Intelligent Bus Ticketing System

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Abstract: The public transportation in many countries is being used as a means of transport for travelling and accordingly people would prefer these public transportation to be scheduled properly .This paper suggests the use of RFID technology with embedded system to provide an improved bus ticketing system with RFID tag. The proposed system is an efficient utilization of RFID with embedded system facilitates the smart ticketing in bus. 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 is used to navigate the different routes of bus using bus number as well as source and destination address. The systems also include modules such as girls security, healthcare and emergency alerts to nearby police station or nearby hospital.

Keywords: RFID Tag, RFID Reader, LCD Keypad, Node MCU.

I. INTRODUCTION

The public transportation in many countries is being used as a means of bus transport for travelling people would prefer this public transportation to be scheduled properly. As for the RFID application, it's been a wide spread tool for both tracking the transit Bus transports and for the public ticketing system. It's already been an outstanding achievement to throughout big cities like London, china, Shanghai, USA, Istanbul, Canada, Australia, UK and many more. The system can be implemented for subways, railways and public bus services for the systematic operations in corresponding cases. In addition to inappropriate trip scheduling, the issue of ticketing also bears some passenger communication. In the Mega city like Mumbai, Delhi the conventional system of public transport is based on paper based bus tickets that ultimately lead to chaos among public, system loss, corruption and most ofall traffic jam that is responsible for a big wastage of time.

Government authority to take control or keep an notation over the whole scenario, the private sectors taking control over the public transport and auto raise in bus fare. No advance message of the initial stop and final stop of the bus are creating a lot of confusion among the passengers who travels by transport [1]. The girl's security, healthcare issues and location of current stop are also big issues for passenger. In public transport they all three factor are important poorreply of customer call, inquires, emergency of bus passengers.

The tracking and ticketing systems using RFID can be merged to solve the problems. Even though the GPS based system can be designed, we propose the RFID based Eco friendly. Tickets for its low cost provide easy operation, portability, durability, reliability and being more user and eco friendly ticket. Public carrying RFID based electronic tickets will have access to any bus service of the city only entering his current location and his destination on the keypad attached to every bus door. The data will directly be transferred to the server main database and the equivalent credit will be stored in bus account. Also every bus stop will be notifying the passengers, the departure time of the last bus of any route of travelling. This automated system will save time [2]. The systems also include modules such as girl's security, healthcare and emergency alerts to nearby police station or nearby hospital. This will be advice to take immediately action on that case and N-map which shows map and location of nearby bus stop and timing, stations etc.

II. LITERATURE SURVEY

GPS tracking in public transportation: The GPS technology is employed towards tracking and scheduling of buses system. This has been achieved in Ahmadabad city in India, where the government has developed and deployed a GPS enabled Bus Rapid Transit System (BRTS) solution to meet its transportation needs in a sustainable fashion. Introduction of the BRTS was motivated by the need for increased reliability and security with emphasis on reduced travelling times of the passenger. The tracking and scheduling of all buses on all routes is centrally controlled from an integrated control center (ICC). Apart from GPS-enabled buses, the system boasts driver assist and automation technologies along with vehicle prioritization and travelers information system. Research has also been carried out, on the use of main information systems and their acceptance, compared by the existing user acceptance theories.[1]

RFID in cashless ticketingsystem:In more to the Smarter Card facilitating quick and easy cashless ticketing system, the ability to board a bus and pay virtually hands-free is realized as the RFID enabled RF Smarter Card is detectable not only when held in hand but also when carried anywhere on the commuter's person. The commuter's transition onto the bus is made even smoother and faster as his or her ticket is expressly printed and ready for claiming as soon as he or she is successfully scanned entering through the doorway of the bus using rfid card to make ticket generate. The issued ticket reflects the commuter and card data gathered from the scan in addition to the scheduled route of the source to designation, boarded bus number, date and time of boarding. [2]

Mobile enabled bus tracking and ticketing system: Public transportation in many countries is being used as a means of transport for travelling and accordingly people would prefer these public transportations to be scheduled properly, on time and the frequency be increased for commuters to take good use of it.. Taking these aspects into consideration, an intelligent mobile bus tracking system for urban transport corporation as a case study has been proposed which enables commuters towards tracking bus of their choice and also knowing their arrival times. In addition to tracking, this system also notifies the passengers on their mobile towards topping up of credit in their RFID enabled smart tickets for travelling. [3]

