Advanced Smart Card Based Energetic Toll Plaza Controlling System

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Abstract- *The system of Toll Plaza Controlling describes the automated toll collection system for toll gate, based on Smart Card based RFID technology. Now-a-days, streams of traffic are increased and toll gate on highways are congested. It will cause the traffic jam and waste time. So our main concentration is to transform manual transaction to automated toll collection with the help of advanced Smart Card based RFID technology. The new user can register and update the amount of balance via Graphical User Interface (GUI) easily. Once the Smart is used in Toll Plaza, corresponding amount is deducted from the Smart Card.*

Keywords- RFID, toll plaza

I. INTRODUCTION

Now-a-days, increasing traffic volume causes congestions commonly around the toll gate of highway. Therefore, the new technique is urgently required to reform the problem of congestions. Automated toll collection system is one of the methods to solve the above conditions. The automated system is composed of several subsystems. The RFID technology, computer database, power supply, microcontroller, motor and inferred device are included. Automated system can bring the several sectors for toll gates as saving time and reducing the human workers. Develop the prototype model, which reproduces the operation states of various toll gate systems: passing time and waiting time.

The RFID tag and RFID reader are contained in RFID technology. RFID means Radio Frequency Identification that consists of the tags which can be either active or passive tag. Passive tag do not have own power supply, much cheaper to manufacture and small coil antenna is used. On the other hand, active tag must have own power supply. It has longer range and larger memories. It can store additional information sent the RFID reader. FID reader is an interrogator. It is placed at the toll gate on every single row where vehicles are passed. The reader contains an RF module, which acts as both transmitter and receiver of radio frequency signals. The reader generates the signal to receive the data from tag. The received signals send to the computer system which contains Graphical User Interface (GUI) and the database of all users. The ID number from the tag checks with the recorded database and deduces the toll tax. The computer and microcontroller are connected with USB cable.

II. EXISTING SYSTEM

In the past system the user has to wait for the long queue and entering the amount and the respective details manually to cross the toll plaza. This process takes more and more time to proceed further and it is very hard to deal with. For this kind of traditional methodology the traffic problem may occur and the situation to raise the traffic jam at many cases in toll surroundings. For all the entire system go through with poor performance handling strategies.

Disadvantage:

- Entering amount and related details manually.
- It takes more time to proceed further.
- Traffic locks may occur.
- Performance is low

III. PROPOSED SYSTEM

In the proposed system we resolve many problems and issues arises into the traditional approach such as the vehicle takes less time to enter data as well as pay the corresponding amount into the toll plaza. This mechanism provides the effective way of communication between users and toll plaza administrators. There is no need for the users to wait for the long queue to pay the amount and cross the toll. As well as this efficient methodology saves lots of time to prevent the users in efficient way.

Advantage:

- Vehicle takes less time for entering data as well as pay.
- Effective communication facilities.
- No need to wait in queue to proceed.
- Efficient Process without human intervention and waste of time.

