



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

Smart RTO with Automated Tollbooth System

Shubham Vyavahare¹, Nishant Paraskar², Dhiraj Sarade³, Vrushabh Sonavale⁴, Prof. Jagruti Wagh⁵

B.E. Scholar, Department of Computer Engineering, MMCOE, Pune, India¹

B.E. Scholar, Department of Computer Engineering, MMCOE, Pune, India²

B.E. Scholar, Department of Computer Engineering, MMCOE, Pune, India³

B.E. Scholar, Department of Computer Engineering, MMCOE, Pune, India⁴

Assistant Professor, Department of Computer Engineering, MMCOE, Pune, India⁵

ABSTRACT: The current RTO for vehicle registration includes numerous stages and toll collection requires tremendous manpower. In current system, there is no privilege for online registration of vehicle. Automation in toll collection is already present to some extent. But user has to recharge his account manually at tollbooth. So in that case every user must visit tollbooth multiple times. In this system more manpower is used for toll collection and traffic management. As the number of vehicles increases, the system need to be automated.

We can optimize the whole process using automation. This document describes the project of SMART RTO WITH AUTOMATED TOLLBOOTH SYSTEM in which we are providing payment gateway so that user can credit his/her e-wallet anytime. The database stores all the information related to owner and his/her vehicle. In this project we are providing account control with different roles to different users. Each user can sign up in the system by filling his/her personal details. In sign up process, user is verified using OTP and link provided on e-mail. With the help of created account, user can register a vehicle using vehicle registration form. Then user can schedule for appointment for verification by authorized person at RTO. RTO officer will have to verify user details and vehicle details in scheduled appointment. Once verified, officer will assign GPS ID, RFID and vehicle number and save it in the database. Authenticated user profile will contain e-wallet for toll payment. We can automate the toll payment process by using RFID given to each vehicle. We can identify particular vehicle and access its data from database using RFID and GPS ID. After identifying vehicle at toll plaza, toll amount is deducted from respective user's wallet.

For query solution we are going to implement chat bot. Graphical representation of toll plazas activity is shown to the toll controller with the help of Power BI.

KEYWORDS: Vehicle Registration, Tollbooth, Smart RTO, Centralized Database, Account Control, OTP, RFID, E-wallet, Arduino, Chat bot, Power bi.

I. INTRODUCTION

Vehicle management is one of the primary problem that developing countries are facing. The main issue in the vehicle management is that when new vehicle is registered then there is no centralised database that saves the whole information of vehicle and owner. Problem: The current system includes the database which stores vehicle information but it is not centralised hence toll management system cannot access this data [1]. So toll automation [2] is not present in current system. More man-power engaged in current system. The system is manual hence time and money increased. As the population increases in developing country like India, the number of vehicles also increases which results in overload on current RTO and toll plaza system. According to survey, India's population was 1.324 billion (2016) is projected to grow up to 8.6 billion by 2030. This count of population is directly proportional to the number of vehicles being sold. If we consider only Maharashtra, there are approx. 23.4 million vehicles. The total number of registered motor vehicles in Maharashtra State, increased from 3,07,030 as on 31st. March, 1971 to 2,78,69,866 as on 31st. March, 2016. And 50 RTO offices are currently active in Maharashtra. As the RTO and toll process is manual, it is difficult to handle such huge count of vehicles. At each toll on an average 20000 vehicles pay the toll. For each vehicle at least 3 min. of time is required. Hence long traffic queue is formed. The system is manual hence it is difficult to handle the



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

process.

Solution:-

We can automate this process by assigning RFID and GPS id to each vehicle and by online process we can register vehicles and manage central database. By using this automated system, manpower, time, money will be reduced. Hence at each toll plaza due to system is automated time required for each vehicle reduces to few seconds. Each vehicle having GPS associated with it, so tracking of vehicle become easy [3]. For query solution we are going to implement chat bot [4]. Graphical representation of toll plazas activity is shown to the toll controller with the help of Power BI [5].

