

RFID BASED SMART TICKETING SYSTEM FOR PUBLIC TRANSPORT SYSTEM

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Abstract : India is the second largest populated country in the world so most of the people use public transport. During peak hours issuing tickets to each passenger manually is time consuming and tedious task and also a problem. The probability of ticket fraud is also high in this case. Since the tickets are made of papers it leads to deforestation and these tickets are of no use once when the passenger gets out of the bus. Passengers should also protect their tickets until they reach their destination. So in order to overcome all these difficulties we have Smart ticketing system is proposed to issue tickets to passengers.

Index Terms - RFID Reader, GPS, Arduino microcontroller, NodeMCU.

I. INTRODUCTION

A Smart Ticketing system has its benefits while many people may argue that a switch to paperless will be more expensive, in terms of software and hardware requirements than the traditional paper-based system. Going paperless not only has a huge impact on the environment but also saves costs of ink, paper, labor costs associated with it. By taking into consideration the above parameters, a smart ticketing system using a combination of RFID technology, GPS, Arduino microcontroller, Nodemcu. 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. A reader will be attached to both ends of the bus. This Reader System is a combination of RFID Reader which serves the main purpose of detecting the RFID cards carried by the passengers to buy tickets in bus. The Arduino microcontroller used in this system is responsible for communicating with the RFID reader. Every RFID card is encoded with a unique identification number. The RFID cards used in this system are passive RFID tags which unlike active tags that require an internal power supply. These tags have a read range up to 10m. The frequency of the RFID Reader MFRC 522 is 13.56 MHz and its read range is between 10cm-1m. These cards are detected by the reader with the help of electromagnetic fields created between them. While the cards are detected by the reader a microcontroller is responsible for fetching the details from the reader system about the balance and bus stations.

II. LITERATURE REVIEW

[1] A methodology has been introduced for introducing RFID based smart transportation system. The main of this research work is to offer an effortless transportation facility by minimizing the problems faced by passengers, drivers and the concerned authorities with the help of a handy android application. Our system uses Radio Frequency Identification [RFID], Global Positioning System [GPS], and an android application for passenger management and real-time tracking features for offering a satisfying bus fare calculation. [2] In the proposed framework, the passenger is identified automatically and the fare based on the distance travelled is deducted automatically, the use of RFID tags along with GPS is used to make the identification of passenger and the fare more accurate. The traditional paper-based tickets can be replaced by the RFID system as they are reusable and provide higher accuracy and hence they are much better. This replaces the existing paper-based bus ticketing system and also prevents corruption/unaccounted money. RFID tags are being used as tickets which are reusable and deducted the fare based on the distance travelled using GPS system by the user. This system minimizes human errors and effort.[3] For the past decades, the usage of public transport especially bus has lost its number of passenger and people started using other private means of transport. Advancement in the technology has shown various features to attract people, give them more comfort while traveling. QR code connects the conductor and the passenger via an application to collect the ticket and transfer the money without any conversation. Based on the results from IR sensor, number of passengers can be counted and analyze the peak hours. This paper attempts to review the various technologies required to arrive at the right advancement. [4] 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 distributes 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. [5] In the proposed system the smart application that will automatically allocate the seat to passenger, can reserve ticket digitally and mode of payment will be cashless thereby promoting digitalization and smart cities initiatives. The source of the user will be added automatically when connected to the device installed at the bus stop. The user can check the availability of seats, book tickets, get the seat automatically through efficient novel algorithm and the expected waiting time. If seats are not vacant, our algorithm will efficiently allot the seat that will be vacant in shortest time.

III. EXISTING SYSTEM

- In the present system, the conductor have to issue the tickets to all users so which is time consuming and tedious task.
- In public transport rendering a proper change to the passengers when they buy tickets is also a problem.
- The time taken for ticketing is comparatively more and more amount of paper is needed to print the ticket.
- So this is a tedious and time consuming task also, the conductor should also make sure that for every user he has to issue tickets.