IV. ARCHITECTURE

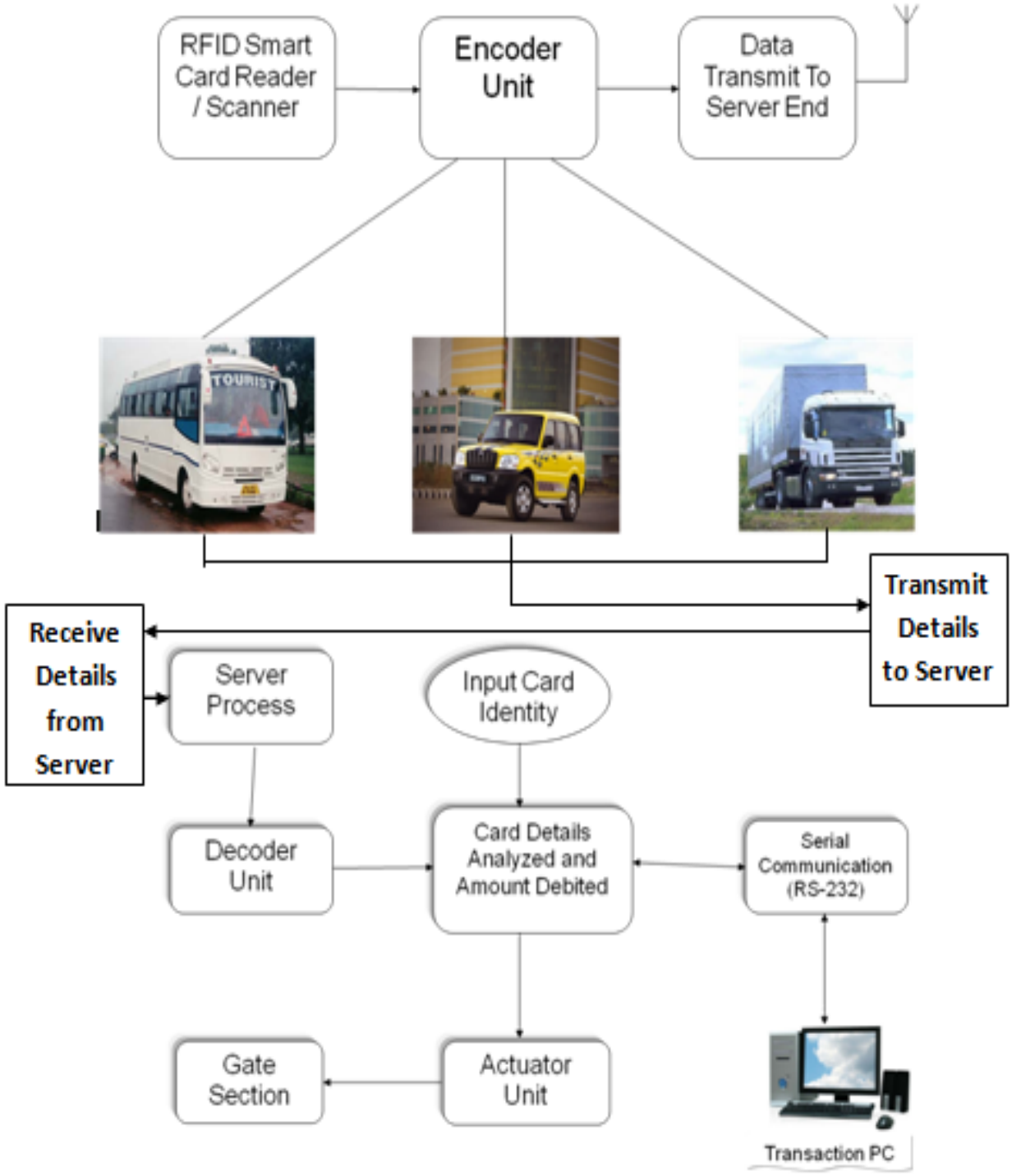

Fig. 1.Architecture

V. MODULE DESCRIPTION

MAIN page contains the information about the system and its purpose. It also contains the administrator, user and toll plaza modules. The administrator module contains the information for view registration users, view registered users, view of registered users, top up smart cards, and toll masters details as well.

Fig. 2 Main page

In this project, ADMINISTRATOR module has the following options to handle the system more perfectly. They are:

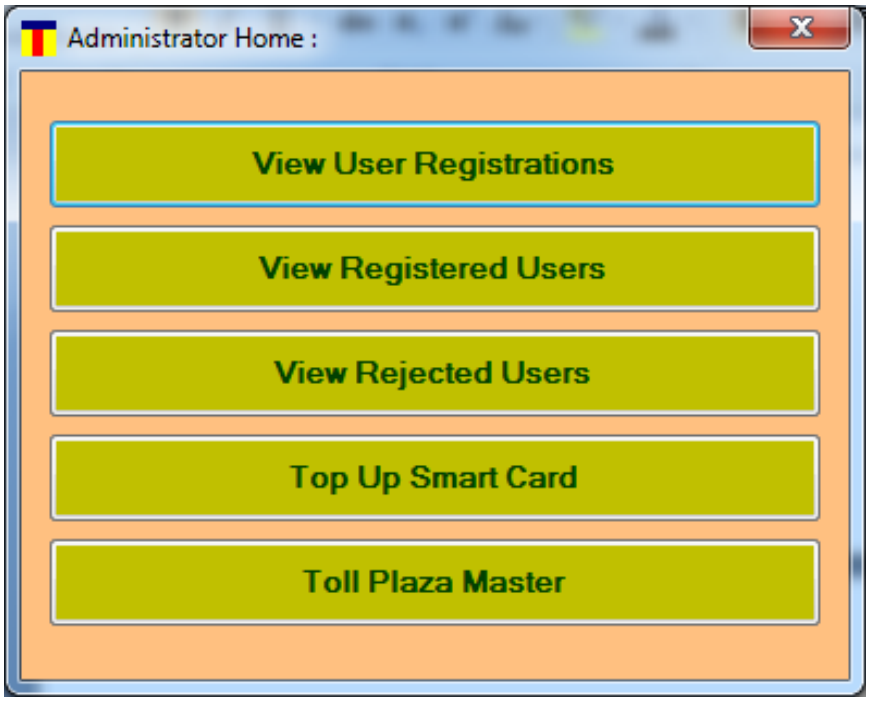

Fig. 3 Administrator Home

The administrator module contains the information for view registration users, view registered users and view of registered users which is described as follows:

(i) View User Registrations:

This module allows the administrator to view the user details, i.e., the persons who are all enrolled in this system. Information such as name, email id, contact number, city, state, country, vehicle type, vehicle number and the person enrolled in this system is identified using a unique id which was provided to him at the time of enrolment.

(ii) View Registered Users:

This module allows the administrator to view the registered users who are all accepted by the administrator and eligible to proceed to the next level of operations. The registered users are identified using a unique id and the administrator won't have the rights to modify the registered

users details enrolled by him and cant able to delete the details or a record entered by the user.

This module allows the administrator to view the registered users who are all rejected by the administrator and are not eligible to proceed to the next level of operations.

(iii) View Rejected Users:

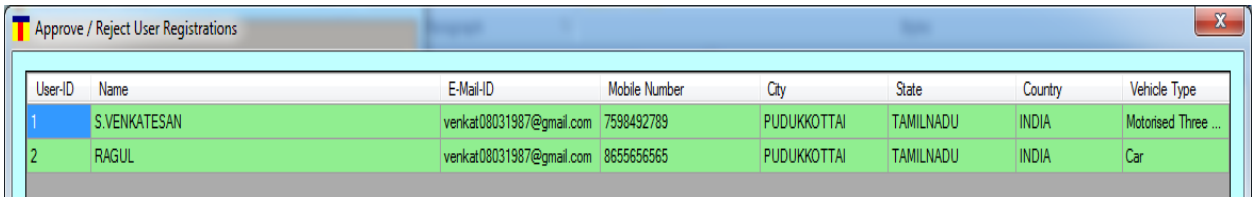

Fig 4.Approve/Reject User Registration

(iv)Top up Smart Cards:

This module allows the administrator to recharge the top up card of the users who are all registered their identities and have the proper login credentials. So that the users time and effort for paying the money to trespass and use the road will be reduced greatly by without waiting in the toll for a long time. By using this module the user can simply top up their smart cards use the roads without any barring gates.

