
ABSTRACT

Time and efficiency are matter of priority now. Smart card emerges as one of the converging technologies. This review paper contains smart access using smart card in toll gate control, and in bus ticketing system. RFID plays major role in auto ID applications like RFID contact less smart cards. Proposed system will present an automated system for ticketing in the Public Transport System (PTS) which is based on passenger identification and also system presents automated system for toll collection. This is a user friendly system, which will automatically identify the passenger and deduct the passenger's fare. The Radio Frequency Identification (RFID) card and IoT are used to make the identification of passenger and transaction very precise. The cards being reusable, they are much more convenient compared to the paper based ticketing system. RFID cards are distributing among the public. The unique ID in the RFID cards is stored in a database in the internet along with personal data and creates accounts for each person. By accessing this database, it is thus possible to identify the person, check his account and deduct the fare from his/her account. System thus reduces human errors and efforts. The rapid development of Internet of things (IoT) technology makes it possible for connecting various smart objects together through the Internet. The RFID reader used is EM18. Minicomputer Raspberry Pi is used as control unit and programming is done using Python.

KEYWORD:Internet of things (IoT), Raspberry pi, RFID, RFID Reader.

INTRODUCTION

In this fast paced modern world we are facing a number of traffic related problems. RFID technology can be effectively used to solve some of them. Some of the problems that require immediate attention is toll gate management, and in bus ticketing.

The system consists of the RFID readers used to read the RFID Tag information based on the card swap by the user. The unique ID in the RFID cards is stored in a database on internet along with personal data. This system is used to access in Toll collection, and in Bus ticketing. By accessing this database, it is thus possible to identify the person, check his account and deduct the fare from his/her account.

PTS remains the major source of income in most of the developing countries like India. But PTS now faces severe malfunction and various security problems. First, there is a lot of confusion between the passengers regarding fares which lead to quarrels and corruption. In addition to this, nowadays there is a severe security crisis in PTS due antisocial elements. The user friendly automated ticketing system suggested in this paper will not only automatically deduct the passenger's fare but also detect the passenger's identification. This is possible by use of RFID cards and IoT, and can be used to make the transaction and travelling very precise. This review paper basically deals with the identification and ticketing of the passengers travelling by the bus. Whenever the vehicle entering in to the toll gate area, the reader reads the RFID card swap by user and identifies it. Also deduct fare from users account according to toll. When fare is deducted boom bar is open to pass the vehicle.

IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. Smart card system using IoT is a system that uses computers or mobile devices to control basic features automatically through internet from anywhere around the world. It is meant to save the electric power and human energy.

RFID card is with owner and this RFID card contains owner info, insurance details, service details etc. to send vehicle identification to traffic information database. RFID reader will be placed with embedded controller raspberry pi in Toll Gates, and in Buses.

This review paper used Wi-Fi module with raspberry pi unit to transmit information to different points. Whenever vehicle meets with an amount transaction, the system reads area information from RFID tags and transfers this information to embedded module. The details are transmitted to the specific numbers stored in database (User). Additionally, through IoT this emergency situation transmitted to user, through SMS and Email.

The usage of RFID has a great advantage as it is considered to be an integral part of IoT. IoT refers to a global network infrastructure, linking physical and virtual objects through exploitation of data capture and communication capabilities. Identification of objects is a huge task ahead of IoT and usage of RFID in PTS can be considered a step towards implementing IoT. The proposed system mainly acts to bring out the consistency among various bus agencies that will conclude in uniform access of passengers in daily rides through an automated server being updated every single time the passengers travel by carrying the RFID based tickets, similarly in toll areas.

SYSTEM DESIGN

This review paper designed following operating points. One is tollgate unit and second is ticket collecting unit.

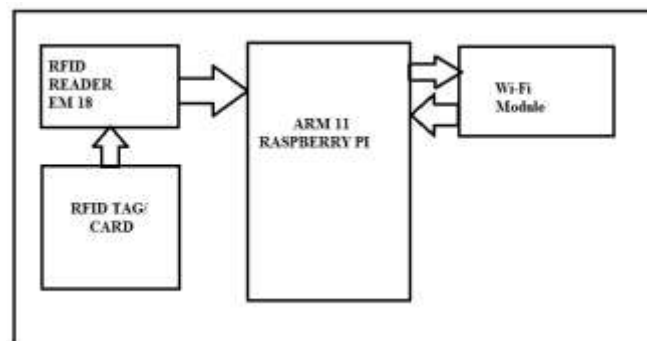


Fig: Block diagram of a system

A. Main unit: These units consist of RFID reader, user information RFID Tag, Raspberry pi 2 B module and Wi-Fi module. Here used Wi-Fi module is used to transmit alert data to the mobile receivers already configured. RFID reader and Wi-Fi are connected to receive and transmit of the serial port in Raspberry pi 2 B module. The total controller program is developed in python language and is downloaded into the memory for operation. Semi passive tag is used to transmit vehicle database like insurance details (renewal date and expiry date), and license etc., to traffic organizers. This data is collected in the RFID reader enabled traffic signal areas. This controls traffic issues like insurance non payment and also used to manage traffic signal in intelligent way.

B. Toll gate management and ticket collecting unit: In this proposed paper raspberry pi, RFID reader, RFID Tag and DC driver motor are used. The vehicle owner is identified by the reader and bill is generated faster. By this it automate toll gates with latest RFID system. In our country the present method of toll gate control and billing is manual. It requires manpower and sometimes billing issues may arise. This proposed system is low cost and fast processing method. Developed countries like USA, UK, Europe etc, are using RFID based systems, but we propose low cost implementation.

