



SMART TOLL BOOTH USING ZIGBEE

Raghavendra.Sheddi^{1*}, Meenakumari.V.Umarani²

¹Computer Science & Engineering department, R. T. E. Society's Rural Engineering college
Hulkoti, Gadag, Karnataka , India-582205

²Computer Science & Engineering department, R. T. E. Society's Rural Engineering college
Hulkoti, Gadag, Karnataka , India-582205

*Corresponding Author Email: raghuis016@gmail.com

Abstract: The aim of this paper is parenthetically the convenience and flexibility of an automatic toll plaza XBEE technology and its blessings over toll plazas using alternative techniques. With the quantity of vehicles increasing once a year, the time and fuel wasted on waiting at the toll plazas is ever increasing. Automatic toll plazas will eliminate this wastage of your time, fuel and enhance the vehicle security by providing a range of alternative options like causation a text message to the registered mobile number of the owner, showing the data regarding the vehicle on the display additionally to automatic gap and shutting of the barricade. The toll is subtracted from the vehicle owner's paid account. The motor for the barricade, on- web site LCD display and GSM modules are interfaced with the microcontroller. This method can prevent time and fuel wastage at the manually controlled toll plazas, offer a layer of security as a result of the SMS sent and can guarantee a power tool travel expertise for the travelers.

Keywords: - Smart Toll Booth, Zigbee, Arduino Uno

1. Introduction

As the demand for the vehicles is increasing day by day there has also been increased traffic in toll booth. Main reason for increasing traffic in the toll booth is Cash payment. Driver's need stop the vehicle in toll booth and pay money and wait for Balance.

Because of these circumstance National highways Authority of India are more focusing on cashless payment which could reduce the taffic in toll booth and can also support Digital India. Earlier method with RFID tag also called fasttags, announced in 2017 for four wheelers(Cars, SUV). Fasttags employes Radio-Frequency Identification (RFID) and it is pasted on the Vehicle's windscreen.



Volume 6, Issue 10 - October 2018 - Pages 102-111

More toll plazas will be brought under the FastTag program in the future. But major limitation of FASTTAG is it also need to stop vehicle in toll plaza and one person need to read the data from fast tag using kit called fasttag reader so traffic in the tollbooth is little bit reduce not completely reduced.

Due to queue system RS. 1000 Core worth fuel waste per year, Increase the Air Pollution in surrounded area. The RSSI based technique well suitable for economic wise as well as environmental wise. The on board unit consists of Voice play back module, Speaker, Relay unit, LCD, keyboard, Zigbee and PIC microcontroller.

In this project we proposed an improved form of tollgate billing system using PIC 16F877A microcontroller, and RSSI Zigbee CC2530, One On Board Unit is attached to the Vehicle, and same version Zigbee is attached to the Toll Gate System, When the motorist enter in to the particular lane of chargeable zone and press the keyboard for one way or two way and the on board unit zigbee transmit the unique id of motorist, and the same version of zigbee in toll booth receives the id from vehicle and compare the id with server system if its valid then charge amount from motorist account, If they have insufficient balance then produce warning message and if they don't pay amount in toll booth while crossing, stop the fuel supply of the engine to stop the vehicle.

2. Literature Survey

[1]AUTOMATED TOLL PLAZA USING ZIGBEE AND GSM- V. Jeyabalraja, Dr.M.S.Josephine, V. Sarala Devi, N.Rajkumar, International Journal of Applied Environmental Sciences (IJAES) ISSN 0973-6077, Vol. 10 No.1 (2015).

The aim of this research paper is parenthetically the convenience and flexibility of an automatic toll plaza Zigbee technology and its blessings over toll plazas using alternative techniques. With the quantity of vehicles increasing once a year, the time and fuel wasted on waiting at the toll plazas is ever increasing. Automatic toll plazas will eliminate this wastage of your time, fuel and enhance the vehicle security by providing a range of alternative options like causation a text message to the registered mobile number of the



Volume 6, Issue 10 - October 2018 - Pages 102-111

owner, showing the data regarding the vehicle on the display additionally to automatic gap and shutting of the barricade. The toll is subtracted from the vehicle owner's paid account. The motor for the barricade, on- web site LCD display and GSM modules are interfaced with the microcontroller (8051). This method can prevent time and fuel wastage at the manually controlled toll plazas, offer a layer of security as a result of the SMS sent and can guarantee a power tool travel expertise for the travelers.

[2]AN AUTOMATED ELECTRONIC TOLL COLLECTION USING ZIGBEE-Surendra S. Dalu,International Journal of Information Technology and Knowledge Management ,January-June 2012, Volume 5, No. 1.

