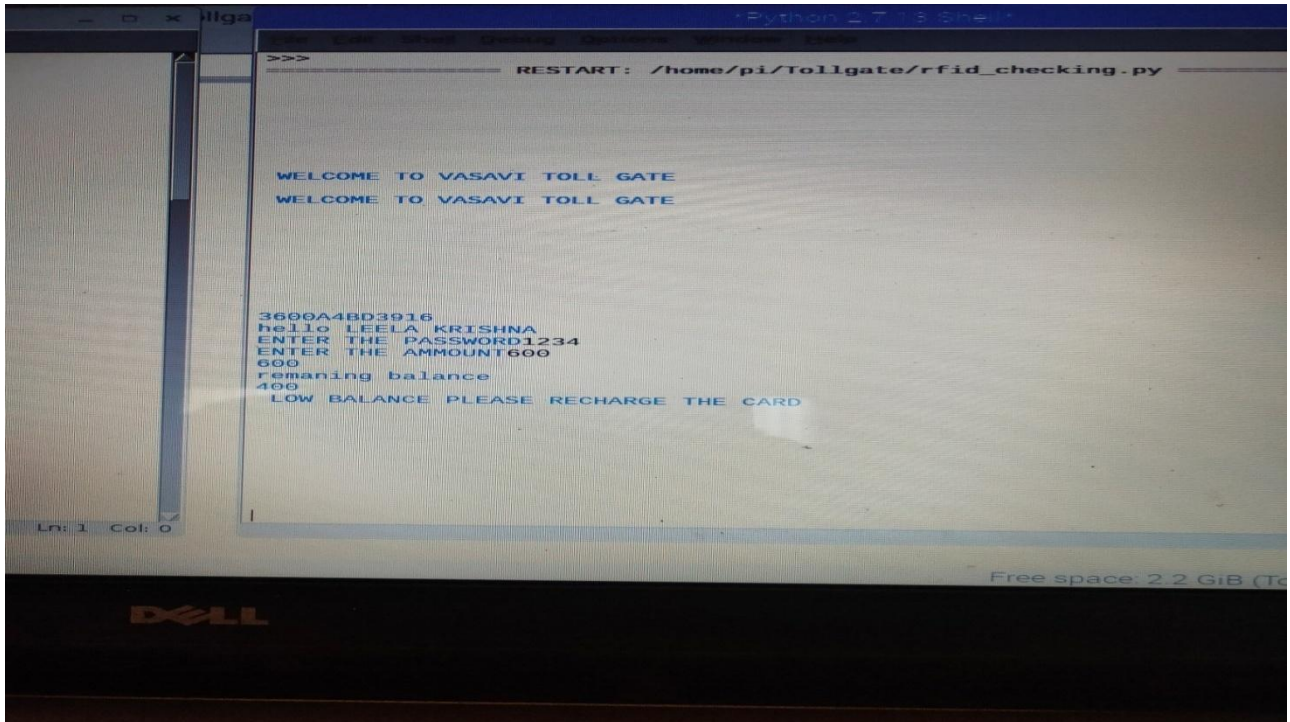Fig. 1 interfacing of Raspberry pi model B board with RFID Reader,Servo Motor,Buzzer

Fig. 2 Displaying Information about user and the remaining balance after successful deduction of amount.