For toll management the reader is placed at the toll areas and the gate is controlled by dc motor driver. The RFID card is read by the reader then dc motor is activated to open the boom bar. The bill is automatically generated while the vehicle is entering in to the exit gate.

Similarly bus ticketing is managed. When passenger enter into the bus, the RFID card is read by the reader then according to the ticket fare is deducted from the passengers account. Each details of user/ passenger is available on internet.

HARDWARE DESCRIPTION

The main components of the system include RFID tags, RFID reader, Raspberry Pi, Wi-Fi module, dc motor etc. Brief descriptions of each are given below:

1. RFID Tag: RFID tags are the components which are utilized for the purpose of identification. The tag has a microchip. Corresponding to each tag, the microchip contains unique digital data. The most significant feature of RFID tag is the uniqueness exhibited by each of them. When the tag is read, digital data in the chip is send through radio frequency interference technique. These cards may be of different size and range. Passive tags with no batteries have long life and shorter reading range and are ideal for mass identification process giving the advantage of low cost.
2. RFID Reader: The unique digital data of tag is decoded with the use of RFID reader. The RFID reader transmits an electromagnetic wave which is input to the tag. RFID tag is energized due to these electromagnetic waves hence resulting in the production of a confined magnetic field, which has an interference pattern. This interference pattern which when read by a RFID reader would produce the unique number assigned to the RFID tag and thus the address of the tag is obtained. It should be noted that the address defers from each RFID tag as they are provided by EPC global and hence it offers complete resistance to duplication. Here we use EM18 reader for reading tags.
3. Raspberry Pi: The Raspberry Pi is a series of credit card-sized single-board computers. It is a low-cost, basic computer that was originally intended to help spur interest in computing among school-aged children. The Raspberry Pi is contained on a single circuit board and features ports for HDMI, USB 2.0, Composite video, Analog audio, Power, Internet, SD card. They are ARM based microcomputers having 40 GPIO pins and can be programmed in programs such as Python.
4. Modem: Any 3G USB modem can be used for getting internet connection. Network providers with more service area are preferred. But this does not affect the performance of the system as it is possible to store data and use it according to internet connection.

SOFTWARE DESCRIPTION

Software used in this project is Python. Python is a widely used general-purpose high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or JAVA. The language provides constructs intended to enable clear programs on both a small and large scale. Python supports multiple programming paradigms, including object oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library. Python is said to be relatively easy to learn and portable, meaning its statements can be interpreted in a number of operating systems.

CONCLUSION

In this review paper we have designed a system to give complete solution for traffic and transport related problems such as Toll gate control, and bus ticketing system using the latest RFID technology. This paper has presented a fully automated, reliable, transparent and convenient system for ticketing in PTS. Since fare calculation is done through internet, fare is crystal clear and provides no room for confusion. Database for travellers were created and accessed via internet using a USB modem.

It is proposed as a low cost optimized solution using RFID and IoT technology. This is in line with the developed countries like USA, England, German and Japan, where RFID, IoT technologies are widely used for traffic management. But in India we have not implemented any automated system for transport management due to prohibitive cost. Keeping this in mind we have proposed this system at low cost.

REFERENCES

- [1] Md. Foaisal Mahedi Hasan, Golam Tangim, Md. Kafiul Islam, Md. Rezwanul Haque Khandokar, Arif Ul Alam, "RFID-based Ticketing for Public Transport System: Perspective Megacity Dhaka," 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT), vol. 6, pp. 459-462, 2010.
- [2] Rudy Hermawan Karsaman, Yudo Adi Nugraha, Indonesia, "A Comparative Study On Three Electronics Toll Collection Systems in Surabaya", 2015 International Conference on Information Technology Systems and Innovation (ICITSI) Bandung –Bali, November 16 –19, 2015
- [3] V.Venkatakrishnan, R. Seethalakshmi, "Public Transport Ticketing And Monitoring System," Journal of Theoretical and Applied Information Technology, vol. 38, no. 1, pp. 31-34, 2012.
- [4] S. Srinivasan Associate Professor in E.C.E P.B. College of Engineering, "An Embedded System and Rfid Solution For Transport Related Issues", 978-1-4244-5586-7/10/2010 IEEE.
- [5] Dr. Bos Mathew Jos1, "RFID Based Bus Ticketing System ", Vol. 4, Issue 4, April 2015
- [6] Varun Krishna K.G., Selvarathinam S., Roopsai V., Ram Kumar R.M., "Modified Ticketing System using Radio Frequency Identification (RFID)," International Journal of Advanced Computer Research, vol. 3, Issue 12, pp. 92-98, 2013.
- [7] KuBo Wuhan Vocational College of Software and Engineering Hubei 420305, China, "The Research of IoT Based on RFID Technology", 2014 7th International Conference on Intelligent Computation Technology and Automation.
- [8] Deming Wang, Jianguo Hu, and Hong-Zhou Tan, Senior Member, IEEE, "A Highly Stable and Reliable 13.56-MHz RFID Tag IC for Contactless Payment". Ieee Transactions On Industrial Electronics, Vol. 62, No. 1, January 2015
- [9] Boyi Xu, and Li Da Xu, "Ubiquitous Data Accessing Method in IoT Based Information System for Emergency Medical Services" IEEE Transactions on Industrial Informatics, Vol. 10, No. 2, May 2014
- [10] Xiaolin Jia1, QuanyuanFeng, Taihua Fan, Quanshui Lei, "RFID Technology and its applications in the Internet Of Things(IOT)," 2nd IEEE International Conference on Consumer Electronics, Communications and Networks (CECNet), pp. 1282-1285, 2012.