Motivation:-

As the population increases, the vehicles will in turn increase. Due to increase in vehicles traffic on road and load on toll plaza increases. We can automate these system by online registering [6] the vehicle and by calculating toll automatically [2]. We can also save manpower, locate the vehicle using GPS ID and save each vehicle information at global storage. Also this automation system plays important role in efficient traffic management.

Objective:-

Main objective of the system is to reduce the wastage of manpower and to auto-mate the whole process of vehicle registration and toll management [2]. This would reduce multiple trips to go to RTO office and waiting time in queues for toll payment. In the proposed system we will be developing a smart RTO system which will register new vehicle and assign RFID, GPS ID and registration number. RFID is used to automate the toll booth system [3]. Location of the particular vehicle can be found out using GPS ID.

Scope:-

- For initial stage, username and password [7] is to be given as input to the application software for the purpose of logging in the user.
- Once the login is successful [8], user can fill up his personal details, vehicle information and schedule for appointment.
- On the appointment date, verification against documents will be done and RFID, GPS ID is assigned to the vehicle. Thus the user is authenticated by RTO officer.
- These all information is stored in central database.
- When the vehicle is at toll, IOT system captures RFID and information associated with that RFID is retrieved.
- Toll is deducted from the e-wallet [9] of associated user account automatically. Major input: Login Credentials and vehicle information.
- Output: Status of user application and e-wallet transactions [10].

Goal:-

- Account control with different roles to different users and user will be able to register new vehicle with its personal information.
- To reduce manual work.
- To manage the registration and monitoring of vehicles.

II. LITERATURE SURVEY

Mishra Avanish, Singh Ashish, Singh Rajeshwar "Smart RTO System (SRS)" International Journal of Advance Research, Ideas and Innovations in Technology (Volume3, Issue2). [1]

Description:

This describes the system used for traffic challan. It consists of interfacing of printer and Smart card reader to Android phone. The penal code will be entered by traffic police officer and it will print the challan with IPC section code and amount of penalty.

Advantages:

- 1) Reduces corruption.
- 2) Fake license holder will be caught easily.
- 3) People will aware of traffic rules and regulation.

Disadvantages:

- 1) Challenge to keep system in active phase.



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 6, Issue 4, April 2018

Rama B. Takbhate and Prof S.D Chavan "Automated Toll Booth System" International Journal of Research Studies in Computer Science and Engineering (IJRSCSE) Volume. 1, Issue 3, July 2014, PP 69-76 ISSN 2349-4840 (Print) & ISSN 2349-4859(Online). [2]

Description:

This document examines the image of the number plate and class of vehicle, the respective information will be processed for toll collection system, to make more efficient and perfect.

Advantages:

- 1) No need human interaction.
- 2) No or shorter queues at toll plazas by increasing toll booth service turnaround rates.
- 3) Faster and more efficient service.
- 4) No need to request for receipts

Disadvantages:

- 1) Requires best quality cameras as image processing requires best quality of image captured by camera.
- 2) Algorithm used for image processing is complex and inefficient.

Arokianathan P , Dinesh V , Elamaram B , Veluchamy M and Sivakumar S "Automated Toll Booth and Theft Detection System " 2017 IEEE International Conference on Technological Innovations in ICT For Agriculture and Rural Development (TIAR 2017). [3]

Description:

This describes the way of encrypting payment gateway to provide security and Merging RFID with vehicle's number in order to avoid any kind of misuse of the system.

Advantages:

- 1) Payment Gateway security by AES/DES algorithm.
- 2) RFID reader detects the time for each vehicle which has passed the toll at every traffic signal/tollbooth.
- 3) GPRS chip Placed in the Vehicle is can track it down.

Disadvantages:

- 1) If person's vehicle is not registered with toll plaza system, the owner has to register manually at toll centre.
- 2) Unable to identify message generated by bot.

Salto Martínez Rodrigo, Jacques García Fausto Abraham "Development and Implementation of a Chat Bot in a Social Network" 978-0-7695-4654-4/12 \$26.00 © 2012 IEEE DOI 10.1109/ITNG.2012.14. [4]

Description:

This describes how to implement a Chat Bot on Twitter social network for entertainment and viral advertising using database and a simple algorithm.