In the fig 2, it shows when the Leela Krishna Sai named RFID card is scanned then it will first greet the user and asks to enter the password.As the password enters correctly it shows the message to enter the amount required to deduct. It also displays the remaining balance in the card as the balance is less than prescribed it will display a message as shown above i.e LOW BALANCE PLEASE RECHARGE THE CARD.
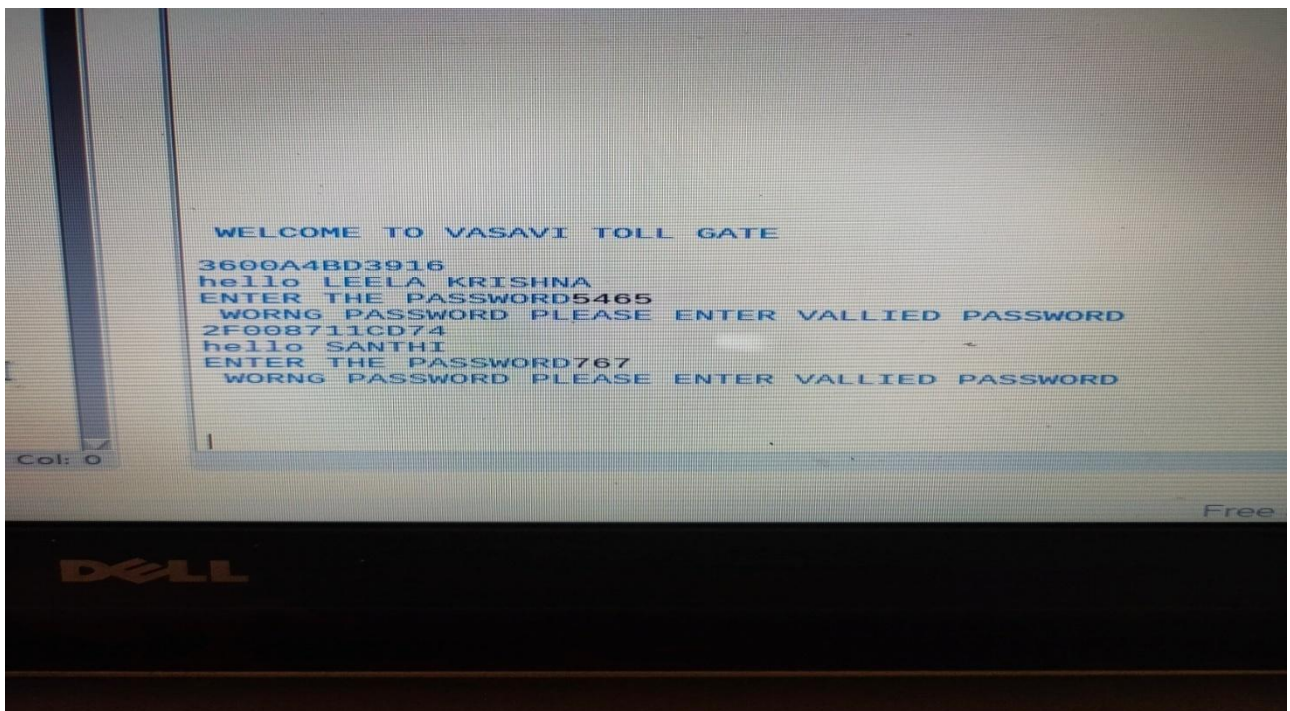

Fig .3 Displaying Alert Message if Password was wrong.

In Fig 3, When the Leela Krishna Sai named RFID card is scanned and the wrong password is given then it displays the message as shown above i.e WRONG PASSWORD PLEASE ENTER VALLIED PASSWORD.Same thing happens with santhi if wrong password was given as shown in the above figure.

VI.CONCLUSION

The Electronic Toll Collection system in expressway based on RFID, a design scheme was put forward. It is low cost, high security, far communication and efficiency, etc. It not improve the passage ability of expressway but also improve the technology level of charge. Electronic toll collection system using RFID is an effective measure to reduce management costs and fees, at the same time, greatly reduce noise and pollutant emission of toll station. In the design of the proposed Electronic toll collection (ETC) system, real time toll collection and anti-theft solution system have been designed. This reduces the manual labour and delays that often occur on roads. This system of collecting tolls. Is eco-friendly and also results in increased toll lane capacity. Also an anti-theft solution system module which prevents passing of any defaulter vehicle is implemented, thus assuring security on the roadways.

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