

Ticketless Transportation using RFID Device

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Abstract— An automated system for ticketing in the Public Transport System (PTS) which is based on passenger identification which will automatically identify the passenger and deduct the passenger's fare according to the distance travelled. The Radio Frequency Identification (RFID) card. The cards being reusable, they are much more convenient compared to the paper based ticketing system. RFID cards are distributed among the public. The unique ID in the RFID cards are stored in a database in the internet along with personal data and creates accounts for each person.

Keywords—:RFID, Raspberry Pi, Python

I. INTRODUCTION

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 to antisocial elements. The user friendly automated ticketing system suggested in this paper will not only automatically deduct the passenger's fare according to the distance travelled but also detect the passenger's identification. This is possible by use of RFID cards and GPS, and can be used to make the transaction and travelling very precise. This paper basically deals with the identification and ticketing of the passengers travelling by the bus. Also discusses possible future extensions of this system in areas such as Internet-of-Things (IoT). The idea of using RFID in PTS was previously put forward by different personalities. But the system proposed here stays closer to a future ticketing system than anything else. RFID technology can be effectively employed in number of applications due to its penchant for efficiency.

II. LITERATURE SURVEY

Md.FoisalMahediHasan, GolamTangim, Md.KafiulIslam, Md. Rezwanul Haque Khandokar, ArifUlAlam, proposes a "public based public transport ticketing system", prevailing in the megacity Dhaka (Bangladesh), introduces severe malfunction in the system, malicious argument among public, corruption and most of all traffic jam. This paper actually

suggests a much more public friendly, automated system of ticketing as well as the credit transaction with the use of RFID based tickets. The total 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.

Varun Krishna K.G., Selvarathinam S., Roopsai V., Ram Kumar R.M., proposes "Modified Ticketing System using Radio Frequency Identification (RFID)"

The paper primarily suggests the use of RFID technology to provide an efficient and enhanced automated ticketing system. The principle aim of the paper is to improve the efficiency of the prevailing suggested RFID ticketing system by considering and overcoming its limitations. The prevailing system proposes the installation of RFID reader circuit in each and every bus stop to facilitate the calculation of distance. Taking into consideration the capital and complexity, this paper suggests the implementation of the ticketing system by making use of a Cyclometer which can be coupled to the wheel(s) of the bus to measure the accurate distance travelled by the user (read automobiles). Depending upon the distance travelled, the corresponding cost is automatically deducted from the user's account. The task is implemented by using an automated. Database system which makes transactions faster, easier and free of ambiguity.

Thimmaraja Yadava G, Prem Narayankar, Beeresh H V, proposes "An Approach for RFID Ticketing used for Personal Navigator for a Public Transport System"

This paper is based on ticketing and identification of the passenger in the public transport. In the metropolitan city like Mumbai, Kolkata we have a severe malfunction of public transport and various security problems. The entire network comprises of three modules; Base Station Module, In-Bus Modules and Bus Stop Module. The In-Bus Modules consists of two Microcontrollers, GSM Modem, GPS, Zigbee, RFID, LCD and infrared sensor. RFID for ticketing purpose. The Zigbee module is also interfaced with the microcontroller which is used to send the bus information to bus stop and to get the information from the bus stop to bus. The Bus Stop

Module is fixed at every bus stop consists of Zigbee node which is interfaced with the Microcontroller.

V. Venkata krishnan,R, Seethalakshmi, proposes “Public Transport Ticketing And Monitoring System. RFID and Zigbee which acts as user friendly to the user. The entire network comprises of three modules; Base Station Module, In-Bus Modules and Bus Stop Module. The Zigbee module is also interfaced with the microcontroller which is used to send the bus information to bus stop and to get the information from the bus stop to bus. The Bus Stop Module is fixed at every bus stop consists of Zigbee node which is interfaced with the Microcontroller. The public transport service can be effectively implemented by deploying the concept of this paper and quality of the service can be improved.

III. BLOCK DIAGRAM

This system consists of an RFID reader which is used to identify the passenger, a control unit which uses the database to monitor factors like account balance, ticket charge etc. The system also includes a distance measuring unit which uses the GPS to find leaving place and arriving place to calculate distance, and an internet access for updating database. Basic block diagram of the system is shown in Fig. 1.