Advantages:

- 1) Message processing is fast.
- 2) Messages are divided into words and phrase for classification.

Disadvantages:

- 1) Inefficient to handle grammatical errors.
- 2) Unable to identify message generated by bot.

Steven Gianvecchio, MengjunXie, Member, IEEE, Zhenyu Wu, and Haining Wang, Senior Member, IEEE " Humans and Bots in Internet Chat: Measurement, Analysis, and Automated Classification "IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 19, NO. 5, OCTOBER 2011 and Bots in Internet Chat. [5]

Description:

Proposed system which consists of two components: 1) an entropy-based classifier and 2) a Bayesian-based classifier.

Advantages:

- 1) An entropy based classifier is more accurate to detect chat bots.
- 2) Bayesian based classifier is faster to detect known chat bots.
- 3) System is highly effective in differentiating chat bots from humans.



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

4) Accuracy and good speed.

Disadvantages:

- 1) Not suitable for messages which are small in size or shorter messages.
- 2) Cannot identify whether the message is generated by bot or human.

Prof. Chandrakant Umarani¹, RashmiTeggi², Prachi Shetti³, Lavanya Dodamani⁴, Yogita Havale⁵ Assistant Professor¹, Student^{2, 3, 4, 5} "Smart RTO Web and Android Application" International Journal of Engineering Science and Computing, June 2017.[6]

Description:

By storing all the information related to vehicle and driver at database by RTO administrator. And android application is provided to traffic police to retrieve vehicle and license information.

Advantages:

- 1) Eliminates human interaction.
- 2) Auto generation of challan and amount of penalty.
- 3) It is very time efficient.
- 4) It also saves paper because all data are in digital format.

Disadvantages:

- 1) There is possibility of humans becoming lazy.

Eddy PrasetyoNugroho, RizkyRachmanJudhie Putra, Iman Muhamad Ramadhan Department of Computer Science Education, Faculty of Mathematics and Natural Sciences Education Indonesia University of Education Bandung, West Java, Indonesia, 40154 "SMS Authentication Code Generated by Advance Encryption Standard (AES) 256 bits Modification Algorithm and One Time Password (OTP) to Activate New Applicant Account"2016 2nd International Conference on Science in Information Technology (ICSITech). [7]

Description:

This describes the way to enhance security measures in registration process by generating authentication code to verify and activate the account.

Advantages:

- 1) Authentication code is generated through activation message.
- 2) Activation message is encrypted using Advanced Encryption Standard (AES).
- 3) Provides enhanced security measures.
- 4) Detect fake accounts and avoids creating of fake accounts.

Disadvantages:

- 1) The algorithm takes more time to execute.
- 2) As it contains key combination it takes longer time to decrypt the message.

SilkeHoltmanns ,Jan Oliver "SMS and One-Time Password Interception in LTE Networks"IEEE ICC 2017 Communication and Information Systems Security Symposium. [8]

Description:

Network providers are now moving towards diameter based LTE networks with hope that the additional security provided in the protocol also improves overall interconnection security.

Advantages:

- 1) SS7 protocol provides additional security.
- 2) Improved overall interconnection security.

Disadvantages:

- 1) OTP generated can be intercepted by an intrusion.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 6, Issue 4, April 2018

III. EXISTING SYSTEM APPROACH

Existing system Disadvantage

- Toll automation is present to some extent but user has to credit his account manually.
- GPS module is not implemented in current vehicles to track them.

IV. PROPOSED SYSTEM APPROACH

Proposed system

- For initial stage, username and password is to be given as input to the application software for the purpose of logging in the user.
- Once the login is successful, user can fill up his personal details, vehicle information and schedule for appointment.
- On the appointment date, verification against documents will be done and RFID, GPS ID is assigned to the vehicle. Thus the user is authenticated by RTO officer.
- User will credit his/her e-wallet by using payment gateway.
- When the vehicle is at toll, automated tollbooths system captures RFID and information associated with that RFID is retrieved.
- Toll is deducted from the e-wallet of associated user account automatically.

