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Conductor less Bus Ticketing System Using RFID Technology

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Abstract: ***The main objective of this paper is to generate passenger tickets using RFID technology for the fare of a particular destination. The appropriate amount is deducted from the RFID card. In addition to that, in proposal system RFID has proven to be one of the most promising technologies in recent years and can be effectively employed in various applications since it is economical and widely used tool for tracking and locating purposes. Radio-frequency identification (RFID) is a technology that uses electromagnetic fields to automatically identify and track tags attached to objects .A small radio transponder, a radio receiver, and a radio transmitter make up an RFID system The RFID application, on the other hand, has become a popular tool for both tracking transit vehicles and the public ticketing system.***

I. INTRODUCTION

In this paper, RFID-based automatic bus fare collection system using electronic Ticket, it is described that a system that employs RFID-based location information to provide navigational guidance based on his position. That a system that uses the RFID-based location information give the navigation indications depending on his current location; given that the user has previously indicated the destinations he wishes to visit.

Collected data can be used to predict bus moment timing in order to provide better service . The Radio-frequency identification (RFID) is a wireless technology that uses low frequency radio signals ranging from 3 kHz to 300 GHz in order to transfer small bits of data between RFID devices . An RFID device consists of two fundamental components: tags and readers . The communication between the reader and the tag is achieved via the transmission of electromagnetic waves. The money can be taken out of the smart card.

In traditional paper-based ticketing, the person sitting at the bus halt counter manually prints and seals lots of tickets each and every day, stating that date. Passengers typically throw away used paper-made tickets after they have completed their journey, polluting the environment

Again, a big number of trees are being cut down because the existing system relies on paper-based ticketing, and used tickets are just thrown away. However, in our suggested approach, the RFID-tagged card carried by the passengers handles everything automatically, reducing the complexity previously indicated.

II. BACKGROUND

It is a bus ticketing system based on RFID Technology which eases the process of ticket booking and generation by infusing Radio Frequency Identification Technology in which we take RC 522 module (with cards and tags) and interface it with an AT Mega 528p microcontroller embedded in Arduino UNO. To display the status we connect a 16x2 LCD parallelly to the microcontroller.

In traditional paper-based ticketing, the person sitting at the bus halt counter manually prints and seals lots of tickets each and every day, stating that date. After they have completed their journey, passengers typically discard the used paper tickets in various locations, polluting the environment.

Because the current method uses paper-based ticketing and the spent tickets are simply thrown away, a vast number of trees are being destroyed once again.

However, in our suggested approach, the RFID-tagged card carried by the passengers handles everything automatically, reducing the complexity previously indicated

The following are some of the advantages of an RFID-based ticketing system over a traditional system (paper tickets):

Operators such as transportation authorities can save time and money by using automatic ticketing systems; fare collection can be organised much more efficiently. Low maintenance costs and increased security are advantages of these systems.

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III. ARCHITECTURE

A. Radio Frequency Identification and Detection (RFID)

RFID is a wireless technology that transfers small amounts of data between RFID devices using low frequency radio waves ranging from 3 kHz to 300 GHz. Tags and readers are the two main components of an RFID device. Transmission of electromagnetic waves is used to communicate between the reader and the tag.

B. RFID Reader

The tag is magnetized and the information is decoded using a reader. Tags are used to store and process information. A reader sends out a radio frequency signal that the tag responds to. This energizes the pin or bar code, causing it to produce its own magnetic field with a unique interference pattern that corresponds to a unique number that the tag reads.



Fig 1. RFID Tag and Reader

C. RFID Tag

Active, passive, and semi-passive tags are classed according to their power source and maximum range. Internal batteries are now used in active and semi-passive tags, increasing the tag's cost. Furthermore, semi-passive tags necessitate sophisticated internal hardware. As a result, its use is not feasible. Table lists the many parameters that are used to classify active and inactive tags.

D. Smart Card

Touch and go cards, sometimes known as smart cards, can be used to substitute cash, tokens, and passes. The term "smart card" refers to a memory or microprocessor that is contained in a computerised chip. It is possible to store and transfer data in a convenient and secure manner.

IV. PROPOSED WORKING

RFID is used to meet the demand for digitalization of public transportation tickets, where users must fill up their cards before using them and after entering the system, they must top up their card before using it, and when entering the system, it will check for the availability of funds in the card by tapping the card in the reader located at both ends of the bus, if available, it will grant access to the service, if not, it will indicate the same through a red LED and the user will have to exit the public transportation system.

The transmission of data over electromagnetic waves occurs in RF communication.

The effect of generating a certain electromagnetic wave at the source can be detected at a receiver far away from the source, allowing it to be identified and hence the information to be decoded. When an RFID tag is scanned by an RFID reader, the EM waves are in touch, and distance calculation is enabled automatically. When the EM waves are no longer in contact, the quantity calculated is lowered.

The smart card should have enough memory to store the passenger information. The available amount in RFID tag passengers who are travelling is displayed on an LCD panel.