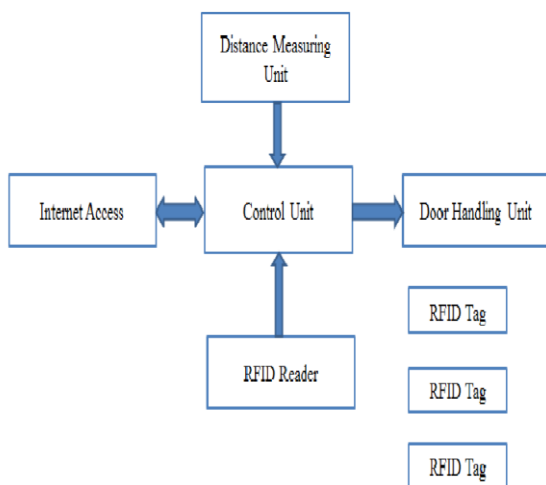


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An RFID system consists of a tag, basically a microchip with an antenna and an interrogator or reader with an antenna. Most RFID tags contain at least two parts, One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal. The passenger entering

the desired bus should display/place the RFID tag in front of the reader.

When the tag is placed before the reader circuit, the tag gets energized and the reader reads the unique digital data behind it. Hence the tag reveals relevant information to the reader circuit. The reader circuit stores this information in its internal memory temporarily and also links to the common database system which has all the details of the particular passenger. It verifies the identity of the person. Having linked with the common database system, it also checks if the passenger has sufficient balance in his account for the travel. Only a person with minimum account balance and verified identity will be able to travel in the bus which assures secure and reliable transportation system.

IV. WORKING DESCRIPTION

This project basically deals with the identification and ticketing of the passengers travelling by the bus. RFID has been an emerging technology in recent years. RFID technology can be effectively employed in number of applications due to its penchant for efficiency. This project depicts getting the ticket in a smarter way. There is a Source touch keypad where the passenger can select the source and destination that he wishes to go by selecting the source touch pad. The passenger has to get the ticket first so that he can allow to enter into the bus. By using the RFID card he can pay the money directly and the money credited for the ticket can be known by the passenger through his smart phone by IOT. And also if any theft activities done means by using the camera his entire information is updated to the owner so that we can track the thief.

A voice board is fixed for the sake of uneducated people so that as per the instruction he can get the ticket and he can pay the money directly to the driver. By implementing this idea we can avoid the ambiguity of getting the fares.

V. EXISTED METHOD

RFID-based public transport ticketing systems rely on widespread networks of RFID readers that locate the user within the transport network in real time to be able to verify whether he can travel at that time with the ticket he holds. This paper presents a system that uses that same RFID-based location information to give the user navigation indications depending on his current location provided that the user has indicated beforehand the places he intends to visit. The system was designed to be cost effectively deployable on the short term but open for easy extension. This paper is based on ticketing and identification of the passenger in the public transport. In the metropolitan city like Mumbai, Kolkata we have a severe malfunction of public transport and various security problems. Firstly, there is a lot of confusion between the passengers regarding fares which lead to corruption, Secondly due to mismanagement of public transport the passengers faces the problem of traffic jam, thirdly nowadays we have severe security problems in public transport due anti-social elements. The entire network comprises of three modules; Base Station Module, In-Bus Modules and Bus

Stop Module. The base station module consists of monitoring system which includes GSM and a PC.

VI. HARDWARE DESCRIPTION

The main components of the system include RFID tags, RFID reader, Raspberry Pi, GPS module, LCD, servomotor 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 and an integrated antenna. 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 sent 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. Cards shaped S50 RFID cards are ideal for the usage here.

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 differs from each RFID tag as they are provided by EPCglobal and hence it offers complete resistance to duplication. Here we use MFRC522 reader for reading passive 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. 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, Analogy audio, Power, Internet, SD card. They are ARM based microcomputers having 40 GPIO pins and can be programmed in programs such as Python or Scratch. Servomotor: A servomotor is a rotary actuator that allows for precise control of angular position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Door handling system is controlled by servomotor. For heavy loads, stepper motors can be used instead. Selection of motor depends on the weight of door, its operating mechanism etc.

4. Display unit: Cheapest display unit available is LCD. But Pi has an advantage that other display units can be connected to it directly through display port.

VII. 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, including UNIXbased systems, Mac OS, MS DOS, OS/2, and various versions of Microsoft Windows 98.

VIII. CONCLUSION

This paper has presented a fully automated, reliable, transparent and convenient system for ticketing in PTS. RFID cards being reusable are much more convenient compared to the paper based ticketing system. These are used as universal travel pass card that will allow any transportation on any route. GPS service along with internet was used for the distance measurement and fare calculation. GPS does not require internet so is reliable even if there's no connectivity at all places of travel. Since fare calculation is done through internet, fare is crystal clear and provides no room for confusion. Database for travelers were created and accessed via internet using a USB modem. Implementing this system can be seen as a step towards IoT. Powerful program algorithm can make system to publish real time location data in internet, ensuring time keeping of services. System also holds bright promises towards different transportation fields, including transportation of school students ensuring better level of safety.

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