IV. PROPOSED SYSTEM

The very need for digitalizing the fares to be easy access to the public transport system, is achieved using RFID for access into the public transport, where the user has to top up the card in the web application and when entering the transport system it will show the card number & latitude & longitude once when swiped on reader and if the user has to leave the public transport at desired station, the user has to tap the card at the exit., in this manner it will calculate the distance travelled using haversine algorithm would detect the exact fare for passengers journey. The passenger can login into his/her account once when the card is created by the Bus manager and view his travel history and he can also know where he is presently by clicking on the map in website & can also recharge their card and can also block their card when they lose it by calling to toll-free number. So these details will be available to bus manager and bus manager can also block passenger's card based on passenger's request. Passenger can call to toll-free number provided in the website homepage to block their card when they lose it. Bus manager can create passengers card and can login and can also approve the passenger's request. With MQTT implementation passengers latitude and longitude i.e., place where he is travelling in bus can also be known by passenger. The proposed RFID based tickets is of low cost, easy operation, portability, durability, reliability and being much more user friendly.

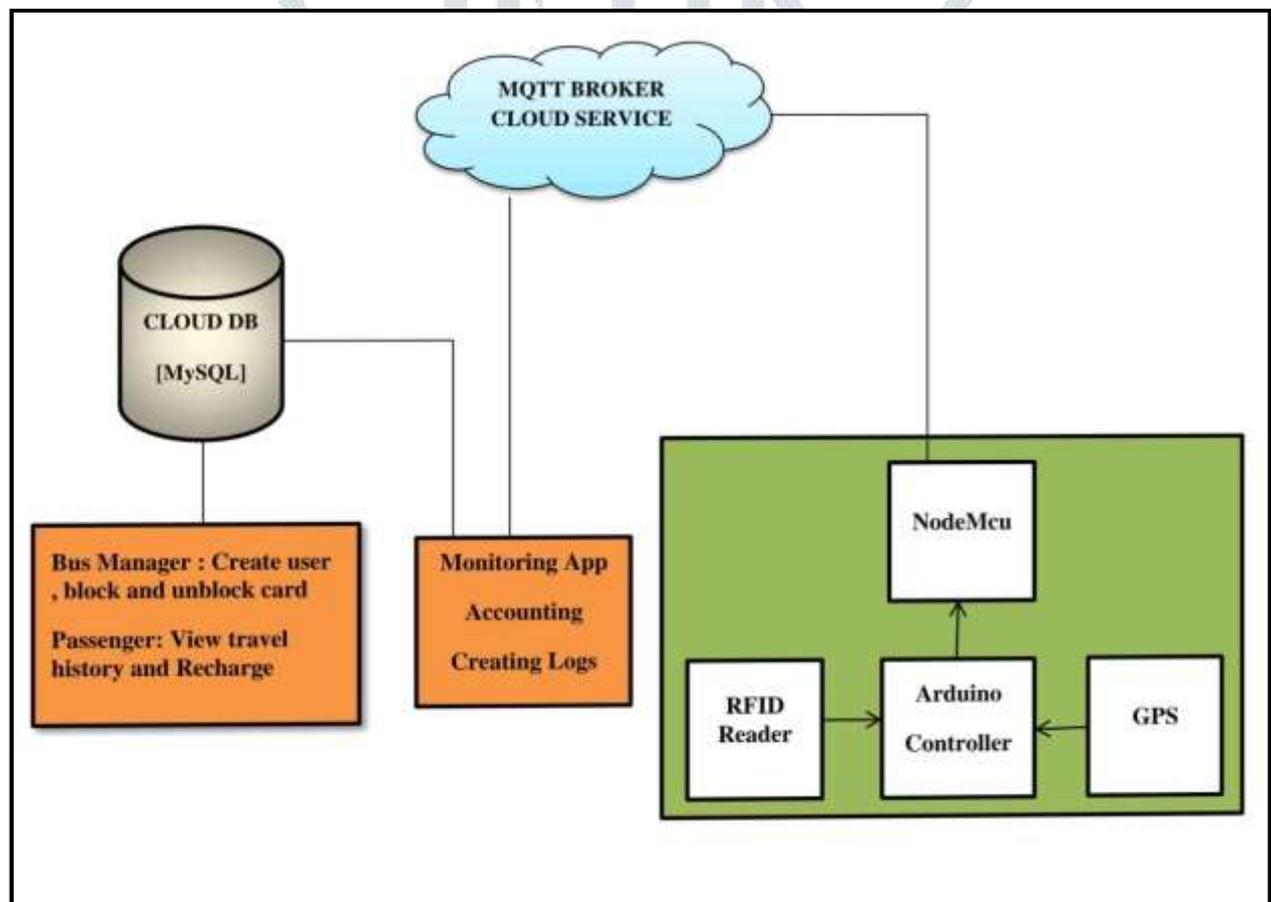


Fig 1: System Architecture of RFID based Smart Ticketing System for Public Transport System.

The Figure 1 depicts the system architecture for RFID based smart ticketing system password. It describes how the system will work with different modules i.e., nodeMCU acts as message transmitter for MQTT cloud service. MySql will act as Cloud database, i.e. monitoring web application ,accounting and creating logs.

Arduino UNO: The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with the sets of digital and the analog input/output pins that may be interfaced to various expansion boards and other circuits. The Arduino is one of the major control units to detect or alert when an accident occurs.

GPS (Global Positioning System): The GPS is used to identify the exact location of the vehicle. In case of an accident, the system determines longitude and latitude of a position of an accident through the GPS module.