Proposed system architecture

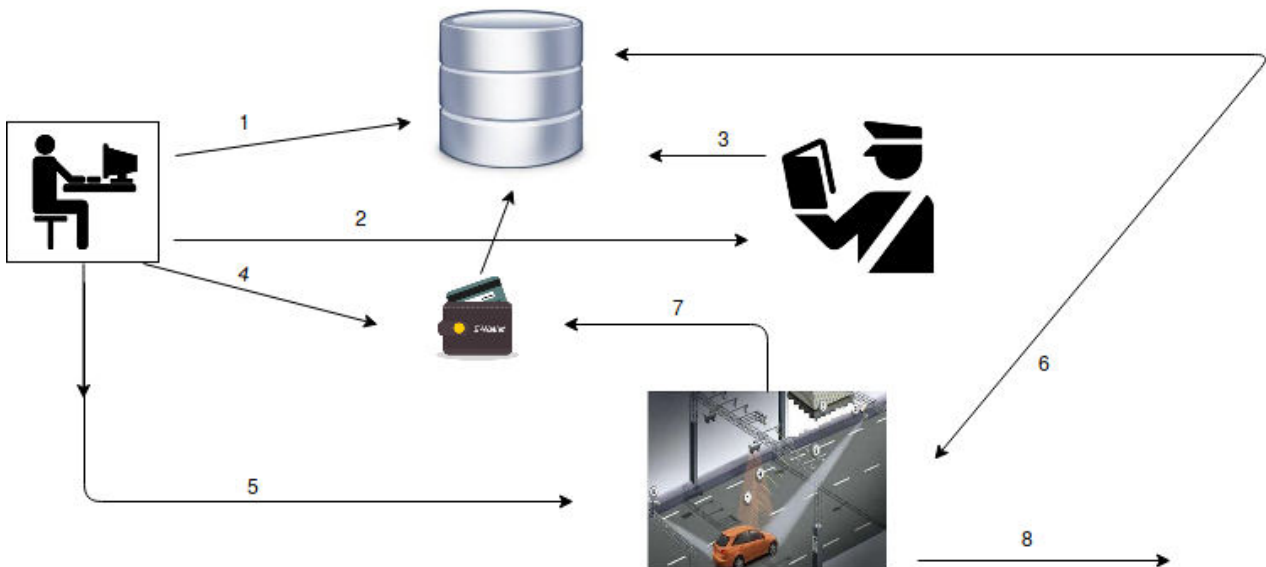


Fig 1: System Architecture

Fig 1. Shows the detailed architecture of the proposed system such as registration, authentication, authorisation, e-wallet generation and dashboards. There are three stakeholders, user, RTO officer and tollbooth system. Each of them having separate view and dashboard. Fig shows flow of the system shown by numbering.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

