Elegant Ticketing System For Buses

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Abstract:
Implementing the security system in buses for the automatic issuing of tickets to the passengers without the need of carrying money every time is the main criteria of this project. this project is to provide flexibility and security to the passengers in buses for paying their ticket sum automatically by providing individual RFIDCARDs to each passenger. Think of prepaid ticketing facility! Just like prepaid mobile recharging facility. RFID-based scheme for single-journey reusable ticketing in mass transportation has gone live in Seoul, South Korea, and is expected to save some 3 billion (over $2.4 million) per year. As for the RFID application, it's been a widespread tool for both tracking the transit transports and for the public ticketing system. It's already been an outstanding achievement throughout the globe including big cities like London, Helsinki, Shanghai, Istanbul.
Keywords: RFID, LCD

1-Introduction

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost-conscious market.

Moscow, Porto and many more. The system can be implemented for subways, railways and public bus services for the sake of systematic operations in corresponding cases

Through this project we can implement prepaid bus ticketing using Smart Card technology. In this project we are going to interface a smartcard reader with microcontroller through a Serial Driver (MAX 232) and also we are going to connect a LCD screen, keyboard and printer. We are going to place this kit within the bus or near the bus stand. First of all we have to issue the smart cards to the customers and that RFID card value may depends on how much money it is having and we are going to collect the money from customer while we are issuing rfid card. So by using this project we can implement a prepaid ticketing system for buses using Smart Card Technology which provides security and avoids the risk of carrying money every time.

This work helps in situations like overpopulation in transportation systems. At these situations, the conductor may not be able to give proper tickets to all the passengers and also he/she cannot verify if proper change is given to the passenger and all passengers have got their tickets. So we can use an efficient method as RFIDs by not giving the ticket in the form of paper instead collecting the fare from it according to their distance travelled and it also reduces the consumption of papers that are used for printing the tickets as the passenger is always carrying the RFID. The RFID contains the data's of

the passenger and also the fare is also debited it from it. RFID is one of the known technologies which are nowadays used in many areas for identification and security purposes. The passengers carrying the RFID are advised to swipe it in the RFID reader, so that the fare can be collected from it. Infrared sensors are generally used for the detection of the presence of any persons or objects, so using this concept we are counting the number of passengers entering the bus. These sensors are placed at the entry levels of the bus at both sides.

Implementing the security system in buses for the automatic issuing of tickets to the passengers without the need of carrying money every time is the main criteria of this project. this project is to provide flexibility and security to the passengers in buses for paying their ticket sum automatically by providing individual RFIDCARDs to each passenger. Think of prepaid ticketing facility! Just like prepaid mobile recharging facility. RFID-based scheme for single-journey reusable ticketing in mass transportation has gone live in Seoul, South Korea, and is expected to save some 3 billion (over $2.4 million) per year.

For the RFID application, it's been a widespread tool for both tracking the transit transports and for the public ticketing system. It's already been an outstanding achievement throughout the globe including big cities like London, Helsinki, Shanghai, Istanbul, Moscow, Porto and many more. The System can be implemented for subways, railways and public bus services for the sake of systematic It's already been an outstanding achievement throughout the globe including big

In this chapter we will discuss about the software requirements for Elegant Ticketing System For Buses.

2-Software Requirements

cities like London, Helsinki, Shanghai, Istanbul, Moscow, Porto and many more. The system can be implemented for subways, railways and public bus services for the sake of systematic operations in corresponding cases. Through this project we can implement prepaid bus ticketing using Smart Card technology. In this project we are going to interface a smartcard reader with microcontroller through a Serial Driver (MAX 232) and also, we are going to connect a LCD screen, keyboard and printer. We are going to place this kit within the bus or near the bus stand. First of all, we have to issue the smart cards to the customers and that RFID card value may depends on how much money it is having and we are going to collect the money from customer while we are issuing RFID card. So, by using this project we can implement a prepaid ticketing system for buses using Smart Card Technology which provides security and avoids the risk of carrying money every time.

This system eliminates the need for physical tickets or cash, providing a faster and more efficient way of fare collection. It reduces boarding time, minimizes human errors, and eliminates cash-handling hassles for both passengers and drivers. Additionally, RFID technology ensures secure and accurate transactions, reducing the likelihood of fraud.

Overall, an RFID-based bus ticketing system modernizes public transportation by improving convenience, operational efficiency, and data-driven decision-making, making it an ideal solution for both passengers and operators in busy urban environments.

