

ONLINE PAYMENT OF TOLLS AND TRACKING OF THEFT VEHICLE USING RFID

A.Aruna^{*1}, S. Amudhavalli^{#2}, P. Brinda^{§3} and Mr.A. Ganesan^{&4}

^{*}B.E, Computer Science and Engineering, Dhanalakshmi College Of Engineering, Chennai, India

[#]B.E, Computer Science and Engineering, Dhanalakshmi College Of Engineering, Chennai, India

[§]B.E, Computer Science and Engineering, Dhanalakshmi College Of Engineering, Chennai, India

[&]B.E, M.E, Assistant professor, Computer Science and Engineering, Dhanalakshmi College Of Engineering, Chennai, India

Abstract—In this paper, we are just going to develop the concept for online payment for tollgate, and using this same system we just detect the theft vehicle. Time and efficiency are a matter of priority of present day. In order to overcome the major issues of vehicle congestion and time consumption RFID technology is used. RFID reader fixed at tollgate frame reads the tag attached to number plate of vehicle. The RFID sensor in the tollgate detects the approach of the incoming vehicle's tag and toll deduction takes place through a prepaid card assigned to the concerned RFID tag that belongs to the owners' account. The concept proposed is of automatic toll tax payment system and the amount transaction information sends to the cell phone of the motorists through the GSM modem technology. This makes tollgate transaction more convenient for the public use. In this same process, once the user registered with his vehicle number which was already in number plate, if the user was lost his vehicle means just he can request in the website to find the vehicle. And if the theft vehicle come across the tollgates the RFID sensor will send the signal to the tollgate booth, and then the vehicle will be hand over to the particular user who have left his/her vehicle.

Index Terms— online payment for tolls, Theft vehicle identification, RFID sensor

I. INTRODUCTION

Automated toll collection (ATC) is a technology enabling the electronic collection of toll Payments. It has been studied by researchers and applied in various highways, bridges, and tunnels requiring such a process. This system is capable of determining if the car is registered or not, and then informing the authorities of toll payment violations, debits, and participating accounts.

The most obvious advantage of this technology is the opportunity to eliminate congestion in tollbooths, especially during festive seasons when traffic tends to be heavier than normal. It is also a method by which to curb complaints from motorists regarding the inconveniences involved in manually making payments at the tollbooths. Other than this obvious advantage, applying ATC could also benefit the toll operators. Thus, the ATC system is a win-win situation for both the motorists and toll operators, which is why it is now being extensively used throughout the world.

An ATC system commonly utilizes radiofrequency identification (RFID) technology. Radio Frequency Identification (RFID) is evolving as a major technology enabler for identifying and tracking goods and assets around the world. It can help hospitals locate expensive equipment more quickly to improve patient care, pharmaceutical companies to reduce counterfeiting and logistics providers to improve the management of moveable assets. It also promises to enable new efficiencies in the supply chain by tracking goods from the point of manufacture through to the retail point of sale (POS).

RFID is a generic term used to identify technologies utilizing radio waves to automatically identify people or objects. RFID technology was first introduced in 1948 when Harry Stockman since then, and has been implemented in various applications, such as in warehouse management, library system, attendance system, theft prevention, and so on. In general, RFID is used for tracking, tracing, and identifying objects.

A complete RFID system consists of a transponder (tag), reader/writer, antenna, and computer host. The transponder, better known as the tag, is a microchip combined with an antenna system in a compact package. The microchip contains memory and logic circuits to receive and send data back to the reader.

These tags are classified as either active or passive tags. Active tags have internal batteries that allow a longer reading range, while passive tags are powered by the signal from its reader and thus have shorter reading range. A reader contains an antenna to transmit and receive data from the tag. The reader also contains a decoder and an RF module. It could be mounted or built as a portable handheld device.

II. RELATED WORK

Jones.A.K and Hoare.R.R (1986) had proposed the toll collection or tax collection is the one of the source for the government and maintenance of road.

This paper of tax payment system will be an advantage for the government and this system will be monitoring the vehicles

which are crossing the gates. This is the first system has been implemented then only accidents has been reduced.

Bean Michal (1994) had proposed the system of toll collection established in England and Wales from about 1986 in responded to the need for better road way. The trusts were ultimate response for the maintenance and improvement of most of the main roads in England.

G(2000) had proposed this technique in street by road side commercial store and done by user but not for public. Then after it become good result and implemented in to highway roads. Finkenzeller.K (2012) had proposed his technique was implemented for reducing time to waiting in toll gate. And also

it is very secured. Data feed system also having to use store customer data's. Gabriel.N and Mitraszewska.I (2010) had proposed the technique implemented here is RFID Based Payment System to reduce the time consumption and easy access of the system, here the money transfer can be done by this method.