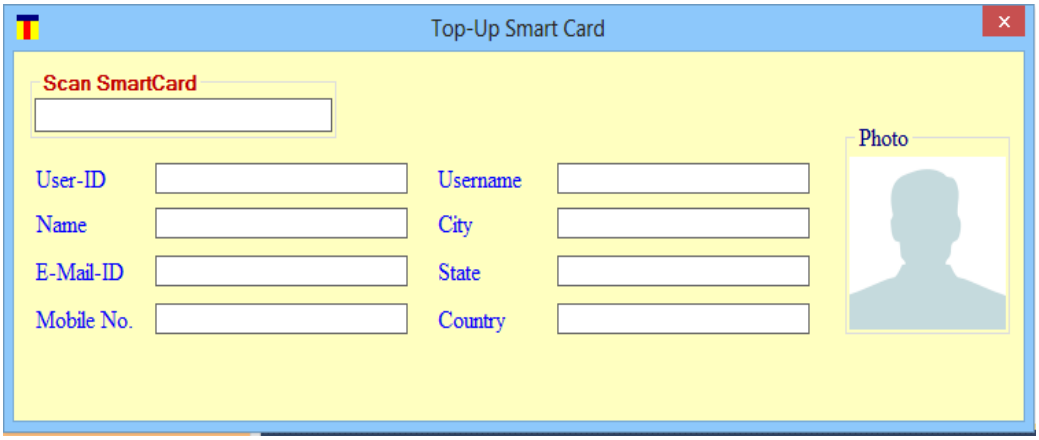

Fig 5.Top Up Smart Card

(v) Toll Plaza Master:

This module allows the administrator to maintain the details regarding toll plaza and manage the details regarding toll plaza name, amount for toll and amount for vehicles and so on.

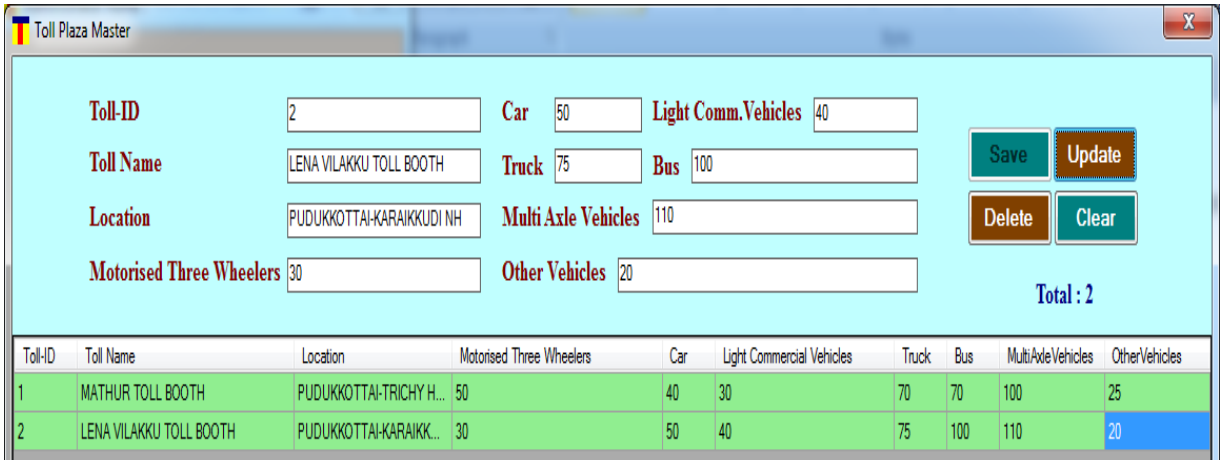

Fig. 6 Toll Plaza Master

USER module allows the users to register the identity such as name, mail-id, vehicle details and mobile number and contact details and so on. Once the administrator accept the respective user request the user can access all privileges of the system otherwise if the administrator rejected the request the user cannot access the system.