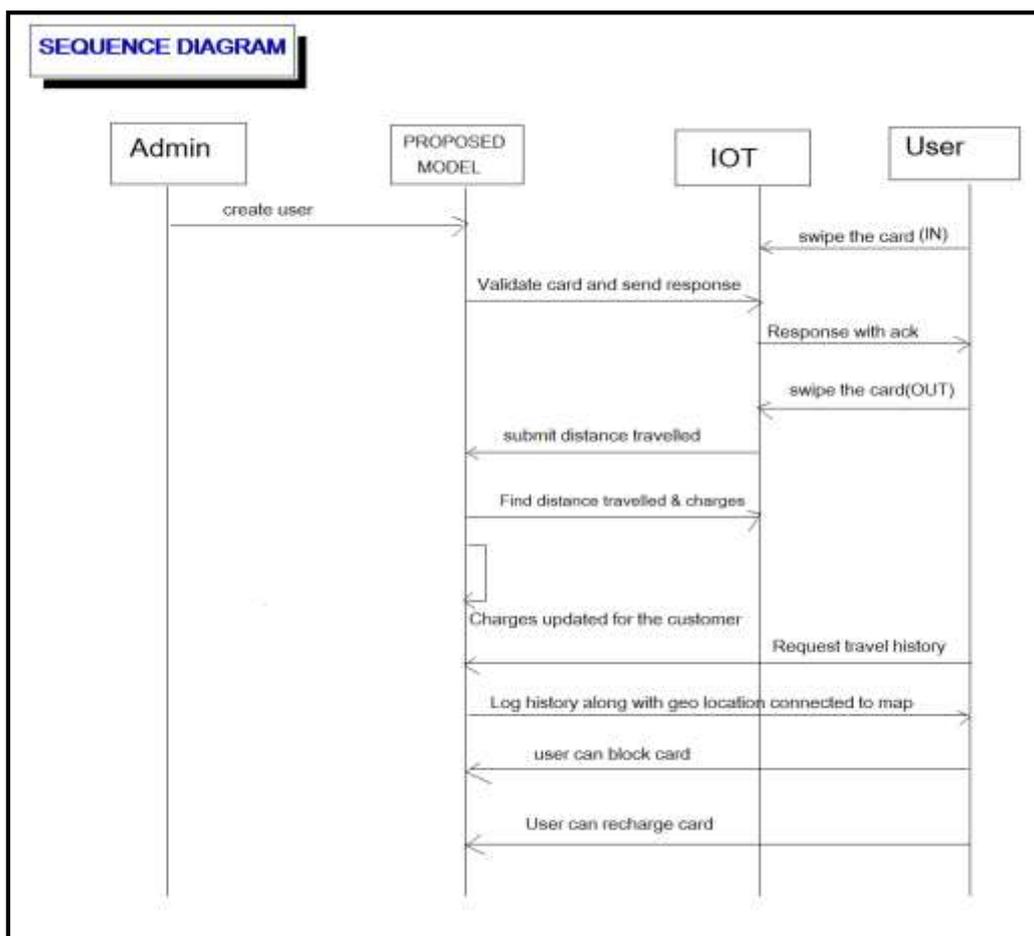


Fig 2: Sequence Diagram of RFID based Smart Ticketing System for Public Transport System.

The Figure 2 depicts the Sequence diagram for RFID Based Smart Ticketing System For Public Transport System in which it show the flow and functionalities of each module and their working like Bus manager create passenger. Validate card once it is swiped and respond on LCD display ageing when card is swiped submit the distance travelled to proposed model & find the distance travelled and charges. Passengers can view travel history in web application along with google map. Passengers can recharge the card and block their card when they loose it by calling to tool-free number.