Automated ticket vending system using RFID tags: Before 2013, the ticketing system was tedious. People are standing in long queues for getting tickets especially in public mode of transportation. This leads to unnecessary time wastage and energy waste. This system attempts to provide feasible solution for the problem of manual ticketing by the use of radio frequency identification tags. In the paper they have also presented the details on the architecture, integration and different design aspects of RFID based automated system.[4]

RFID based bus ticket system: The Radio Frequency Identification (RFID) card and GPS are used to make the identification of passenger and transaction very precise. The cards being reusable, they are much more affiance compared to the paper based ticket system. RFID cards are distributed among the public. The unique ID in the RFID cards is stored in a database in the internet system along with personal/private data and creates accounts for each person in system. By accessing this database, it is thus possible to identify the traveler, check his account and deduct the fare from his/her account.[5]

Conductor less bus ticket system using rfid and accident information through GSM the distance travelled by the passenger automatically using motor and u-slot sensor, and the corresponding amount is debited from RFID card. In addition to that if any kind of accident occurs, then accident information is automatically transmitted to the nearest hospital using GSM and GPS. In this system RFID tag was rechargeable one, where as it can be recharged in bus depot or nearest retail shop. Micro controlled, keypad and LCD are provided in bus depot for recharging purpose by own. [6]

RFID based ticketing for public/private transport system in bus: This system is much more public friendly and make system, automated system of ticketing as well as credit or card transaction with the use of card based ticketing in train/bus. being updated every single time the passenger travel by carrying the RFID based ticket in bus for update the system. [7]

Automatic bus fare collection system using RFID: Here, RFID card is given to each passenger or the traveler and when passenger gets into the bus of system track he has to swipe the card into the RFID reader or monitor and based on the destination point the device will automatically the fare and deduct the money. All the record will have updated automatically in the server continuously. This system overcomes all the problems faced in bus with IOT based web-page monitor system. [8]

RFID and Android based smart ticketing and destination announcement system: Standing in long queues at bus stands, quarrelling with conductors for trifle matters make the journey uncomfortable for the passengers. That is why; in this system an idea for implementing smart card technology for ticketing the passengers travelling in bus. The smart card is mainly based on latest Radio Frequency Identification (RFID) technology. For this purpose, an interface is built between RFID setup and driver's mobile phone using a specifically developed Android app "SwipeNgo". The interface helps to send passenger ID from RFID reader to the driver's mobile phone via Bluetooth. The developed "SwipeNgo" app is installed in driver's mobile phone and receives passenger ID from the RFID card reader via interface when passenger get into the bus. Along with the passenger ID, "SwipeNgo" also keep records of the stoppage name/no. into database in mapping with the Global positioning system (GPS) coordinates. The exact fare between source and destination is calculated and deducted from the balance when the passenger gets down from the bus. This information regarding balance is also sent to the RFID setup where the fare is displayed. There is a separate announcement system which alerts the passengers prior to the next halt. [9]

Public online reservation system (Website): This is the website for Maharashtra State Government. Through this website we can book the tickets from anywhere you want. We can book the tickets using any mode of banking. And if cancel the booking than we get the refund immediately, no more waiting for refunds after the cancellation. Here passengers can also earn some redeem points while booking the tickets. [10]