Software Requirements

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave

oven. Almost every household has one, and tens of millions of them are used every day, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner. An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost every household has one, and tens of millions of them are used every day, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner. Frequently, an embedded system is a component within some larger system. For example, modern cars and trucks contain many embedded systems. One embedded system controls the anti-lock brakes, other monitors and controls the vehicle's emissions, and a third displays information on the dashboard. In some cases, these embedded systems are connected by some sort of a communication network, but that is certainly not a requirement. For example, my computer consists of a Central Processing Unit, keyboard, mouse, video card, modem, hard drive, floppy drive, and sound card each of which is an embedded system. Each of these devices contains a processor and software and is designed to perform a specific function. For example, the modem is designed to send and receive digital data over analog telephone line. That's it and all the other devices can be summarized in a single sentence as well.

If an embedded system is designed well, the existence of the processor and software could be completely unnoticed by the user of the device. Such is the case for a microwave oven, VCR or alarm clock. In some cases, it would even be possible to build an equivalent device that does not contain the processor and software. This could be done by replacing the combination with a custom integrated circuit that performs the same functions in hardware. However, a lot of flexibility is lost when a design is hard-cooled in this way. It is much easier, and cheaper, to change a few lines of software than to redesign a piece of custom hardware. Arduino IDE (Integrated Development Environment) is a free, open-source platform for writing, compiling, and uploading code to Arduino boards. It supports C and JavaScript programming languages, providing a user-friendly interface for beginners and experienced developers alike. Arduino IDE offers features like code completion, syntax highlighting, and library management, streamlining the development process.

Chapter 3-Elegant Ticketing System For Buses

In this chapter we will discuss about Existing/Proposed System, block diagram and methodology for Elegant Ticketing System For Buses.

Existing System

In our country there is always a presence of problems regarding the buses related to ticketing method. The conductor will give the tickets to the passengers who are all travelling in the bus. Based on the count and the amount given to the conductor, he/she will issue the tickets to the passengers. This will include many papers for printing the tickets and the use of hand-held machine also creates many problems.

The passenger also has to carry the correct amount within during his/her travel. The conductor should also have the correct change when any passenger is not having the correct amount. Sometimes some conductors will not give the correct change to the passenger. For

example, when we travel from erode to Coimbatore the charge for the ticket is only 59 rupees but when the passenger travelling in that bus gives the conductor an amount of 60 rupees. Then the conductor has to give the passenger 1 rupee. Some conductors are giving the correct change to the passenger but many are not giving.

The existing system overcomes these difficulties by using a RFID with keyboard in which the passenger has to enter the designation where he/she is going to get down. The RFID reader will read the respective information about the passenger from the RFID tag. The respective amount is debited from the passenger with the help of that RFID tag.

Proposed System

Nowadays, automation is seen in every nook and corner of the world. Hence we can apply it in buses to generate automatic fare collection and ticketing system using RFID. The RFID is one of the best technologies in getting the details of a person by just using the tag and the amount is debuted from it according to the distance travelled by the passenger. RFID reader which helps in identifying the owner of the tag once the tag is punched in it. The RFID Bus Ticketing System revolutionizes public transportation by providing a convenient, efficient, and secure way to manage fares. Radio Frequency Identification (RFID) technology enables passengers to pay fares effortlessly, eliminating the need for cash or paper tickets. Automated fare collection reduces revenue loss and minimizes cash handling. Passengers enjoy swift boarding and alighting, decreasing travel times. Real-time balance updates and transaction records ensure transparency. Transit authorities gain valuable insights analytics.

Block Diagram

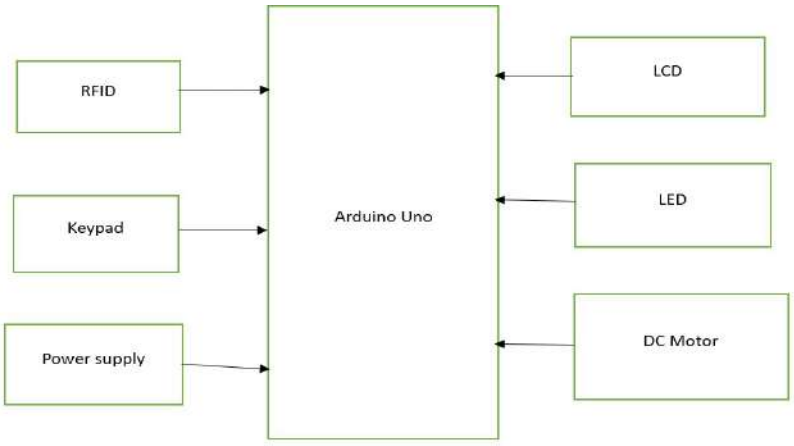

Figure 3.1 Block Diagram

RFID

RFID is short for Radio Frequency Identification. Generally a RFID system consists of 2 arts. A Reader, and one or more Transponders, also known as Tags. RFID systems

evolved from barcode labels as a means to automatically identify and track products and people. You will be generally familiar with RFID systems as seen in:

- Access Control.