V. RESULTS



Fig 3: Home Page

The Figure 3 shows the home page of RFID Based Smart Ticketing System For Public Transport System.



Fig 4: Login Home Page

The Figure 4 the Login page of RFID Based Smart Ticketing System For Public Transport System.



Fig 5: Bus Manager Login Page

The Figure 5 depicts the Bus Manager Login Page where Bus Manager can login into the page by entering valid login id and password.

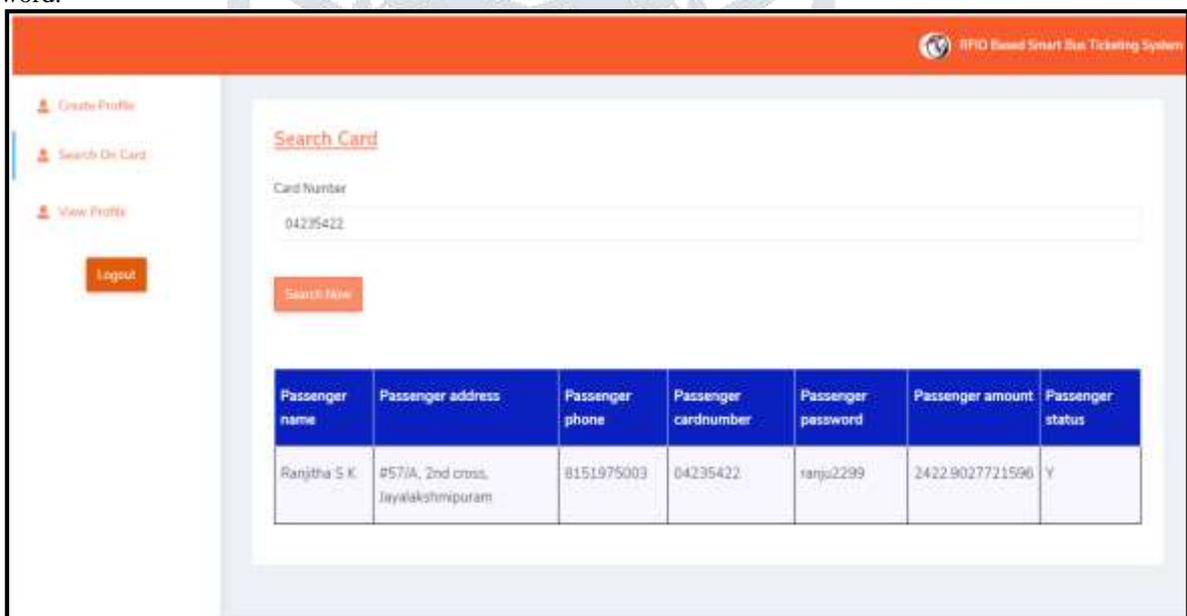


Fig 6: Bus Manager Card Search Page

The Figure 6 depicts the bank registration form where the bank has to enter the bank name, email, address, password etc.

