

SMART TICKETING SYSTEM

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Abstract - In the present overpopulated world, transport systems are the basic economic arteries of the country. Citizens prefer to have smart and coordinated transport system. This paper suggests to have smart transport system by incorporating modern technologies like RFID and embedded systems and database to have smart ticketing systems. The conventional method in mega cities use paper-based ticketing system, which leads to chaos among public, usage of paper and consumption of time etc. This paper resolves all these problems to provide smart ticketing system. The proposed system uses GPS to locate the co-ordinates of all the bus stops and are stored accordingly. As bus travels from one stop to another the fare will be deducted accordingly. This brings a major change in this smart world.

I. INTRODUCTION

RFID has many applications, it's basically a tool for both tracking the transit transports and for the public ticketing system. The applications of RFID can be extended for subways, railways and public bus services for the sake of systematic operations in the above-mentioned cases.

The conventional system of public transport in megacities is based on paper-based bus or railway tickets, which leads to lot of chaos among public, corruption, wastage of paper ticket in bulk every day that ultimately lead to system loss and most of all traffic jam that is responsible for a wastage of time. No prior information of the arrival and departure of the transports are available creating a lot of confusion among the passengers resulting in arguments between the passengers and the bus supervisors or the conductors. Here we also include the involvement of Conductors for proper vigilance. So that there will be no employment problem for conductors.

The ticketing system using RFID is an emerging technology to solve the prevailing problems. GPS is involved in tracking applications, With the help of GPS, the coordinates of the bus stop is located, we propose the RFID based tickets for its low cost, portability, easy operation, durability, reliability and being much more user friendly.[1]

Public transporting RFID based electronic tickets will have access to any bus service of the city only by scanning the unique RFID card through Reader installed at the rear end of the bus so that the location of that particular stop is saved in the database accordingly for individual passengers. The data will directly be transferred to the server main database and the equivalent credit will be debited from the corresponding users account at each pre-specified stop. Before getting down from the bus at their destination stop passenger has to scan the RFID card once again through the Reader installed at the front door so that the GPS locates it as a final stop of the passenger and further deduction of money from the account is blocked until he uses again the bus service.

This system proves to be more efficient in terms of tracking and ticketing system, which is automated in its operation will save time, have a higher authoritative inspection and reduce chaos and confusion on the road.[3]

A. RFID Reader and Tag

RFID reader is the device capable of extracting or reading information stored inside RFID tags. Two types of RFID reader available are active and passive RFID reader. Active RFID reader can detect the active RFID tag at few meters to line of sight while passive RFID reader can only detect passive RFID tag at a few centimetres from the reader. The RFID reader used in the system is a low-cost reader for reading passive RFID tags. It operates at frequency of 125 kHz and 12V power supply. The effective detection range of the reader is around 5cm from the antenna. The RFID reader is constructed based on the EM4095 RFID transponder IC. Each RFID tag will have unique ID or serial number which makes it suitable for distinguishing among products. Some RFID tags even contain information that can only be read by RFID reader. There are three types of RFID tags, namely active, semi-passive and passive RFID tag. The main difference between these RFID tags is that active and semi-passive RFID tags contain internal battery while passive RFID tags do not have any internal battery. [2]

B. Basic Operation

The basic operation of the proposed system mainly focuses on efficient utilization of RFID with embedded system to facilitate smart ticketing system in bus. This paper implements how GPS and RFID technology can combinedly prove extremely useful in public bus transportation system in mega cities. This system elaborates the installation of RFID reader circuit in each and every bus to calculate the ticket charges. Depending upon the distance (number of stations) travelled, the corresponding cost is automatically deducted from the user's account. This task is implemented by using an automated database

system which makes the transactions faster, easier and free of ambiguity. The proposed system uses GPS to locate the co-ordinates of all the bus stops and are stored accordingly. As bus travels from one stop to another the fare will be deducted accordingly.[4]