Hitachi.S (2011) had proposed the processor implemented here ARM -7 Processor by the ARM-7 the processing of the details of the vehicle has been developed and the time taken is reduced to a great extent.

III. AUTOMATIC TOLL GATE SYSTEM USING ADVANCED RFID AND GSM TECHNOLOGY

Most Electronic Toll Collection (ETC) systems around the world are implemented by DSRC (Dedicated Short Range Communication) technology. The concept proposed is of automatic toll tax payment system and the amount transaction information sends to the cell phone of the motorists through the GSM modem technology. It is an innovative technology for expressway network automatic toll collection solution. In this paper, the frame composing and working flow of the system is described and data information is also easily exchanged between the motorists and toll authorities, thereby enabling a more efficient toll collection by reducing traffic and eliminating possible human errors. After segmentation of numbers and characters present on number plate, template matching approach is used to recognition of numbers and characters. The concentrate is given to locate the number plate region properly to segment all the number and letters to identify each number separately.

IV. NUMBER PLATE DETECTION WITH APPLICATION TO ELECTRONIC TOLL COLLECTION SYSTEM

This Paper describes a new approach of tagging of number plate for collection of Toll with application to Automated Toll System. In this system we detect the location of number plate of vehicles with the help of template matching and extract number from number plate and process it for collection of toll. The number plate is tagged in the database with the user's personal information, bank account and vehicle details. Toll is

automatically deducted from user's bank account or credit card and notification is provided to the user by sending SMS or Mail. Users have to follow standard rules for number plate design prescribed by the toll. Manual toll facility will be provided for unregistered vehicles and in case of system failure. This system can be implemented in different places such as Clubs, Restaurants, Companies, Parking areas etc. The main goal is to create automation in traffic management without much change in current system and should be less expensive.

V. ADVANCED VEHICLE TAX COLLECTION

The major problem being heavy traffic at every Toll Booths in the city can be practically reduced by the introduction of the Radio Frequency Identification Based Toll Tax Automation System which makes the Toll Deduction at the Toll Plaza's more efficient and perfect. Its primary requirement is to wipe out the need for automobilist and toll authorities to manually perform toll gateway payments and toll tax collections, respectively in order to go past the toll booth. The proposed RFID system transmits a particular ID code as soon as it reaches near the toll station. On receiving the code, processor checks the received code and compares it with the stored code, if the code matches the gates open else they remain closed disallowing the vehicle to pass. This paper focuses on use of radio frequency identification (RFID) technology for electronic toll collection system. Due to which the problem of traffic congestion and human errors in the system is effectively rectified and provides efficient toll tax collection facility for the consumers at every Toll Station.

VI. EXISTING SYSTEM

Road tolls were levied traditionally for a specific access (e.g. city) or for a specific infrastructure (e.g. roads, bridges). Tolls are a form of user tax that pays for the cost of road construction and maintenance without raising taxes on non-users. Tolls are paid by hand at a tollgate, payments are generally made in cash. User deposits a certain amount at a tollgate depending on his vehicle type and the authorities allow passage or entry.

In the current times of increasing traffic on the road, it is important to collect the toll tax in a managed and controlled process so that it doesn't result in a total unorganized jungle of traffic. It is very challenging to handle a vehicular flow by a manual system of revenue collection. Poor management at toll plaza may result into great chaos and revenue loss, which is not desired.

VII. PROPOSED SYSTEM

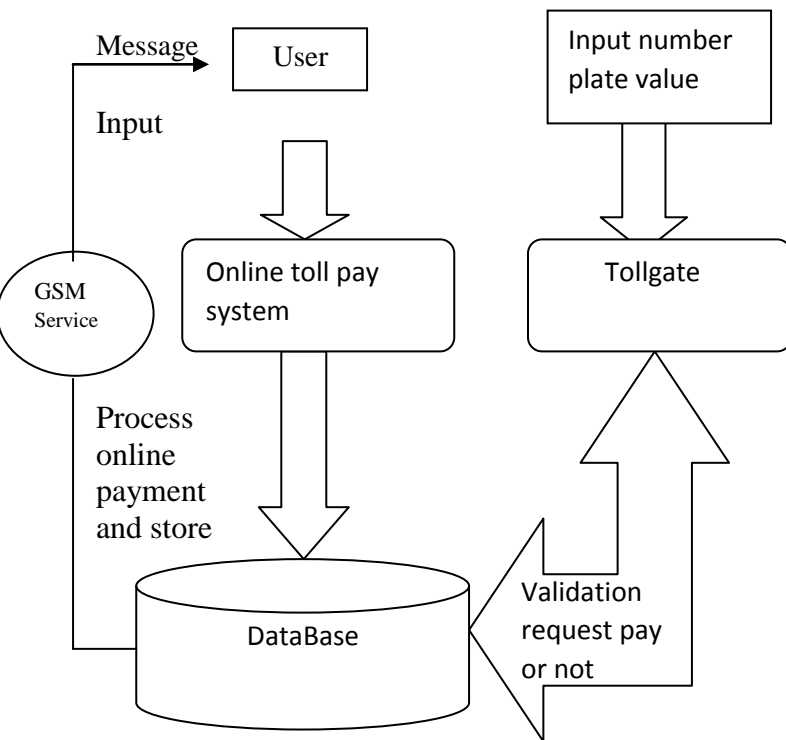
The proposed method is to provide a fast and safe environment for toll collection and to automatically control the vehicle movements at the toll stations. The RFID reader is