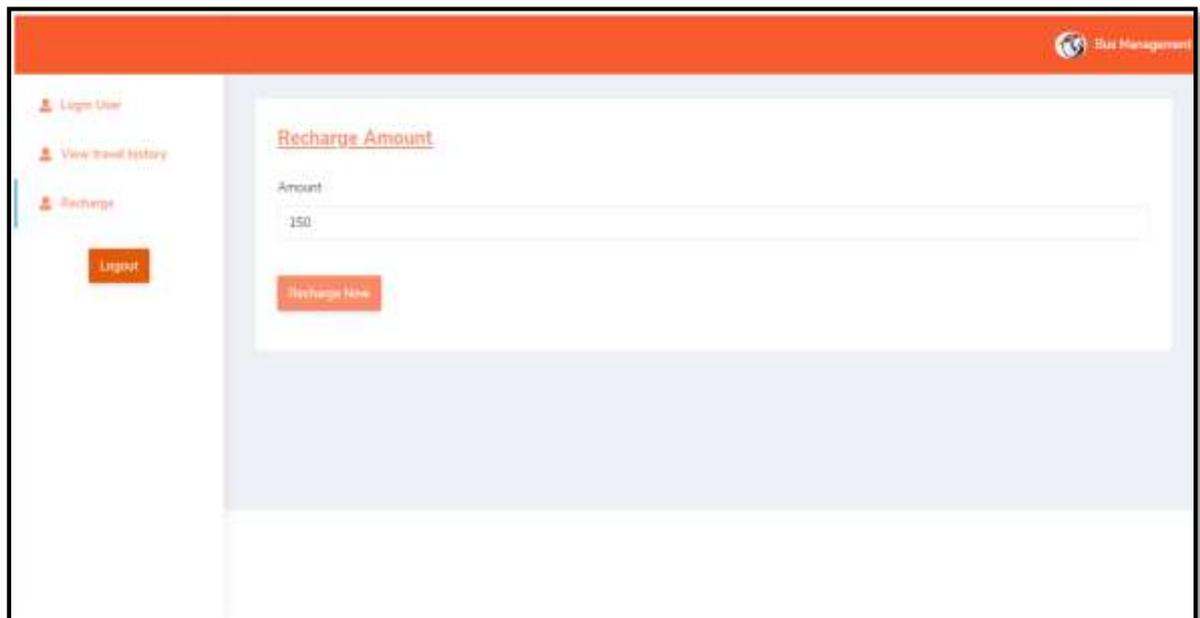


Fig 7 : Passenger Amount Recharge Page

The Figure 7 depicts the Passenger amount recharge page where passenger can recharge their card .

Date and Time	Type[IN: Getting Inside of Bus/OUT: Step Out Of Bus]	Charges	Distance	Gps/latitude
7/10/2021 5:16:26 PM	IN	0.00	0.00	Click To View Map
7/10/2021 5:17:27 PM	OUT	1.60	3.20	Click to View Map

Fig 8 : View Travel History Page

The Figure 8 depicts the travel history page of passenger and by clicking on view map option they can know where they travelled at what time and date.

VI. CONCLUSION

The system is expected to be fully automated, reliable, transparent and convenient. The whole system can also be used in vehicle on highways, their toll payment and in the railway ticketing system with small or no modification. The cards being reusable, they are much more convenient compared to the paper based ticketing system. The card also can be used to be a universal travel pass card that will allow any transportation on any route. Also the possibilities of reducing traffic jams, chaos in the bus stoppage and we can also make right travel distance payment to the passengers and tendering exact change problem can also be solved and hence solve the problem of ticketing.

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