Fig 7. User Home Page

This module helps the administrator to View top-up history allows the users to view the name, date and timing of recharge and then amount details. Using which the administrator can easily track the users record for usage of toll, money deduction, the balance amount to be used by him and the past recharge date etc., can be viewed and maintained easily by the administrator

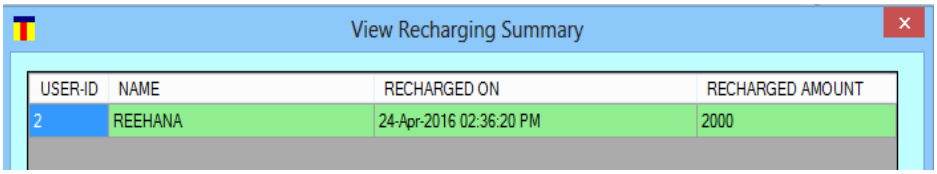

Fig 8. Top up History

It provides the details of the toll plaza that has been entered based on the number of entries with respect to date and time with the details of the vehicle. This module contains the information about toll used by the administrator, user name, time at which they use the toll i.e., the toll cross on detail, the vehicle used by the user and the amount deducted for using the toll.

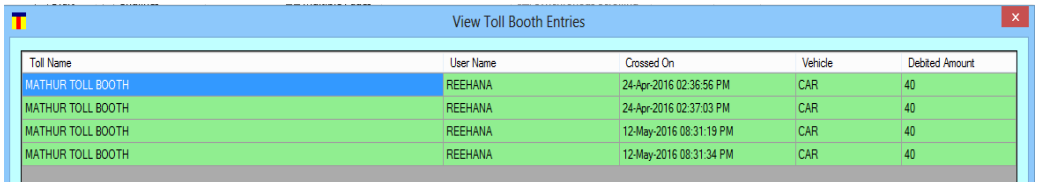

Fig 9. Toll Booth Entries

TOLL PLAZA module allows the registered users to make the entry of the toll plaza with proper smart card by selecting the toll and the amount for the respective vehicle gets detected based on the number of entries with respect to date and time by using the smart card number hold by the customer. This module contains the information for name of the toll, smart card number, user id, name of the user, email id, contact no, city, state, country and the vehicle type for future usage of toll by the user.

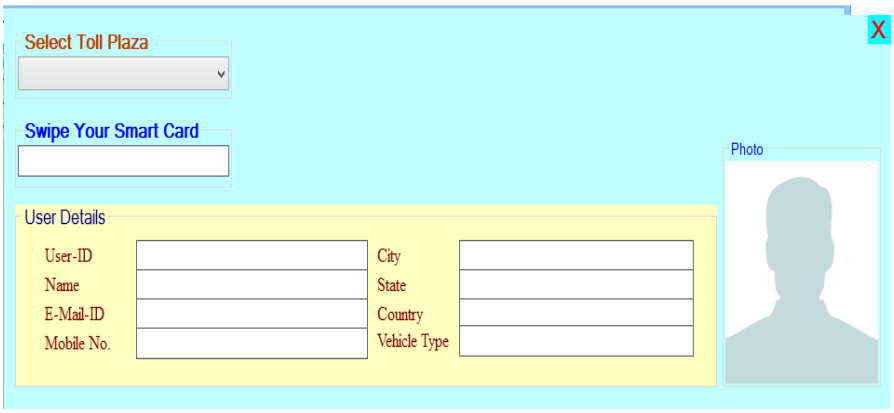

Fig 10. Toll Plaza

VI. CONCLUSION

This system mainly reviewed the research and development work for toll collection at the toll gate on highway with the help of passive RFID technology. By the application of this project into real time we can avoid malfunctions, Time consumptions, and long wait on the Highways can be avoided. By using RFID based automated toll collection system, the vehicle can check for security with the passing time, save the time for toll collection and reduce traffic congestion at the toll plaza. Therefore the RFID based toll collection system is the best way for toll collection at the toll plaza.

VII. FUTURE WORK

In future we plan to extend our work based on the mobile based methodology with advanced gateway manipulation systems, Once the user recharge the smart card with proper amount the immediate response like card recharge alert is sent to respective user mobile via SMS and the amount debiting messages also reached to users properly via SMS mechanisms without any delay.

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