used to read the tag value of the vehicles. The Vehicle information is stored in the tollgate database.

Based on that number the Tax amount for that vehicle will automatically transfer to the toll gate system. And that cost information will be sent through GSM modem to a mobile phone of the owner.

The main objective behind this proposal is to create a suitable Automatic Toll Gate System to be implemented. In this same process, once the user registered with his vehicle number which was already in number plate, if the user was lost his vehicle means just he can request in the website to find the vehicle.

VIII. SYSTEM DESIGN



And if the theft vehicle come across the tollgates the RFID sensor will send the signal to the tollgate booth, and then the vehicle will be hand over to the particular user who have left his/her vehicle.

IX. RESULT

This diagram shows how the tollgate process is carried out. Whenever the vehicle enter the toll-gate, the RFID reader will check whether the RFID tag is valid or not. If the card is valid,

it will allow thevehicle to move and reduce the toll tax from his/her accountautomatically. If the card is not valid. Depending upon the aboveprocess, the message will go to the vehicle owner.

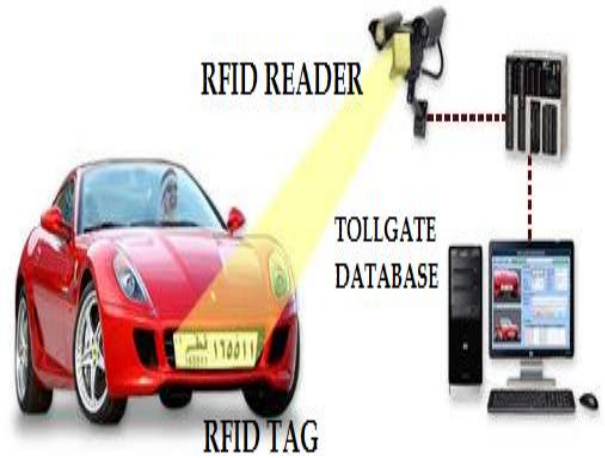


Fig. 2: Toll-Gate Process

X. CONCLUSION

The automation of toll plaza can have the best solution over money loss at toll plaza by reducing the manpowerrequired for collection of money and also to reduce the traffic indirectly resulting in reduction of time at the toll plaza. In this project, the technique such as Radio Frequency Identification is introduced. This technique will include theRFID tag & reader, which can be used to detect the vehicle identity. In this way the theft vehicle can be identified easily and using the GSM technology the messages will be send to the particular user.

REFERENCES

- [1] Muhammad Ali Mazidi, Janice GillispieMazidi "The8051 Microcontroller and Embedded Systems", Pearson Education.
- [2] KENNETH JAYALA, "8051 Microcontroller Architecture" programming and application.
- [3] ATMEL 89s52 Data sheets
- [4] The interference issue in RF protocols -- Reader-talksfirst versus Tag-talks-first [Online] Available : <http://transpondernews.com/tftrf.html>
- [5] RFID Technology [Online] Available : <http://www.answers.com/topic/radio-frequency-identification>
- [6] Radio Frequency Identification (RFID) RFID [Online]
- [7] HuiLan, Ming Zhang, and Wee Ser., "Automatic Tax Plaza" IEEE Transactions on Signal Processing, Vol.9, pp.1070-1077, 2002.
- [8] Jiashu Zhang and Heng-Ming Tai., "Modified Toll Collection System", IEEE Transactions on Signal Processing, Vol.5,pp.442-447, 2007.
- [9] Liang Wang and Woon-SengGan., "Electronic Based Toll Collection System", IEEE Transactions on Signal Processing, Vol.17,pp.342-347,
- [10] P. Ramasubramanian, R. JerlinEmiliya, R. Janaki, B. Gifston Daniel and C. Anand, "Number PlateRecognition and Character Segmentation using Eight-Neighbors and Hybrid Binarization Techniques", International Conference on Communication and Signal processing, April 201