The highway transportation has become more and more important in modern road network and the traditional manual toll collection system has become outdated due to its drawbacks. By employing automated toll collection system, driver of vehicles need not to stop at a window or toll machine and waste time waiting in a long queue to pay their toll. This reduces the consumption of fuel, reduce road congestion, increase road safety and traveler become pleased. Electronic Toll collection (ETC) system is basically designed for an uninterrupted toll collection, which has become an important part of intelligent transportation system. This paper presents the concept of Automated ETC using ZigBee transceiver instead of RFID technology. The communication range is increased comparatively. ZigBee automated ETC can eliminate manual toll collection, require minimum employee, and thus lower the cost of operation.

[3] ADVANCE TOLL COLLECTION SYSTEM BY USING RFID AND ZIGBEE-Mr.Nileshkumar Mansingrao Sawant, Mr.V.NAGA MAHESH,Science Institute of Technology,September 2016, Volume 3, Issue 9.

Now the highway transportation process has become more and more important in modern road network and the collect toll by manual has become outdated due to its limitations. Every citizen has unique identity for next generation ID. In the toll collection system using next generation ID card will simplify toll collection system and also the system will be friendlier managed. When using the next generation ID card as identification tag at toll collection system, we should access



Volume 6, Issue 10 - October 2018 - Pages 102-111

real time transmission of information between terminal and control center which is based on the networking technology. Zigbee technology has many important features to support the system. Thus the design uses the next generation ID card as identification purpose and Zigbee as information collection purpose. The combination of Zigbee technology and the next generation ID card will satisfy the safety, convenience and time requirements of advance toll collection system.

[4] ELECTRONIC TOLL COLLECTION SYSTEM USING ZIGBEE AND RFID- Sanket Gupta, G. Rohith, CH Amul, K. Vadivukkarasi, International Journal of Civil Engineering and Technology (IJCIET), Volume 8, Issue 4, April 2017, pp. 1714-1719.

The paper demonstrates the use of Electronic toll collection using RFID and zigbee transceiver technology to provide benefits over fuel wastage, traffic congestion and theft vehicle. The RFID tag is used for creating rechargeable account. The toll Gates are equipped with RFID reader, RFID antenna, database handling software and zigbee receiver. The driver vehicle is equipped with RFID tag which handles the name, total amount and the mobile number, the zigbee transmitter that transmit the vehicle number for theft vehicle detection. As the vehicle approaches the toll gate the RFID reader reads the RFID tag and zigbee receiver receives the vehicle number. The toll gate opens only when the vehicle theft detection report is negative and the RFID tag amount is above the desired set amount to be deducted. The GSM technology is used to send messages about the money deduction. This model provides the benefits of stopping illegal toll collection, reliability and security.

[5] SMART TOLL BOOTH USING ZIGBEE AND PIC MICROCONTROLLER- Mrs. D. Nirmala, Mrs. Geetha Bala, S. Aswin Karthik, K. Sakthivel, International Journal of Pure and Applied Mathematics, Volume 119 No. 16 2018, 1275-1278.

In this project we proposed an improved form of tollgate billing system using PIC 16F877A microcontroller, and RSSI Zigbee CC2530, One On Board Unit is attached to the Vehicle, and same version Zigbee is attached to the Toll Gate System, When the motorist enter in to the particular lane of chargeable zone and press the keyboard for one way or two way and the on

Volume 6, Issue 10 - October 2018 - Pages 102-111

board unit zigbee transmit the unique id of motorist, and the same version of zigbee in toll booth receives the id from vehicle and compare the id with server system if its valid then charge amount from motorist account, If they have insufficient balance then produce warning message and if they don't pay amount in toll booth while crossing, stop the fuel supply of the engine to stop the vehicle.