RFID Readers placed at entrances that require a person to pass their proximity card (RF tag) to be "read' before the access can be made.

- Contact less Payment Systems.

RFID tags used to carry payment information. RFIDs are particular suited to electronic Toll collection systems. Tags attached to vehicles, or carried by people transmit payment information to a fixed reader attached to a Toll station. Payments are then routinely deducted from a users account, or information is changed directly on the RFID tag.

Product Tracking and Inventory Control. RFID systems are commonly used to track and record the movement of ordinary items such as library books, clothes, factory pallets, electrical goods and numerous items.

Shown below is a typical RFID system. In every RFID system the transponder Tags contain information.

RFID transceiver that communicates with a passive Tag. Passive tags have no power source of their own and instead derive power from the incident electromagnetic field. Commonly the heart of each tag is a microchip. When the Tag enters the generated RF field it is able to draw enough power from the field to access its internal memory and transmit its stored information.

When the transponder Tag draws power in this way the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. This effect is utilized by the Tag to communicate its information to the reader. The Tag is able to control the amount of power drawn from the field and by doing so it can modulate the voltage sensed at the Transceiver according to the bit pattern it wishes to transmit.

4-Advantages, Disadvantages and Applications

In this chapter, we will discuss about the results of the comprehensive spectrum sensing for Elegant Ticketing System For Buses.

Advantages

1. Increased Passenger Throughput: RFID systems allow for quick and seamless boarding, enabling more passengers to board and a light efficiently, especially during peak hours.
2. Easy Ticketing: RFID systems offer a user-friendly ticketing process, making it convenient for passengers to purchase and validate tickets with a simple tap or scan.
3. Reduced Labor Costs: Conductors are no longer required with a conductor less RFID system, leading to significant savings in operational expenses related to human resources.
4. Automated Fare Collection: RFID technology ensures precise fare collection, reducing errors and discrepancies in revenue collection.
5. Reduced Paper Waste: Moving towards a paperless ticketing system with RFID technology helps in reducing paper waste, contributing to environmental sustainability by minimizing the use of paper resources.
6. Secure Transactions: Transactions made through RFID systems are encrypted, enhancing security and preventing unauthorized access or tampering.
7. Lower Ticket Printing Costs: By moving to a digital ticketing system, the need for physical paper tickets is eliminated, cutting down on printing costs.
8. Faster Boarding: With RFID technology, passengers can simply tap their cards or devices to

board, significantly speeding up the boarding process compared to traditional ticketing methods.

Disadvantages

1. Vulnerability to Hacking: Like any digital system, RFID bus ticketing systems are susceptible to hacking or cyber-attacks that could compromise passenger data, payment information, or the overall security of the system.
2. Loss of Card: If the lost RFID card had a stored balance for bus fares, the passenger may lose that amount and need to top up a new card or device.

In this chapter, we will discuss about the results of the Compressive spectrum sensing for Elegant Ticketing System For Buses.

1.1 Working

RFID-based bus ticketing machine is a validation device used for issuing and validating bus tickets using RFID technology. It allows passengers to simply tap their RFID-enabled cards or devices on the machine to pay for their bus fare, without the need for physical tickets or cash

5- Results and Discussion

Figure 5.2 Booking ticket

When the RFID Bus Ticketing Machine is switched on, it displays a welcome screen with two primary options: Recharge and Book Ticket. The user can select either option using the provided buttons.

Figure 5.3 Entering start and stop stages

Next, passengers are prompted to enter their start and stop stages. The system displays a clear message: Start Stage: 2(example)

Stop Stage: 4(example)

Figure 5.4 Entering no. of adults

Figure 5.5 Entering no. of child

To complete the ticketing process, passengers are prompted to enter the number of children traveling. The system displays a clear message: Ticket Price: (cost in rupees) Number of child: 1(example)

Figure 5.6 Scanning the RFID

Now the passengers need to tap the card on the RFID reader to complete the transaction. Once the card is tapped, the RFID reader scans and displays the card number on the LCD screen.