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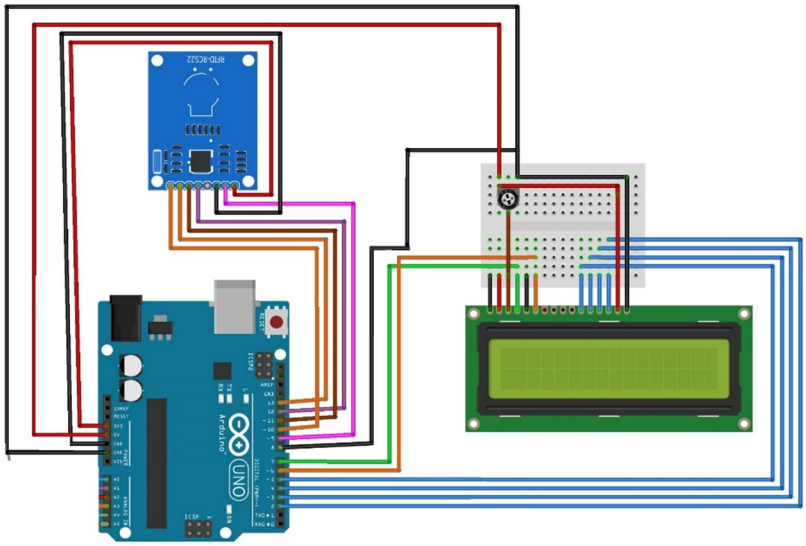


Fig 2. Circuit Diagram



Fig 3. Arduino UNO

V. FUTURE SCOPE

We can find the location of the passenger entrance and exit by using a smart card instead of RFID with GPS.
We may calculate the distance and amount travelled by using the location.
By combining GPS with a smart card, a microcontroller may be utilized to programmed this system. Using this strategy, the use of loose currency can be reduced, and effective ticketing can be achieved.
While addressing the issue of ticketing, our project saves time and manpower. Apart from buses, this idea can be used in a variety of other public transportation services such as trains and metros.

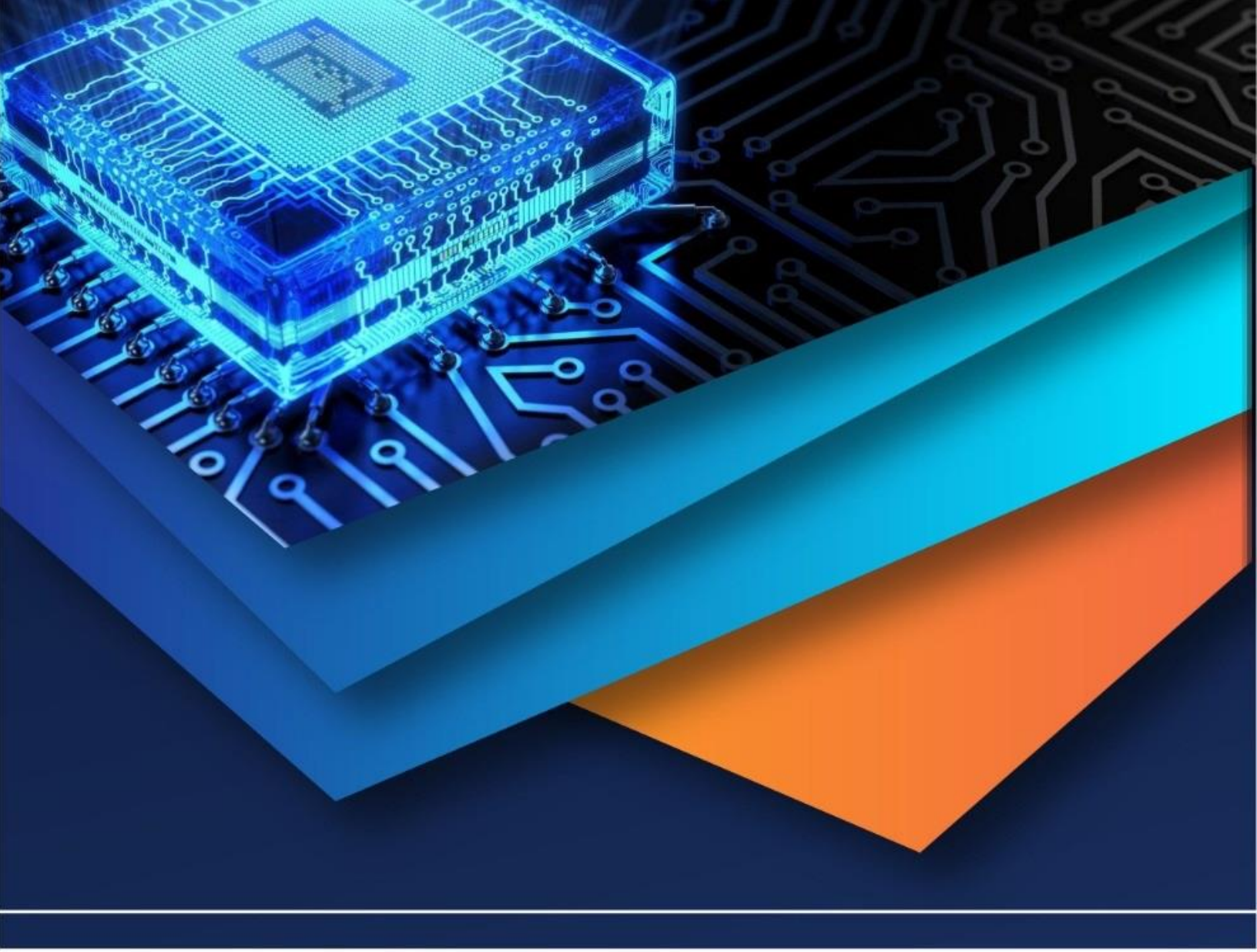
VI. CONCLUSION

This proposal is based on the RFID technology-based bus ticketing system. The major goal of this project is to make extensive use of retarded technology. Reduce the amount of paper wasted. While many may argue that switching to paperless will be more expensive in terms of software and hardware needs than the previous paper-based system, a Smart Ticketing system has its advantages. The system should be totally automated, dependable, transparent, and user-friendly. With minor or no modifications, the entire system can be employed in highway vehicles, toll payment systems, and railway ticketing systems. Because the cards are reusable, they are far more convenient than paper based ticketing system.

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