VI. SIMULATION & RESULTS

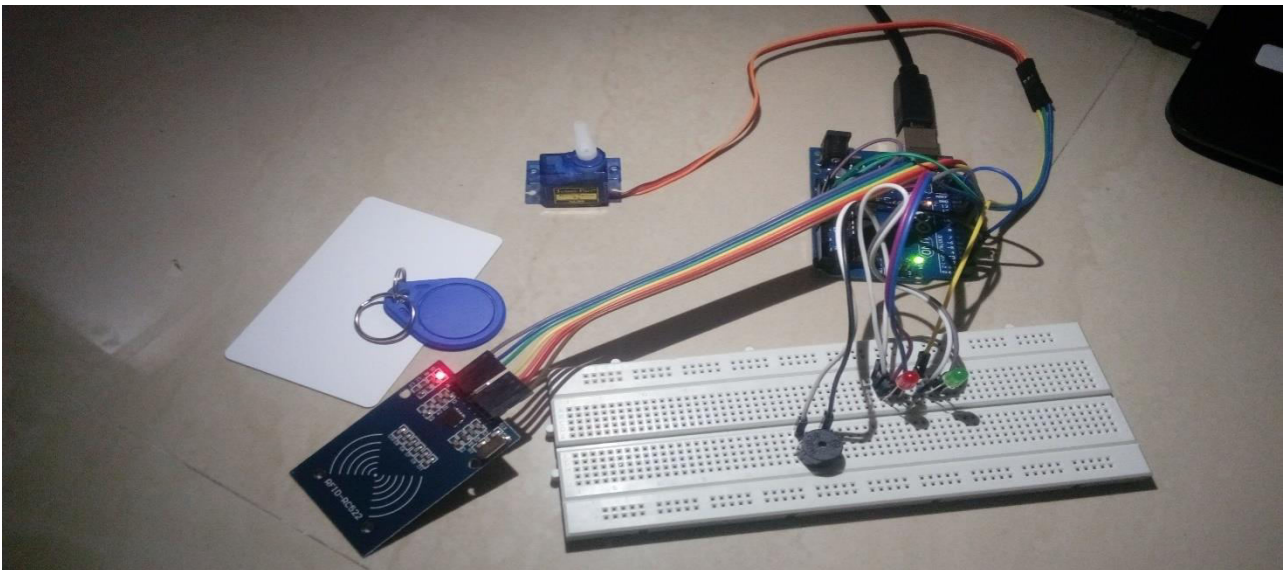


Fig 2: Automated tollbooth system prototype

Fig 2 shows the connections from Arduino to RFID reader. We have used Arduino UNO R3, RFID reader MFRC522, one buzzer, two LEDs, breadboard, Servo motor.

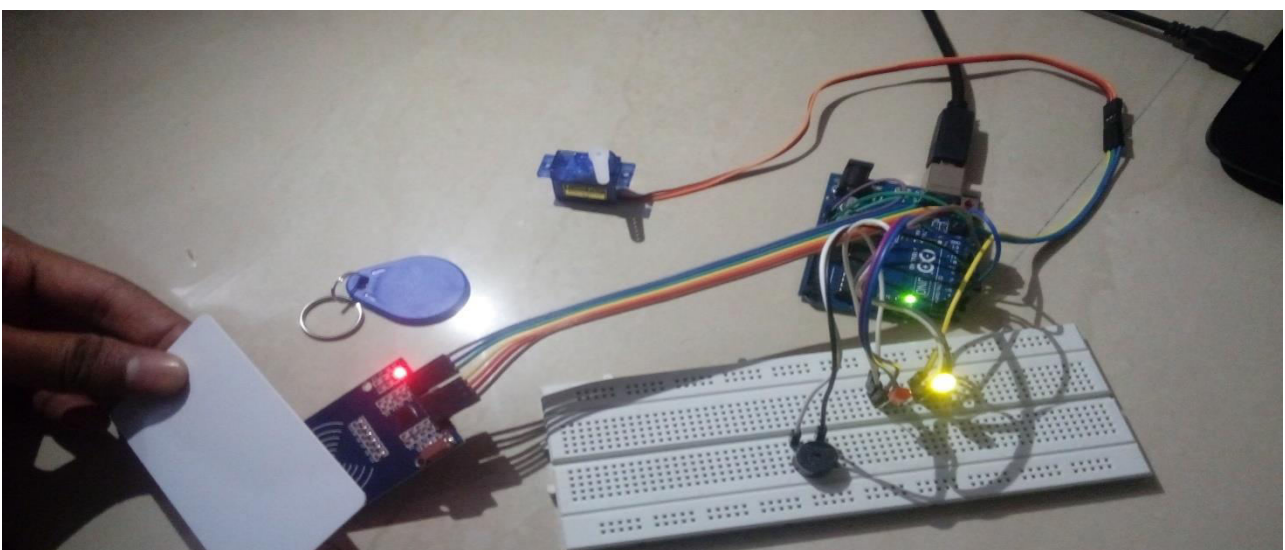


Fig 3: Authenticated User

As shown in Fig 3 when authenticated RFID tag is detected by RFID reader then green LED glows and servomotor rotates so that boomer will open.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