Card Number: XXXX-XXXX-XXXX-XXXX

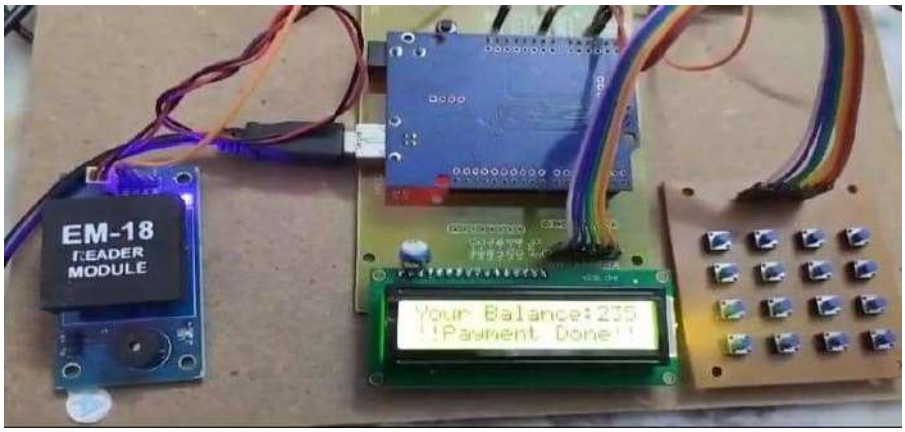

Figure 5.7 Payment Successful Upon tapping the card on the reader the fare will be automatically deducted and it displays "payment done" on the LCD screen.

6-Conclusion

The project "RFID Based Bus Ticketing System" has been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing tothe best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

This project aims to give smooth ticketing experience. The system gives the passengers a newexperience of ticketing which will be easy to understand and helpful by going cash-less, reducing time for buying tickets and storing the details of travel of passengers.

The RFID-Based Ticketing System revolutionizes the way people travel, making public transportation more efficient, convenient, and secure. Radio Frequency Identification (RFID) technology

replaces traditional paper tickets and cash transactions, streamlining the ticketing process.

The system offers numerous benefits, including convenience, efficiency, security, and data analysis. Passengers simply tap their RFID cards on the reader, eliminating the need for cash or paper tickets. Automated fare collection reduces waiting times, increasing passenger throughput. Encrypted RFID cards prevent counterfeiting and unauthorized transactions.

The system consists of RFID cards/tags issued to passengers, RFID readers installed on buses and ticketing machines, and a central server managing data, processing transactions, and updating balances. Passengers purchase and recharge RFID cards, tap them on the RFID reader upon boarding, and have their fare deducted with balance updated.

The advantages of the RFID-Based Ticketing System include reduced revenue loss through automated fare collection, enhanced passenger experience through quick transactions, and increased efficiency through reduced manual processing and minimized queues.

Despite initial infrastructure costs and public awareness challenges, the system's benefits outweigh its drawbacks. Future developments will integrate mobile payments for seamless transactions and provide real-time information through passenger alerts and schedule updates.

The RFID-Based Ticketing System transforms public transportation, offering a convenient, efficient, and secure travel experience. By leveraging technology, cities can modernize their transit systems, encouraging widespread adoption and fostering smart, sustainable growth.

References

[ll. T. Manikandan, G. Kalaiyarasi, P K. Priyadharshini, PR.Priyanga," Conductor less Bus Ticketing System Using REID and Accident Information through GPS and GSM", IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 2
Issue 9, September 2015.

[2]. Prof. A. U. Deshmukhl Priyanka Kokil Dhanashri Khadtar Bhagyashri Khadtar," Conductor Less Bus using Image Processing", IJSRD - International Journal for Scientific Research & Developmentl Vol. 4, Issue 02, 2016.

[31. Ciripireddi Durgaprasad, G. Rajesh, "Automatic Fare Collection System in Public Transportation", International Journal of Scientific Engineering and Technology Research, Issue.47 December-2016.

[41. Arun Das .S .V, K. Lingeswaran, "GPS Based Automated Public Transport Fare Collection Systems Based On Distance Travelled By Passenger Using Smart Card", International Journal of Scientific Engineering and Research, Volume 2 Issue 3, March 2014.

[51. Suresh Sankarananrayanan, Paul Hamilton," Mobile Enabled Bus Tracking and
Ticketing Conference on Information and Communication Technology,2014.

[61. Paul Hamilton and Suresh Sankaranarayanan, "lntelligent Agent Based RFID System for on Demand Bus Scheduling and Ticketing", International Journal of Future Computer and Communication