III. HARDWARE DESIGN

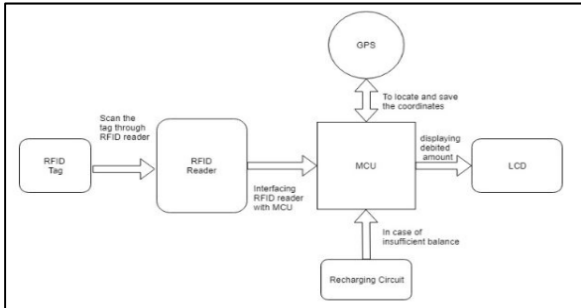


Figure 1: block diagram

When a passenger gets into the bus, first step is to scan the unique RFID card on RFID reader. The RFID reader is in turn interfaced with the Microcontroller unit. GPS is interfaced with MCU to locate the boarding point and corresponding bus stop. The GPS data is converted to coordinates and saved in database as shown in figure 1. Amount from the user’s account gets deducted based on distance travelled by passenger. Recharge circuit is made available to recharge the prepaid card in case if the passenger has insufficient balance or if the passenger wants to recharge. When the passenger is ready to get down from the Bus, then the card is scanned again so that destination is detected by the GPS and accordingly the amount is deducted from the account and is displayed on LCD screen fixed nearby RFID reader.[5]

III. EMBEDDED SOFTWARE DESIGN

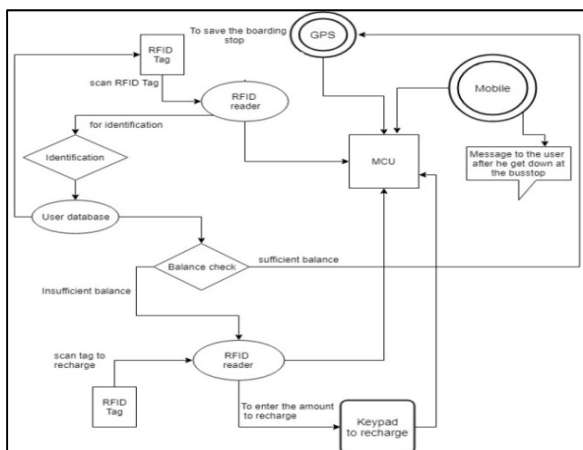


Figure 2: flow chart for bus ticketing system

The main input to this system is RFID card, whenever a person enters the bus scan of unique card through RFID reader is done, the RFID reader is connected to MCU and first it checks for the identification and

gives relevant user database on the LCD display as shown in figure 2. If the balance is sufficient then the MCU interacts with the GPS module to save the coordinate of the boarding stop. In case of insufficient balance, the user has to recharge his card by moving to recharge circuit present in the bus system where we use Keypad interfacing with MCU to recharge as per user's wish. The GPS module is interfaced with MCU in such a way that the coordinates of the bus-stops are pre-recorded with suitable amount. The amount from user's account will be deducted at every stop until the person finally scans the card and gets down. The deducted amount will be shown on the LCD present over the RFID reader installed at the exit door.[7]

IV. RESULT INTERPRATATION

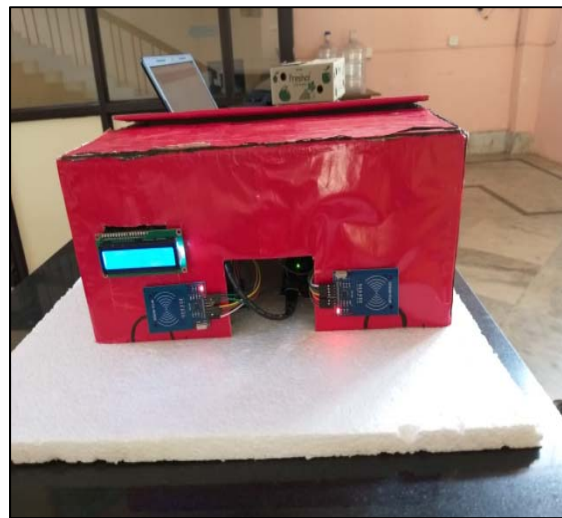


Figure 3: project prototype



Figure 4: Display of user's information during scanning of RFID tag

CONCLUSION

This project mainly concentrates on the technology advancement in the transportation system. Our specific area of work is bus transportation. RFID based bus transportation is the objective of the project. When a bus reaches a stop, the location will be noticed. The locations of the bus stops are pre-assigned. The passenger is supposed to swipe the

RFID card to the reader. Then the corresponding name and number of the card is displayed and also stored. In case of insufficient balance there will be a recharge circuit through which the money can be recharged to the smart card.

The fair of the journey will be cut when the card is scanned again at the exit door when the destination has arrived. The name of the card, the total fair of the journey and total balance left will be displayed on the screen. It is efficient and time saving.

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