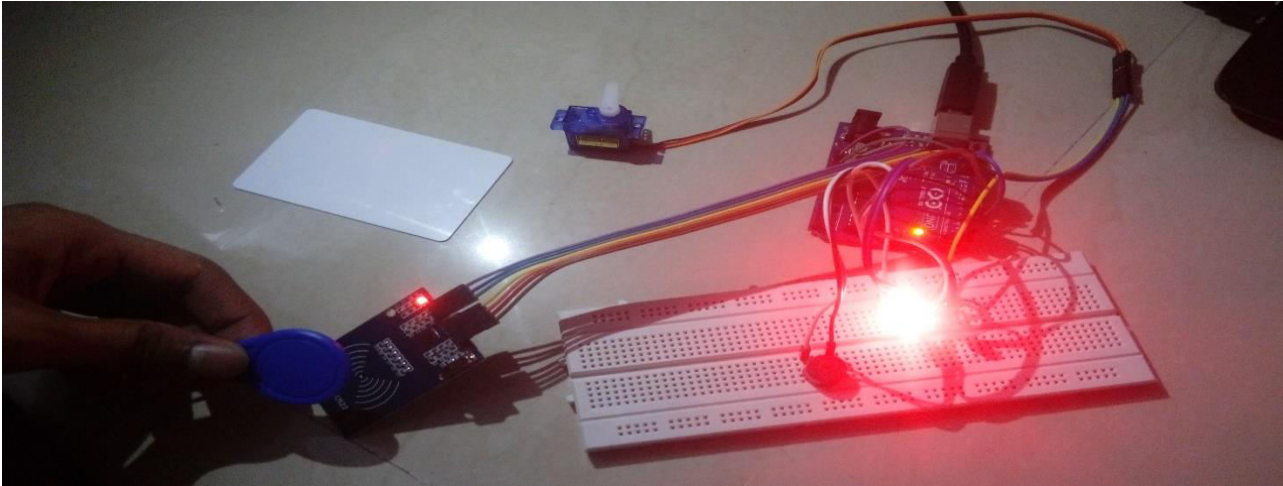


Fig 4: Unauthenticated user

Fig 4 shows when unauthenticated RFID tag is detected by RFID reader then red LED glows and servomotor will not rotate so that boomer will not open.

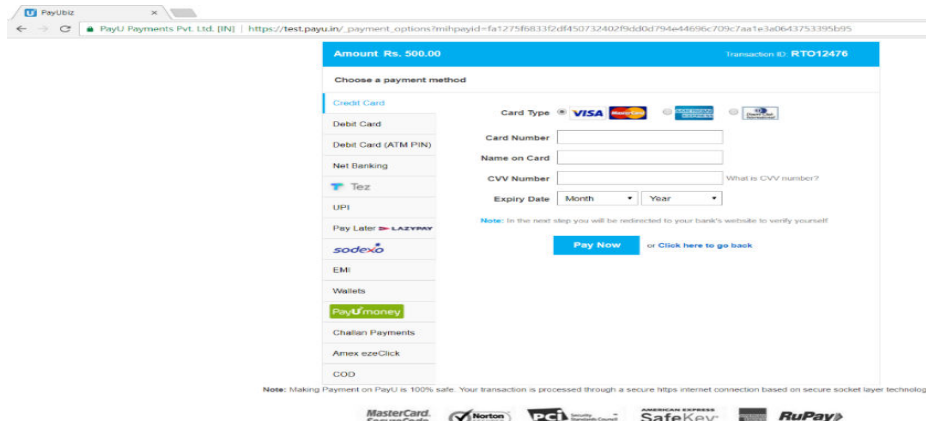


Fig 5: PayUmoney gateway Screenshot

Fig 5 shows the gateway [11] to fill the wallet. By using PayUmoney gateway [12] user can send money to wallet. When the vehicle is at tollbooth then the IoT system recognise vehicle and toll is automatically deducted from the e-wallet and user also get the SMS and email for the same.

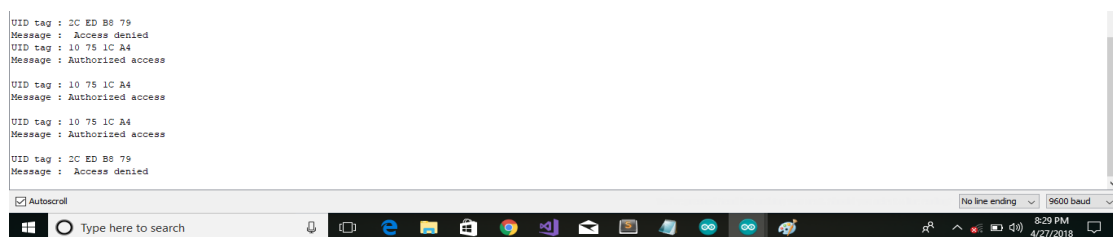


Fig 6: RFID Tag Detection

Fig 6 shows RFID tags with authenticated and unauthenticated users.