3. Methodology

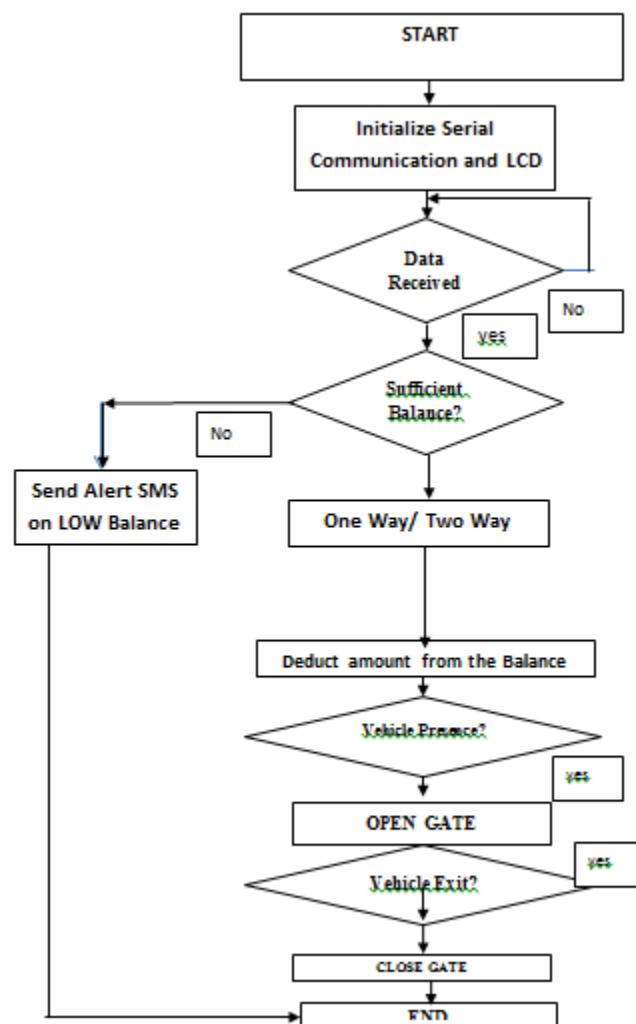


Fig 3.1 Flowchart

Volume 6, Issue 10 - October 2018 - Pages 102-111

we proposed an improved form of tollgate billing system using PIC 16F877A microcontroller, and RSSI Zigbee CC2530, One On Board Unit is attached to the Vehicle, and same version Zigbee is attached to the Toll Gate System, When the motorist enter in to the particular lane of chargeable zone and press the keyboard for one way or two way and the on board unit zigbee transmit the unique id of motorist, and the same version of zigbee in toll booth receives the id from vehicle and compare the id with server system if its valid then charge amount from motorist account, If they have insufficient balance then produce warning message and if they don't pay amount in toll booth while crossing, stop the fuel supply of the engine to stop the vehicle. Fig 1 show the bloc diagram of On board unit. The main purpose of using Zigbee is it receive the id from the transmitting on board unit, and compare which signal strength high, and make money transaction to avoid collision.

4. Results and discussion



Fig 4.1 : Lcd Screen



Fig 4.2 : Photo Diode & Infra Red Light



FIG 4.3 : GSM



Fig 4.4 : Arduino Uno

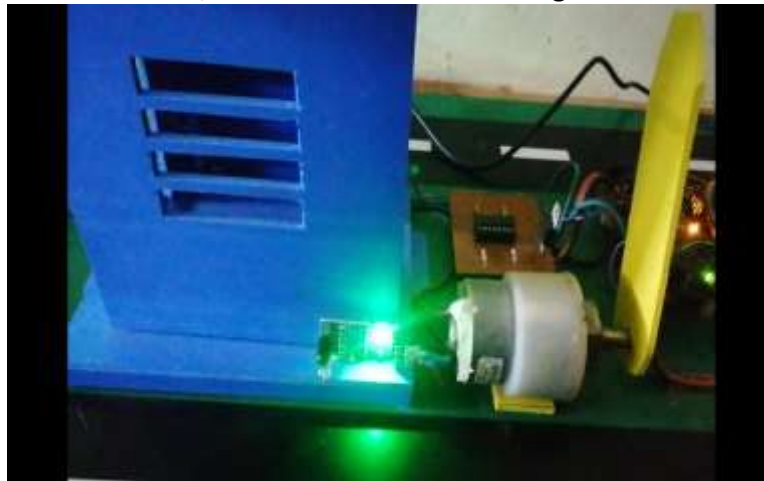


Fig 4.5 : Toll Gate Open Sensing The Vehicle

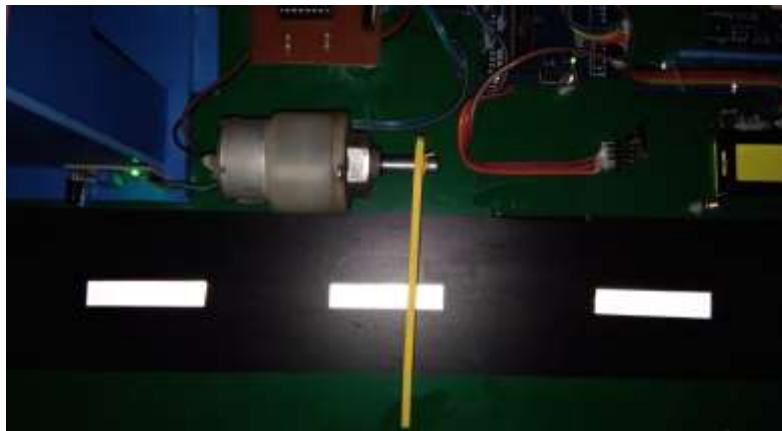



Fig 4.6 : Toll Gate Closed After Vehicle Passes By

*WelCome to SMART
TOLL GATE*

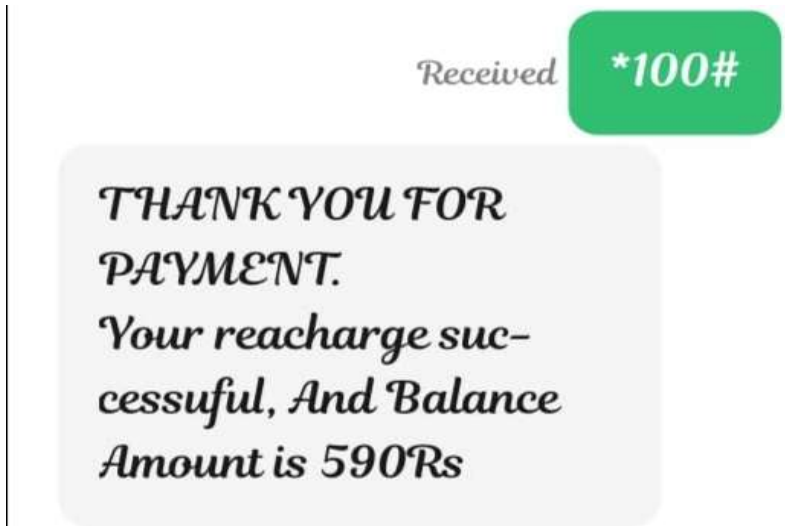
*Thank For Your Visit
Rs. 10 has been deducted
from your balance
And Available Balance
is Rs. 490*

Fig 4.7 : When User Selects One Way



*Thank For Your Visit
Rs. 20 has been
deducted from your
balance
And Available Balance
is Rs. 480*

Fig 4.8 : When User Selects Two Ways Double Amount Deducted



Received ***100#**

*THANK YOU FOR
PAYMENT.
Your recharge suc-
cessful, And Balance
Amount is 590Rs*

Fig 4.9 : To Recharge The Respective Account

5. Conclusion

We can cut back the current drawback of skipping the payment of toll at toll plazas thanks to automatic deduction and enhance the safety of the vehicle because of GSM interfacing. The long queue at the toll plaza and want for human intervention is reduced greatly. This method can guarantee a power tool and safer journey for the passengers.



Volume 6, Issue 10 - October 2018 - Pages 102-111

In addition to the present work, image process is combined with the XBEE system to build the system a lot of reliable and secure. By combining the positives of the two we are able to eliminate any attainable discrepancies within the system. We banking likewise as SMS banking are used for recharging the account of the user to create it convenient

6. References

- [1] AUTOMATED TOLL PLAZA USING ZIGBEE AND GSM- V. Jeyabalraja, Dr.M.S.Josephine, V. Sarala Devi, N.Rajkumar, International Journal of Applied Environmental Sciences (IJAES) ISSN 0973-6077, Vol. 10 No.1 (2015).
- [2]AN AUTOMATED ELECTRONIC TOLL COLLECTION USING ZIGBEE- Surendra S. Dalu,International Journal of Information Technology and Knowledge Management ,January-June 2012, Volume 5, No. 1.
- [3] ADVANCE TOLL COLLECTION SYSTEM BY USING RFID AND ZIGBEE- Mr.Nileshkumar Mansingrao Sawant, Mr.V.NAGA MAHESH,Science Institute of Technology,September 2016, Volume 3, Issue 9.
- [4] ELECTRONIC TOLL COLLECTION SYSTEM USING ZIGBEE AND RFID- Sanket Gupta, G. Rohith, CH Amul, K. Vadivukkarasi,International Journal of Civil Engineering and Technology (IJCET),Volume 8, Issue 4, April 2017, pp. 1714-1719.
- [5]SMART TOLL BOOTH USING ZIGBEE AND PIC MICROCONTROLLER- Mrs. D. Nirmala,Mrs. Geetha Bala,S. Aswin Karthik, K. Sakthivel,International Journal of Pure and Applied Mathematics, Volume 119 No. 16 2018, 1275-1278.