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

V. CONCLUSION

The current system for vehicle registration includes numerous stages with tremendous manpower. In current system there is no privilege for online registration of vehicles. Also, in tollbooth system more man power is used for toll collection and traffic management at toll plaza. In proposed system whole process is automated and optimized. Parsons's personal information and vehicle information is stored at central database. As we have integrated RFID and GPS ID with each and every vehicle we can easily identify and locate the specific vehicle. Due to RFID we have automated tollbooth system. It saves time, reduces traffic and minimizes the fuel consumption during idle condition of the vehicle. It can be used to remove draw-backs of current system such as time and human efforts.

REFERENCES

- [1] Mishra Avnish, Singh Ashish, Singh Rajeshwar "Smart RTO System (SRS)", International Journal of Advance Research, Ideas and Innovations in Technology, Volume3, Issue2, PP:675-681,2017.
- [2] Rama B. Takbhat and Prof S.D Chavan "Automated Toll Booth System" International Journal of Research Studies in Computer Science and Engineering (IJRSCSE) Volume. 1, Issue 3, PP 69-76, July 2014.
- [3] Arokianathan P , Dinesh V , Elamaran B , Veluchamy M and Sivakumar S "Automated Toll Booth and Theft Detection System " 2017 IEEE International Conference on Technological Innovations in ICT For Agriculture and Rural Development,978-1-5090-4437-5/17, 2017.
- [4] Salto Martínez Rodrigo, Jacques García Fausto Abraham, "Development and Implementation of a Chat Bot in a Social Network", IEEE Ninth International Conference on Information Technology, 978-0-7695-4654-4/12, PP: 751-755,2012.
- [5] Steven Gianvecchio, MengjunXie, Member, IEEE, Zhenyu Wu, and Haining Wang, Senior Member, IEEE " Humans and Bots in Internet Chat: Measurement, Analysis, and Automated Classification "IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 19, NO. 5, OCTOBER 2011.
- [6] Prof. ChandrakantUmarani, RashmiTeggi, PrachiShetti, LavanyaDodamani, YogitaHavale, "Smart RTO Web and Android Application", International Journal of Engineering Science and Computing, Volume 7, Issue 6, June 2017.
- [7] Eddy PrasetyoNugroho, RizkyRachmanJudhie Putra, Iman Muhamad Ramadhan, "SMS Authentication Code Generated by Advance Encryption Standard (AES) 256 bits Modification Algorithm and One Time Password (OTP) to Activate New Applicant Account", 978-1-5090-1721-8/16, 2016.
- [8] SilkeHoltmanns ,Jan Oliver, "SMS and One-Time Password Interception in LTE Networks", IEEE ICC Communication and Information Systems Security Symposium, 978-1-4673-8999-0/17, 2017.
- [9] EligijusSakalauskas, Jonas Muleravicius, Inga Timofejeva, "Computation Resources for Mobile E-Wallet System With Observers", IEEE, 978-1-5386-0394-9/17, 2017.
- [10] BehzadYahid, Dr. Mohammad BagherNobakht, "Providing Security for E-wallet using E-cheque", IEEE 7th International Conference, 978-1-4799-0393-1/13, 2013.
- [11] Xuewang Zhang, Linlin Wang, "Key Technologies for Security Enhancing of Payment Gateway", IEEE, International Symposium on Electronic Commerce and Security, 978-0-7695-3258-5/08, 2008.
- [12] QifengYang ,Zhengwei Cheng, Ping Song, "Research on Online Payment Mode Based On Internet Banking Payment Gateway", IEEE International Conference on Convergence Information Technology, 0-7695-3038-9/07, 2007.