III.PROPOSED SYSTEM

Considering from the arrival of a bus at the bus stop, the reader will read the RFID tag attached to the front side of the bus door that is denoted as the front tag of the bus. Thus the reader will have the idea of the bus route and also the arrival time. Also the reader being connected to the main server, the data will automatically transfer to the server database of the system. All the passengers will carry a prepaid system RFID based card with them that will have a unique ID number on it. The card is rechargeable from our application or from website of the bus ticket official site. The RFID based ticket will contain some a group of data on that. The passenger trying to get on board will have to place the RFID ticket in front of the reader attached to every bus so the reader read the current location and at designation RFID put in front of reader it auto reduce amount from that card. Bus arrival identification in the bus stop by the reader or given keypad number which noted by bus driver when it reaches to designation to bus stop. Reader will detect the tag and require certain information from the passenger card. According to the route distance between initial & destination as well as considering bus number, it will calculate the ticket fare amount and deduct the credit amount from the RFID tag based ticket electronically and generate eco-friendly ticket on our mobile. The sample information stored in the database about the route distance & credit unit is shown of the server room of the bus controller. After all the travels getting on board bus stop, the bus will leave the stoppage and the reader will detect the rear tag attached to the bus driver press key in front of them so reader will start from initial stoppage. The reader will send the information to the server of controller and also to the screen show the departure time of the bus from the station in database. If an agency has a bus service that the buses come after each 20 minutes late from the screen above the waiting passenger will surely know when the last bus departed and after how long the next bus is coming on that bus stoppage. The girl's security key and healthcare key are important function of our application in which at every passengers phone using our application they will have a key in that application if travelers required any emergency service they press key and information of the location with time will send the message to immediately nearby police station or hospital. N-map is one of the best feature of our application its wok similar to the m-indicator for the train journey. Route, bus timing, alerts message, fare chart, feedback to bus service, complain box etc. show in fig 1
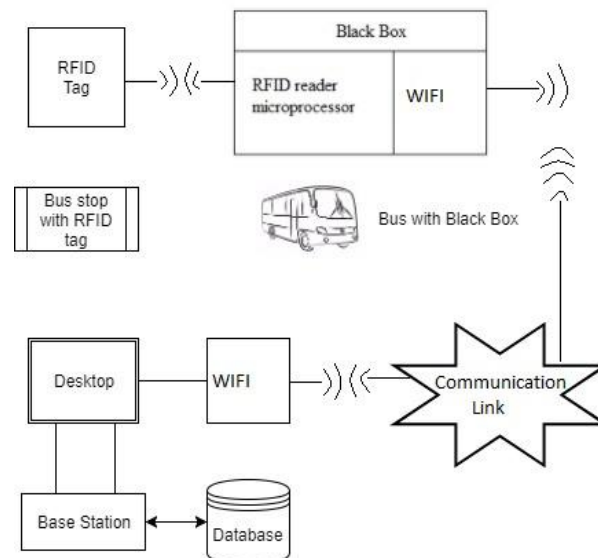

Fig 1-- System Tracking Flow

IV.   BENEFITS OVER CONVENTIONAL SYSTEM

In paper ticketing, each and every day lots of tickets are being print and sealed show that date same by the person sitting in the bus stop counter frauds with bus owners. After finish travelling, the traveler usually through away the used paper tickets here & there which ultimately pollutes the environment. Again large number of trees is being destroyed current system uses paper based ticketing and the used tickets are just wasted. But in our system the RFID tagged card carries by the passengers who travels does everything automatically done and reduces the fare and mention

complexities of ticket collection. The security of girls and healthcare are poor due to lack of misunderstanding in between current location of the bus and the passengers. Map of the buses we can't find out the nearest bus stop or current timing and next buses are coming toward that bus stop. Show on fig 2
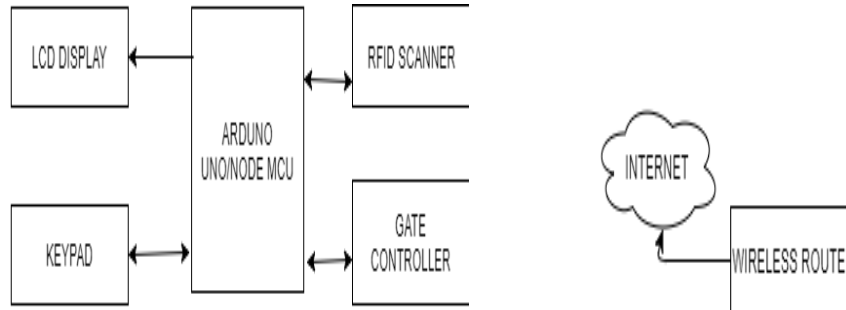

FIG 2 RFID System Component

Some more profits of RFID based ticketing system over this system (both the paper based tickets and magnetic tickets) are given below: Using automatic ticket systems RFID base enables such as transportation to save time and personal costs of tax and etc. fare amount collection can be organized much more valuable on this. These systems low maintenance costs of ticket and reduced fraud induced losses in ticket to represent further advantages. Smart tickets, RFID tickets are more difficult to duplicate than magnetic tickets, to reducing the fraud. Waves coming from readers are not harmful they are similar to those waves coming from our car radio waves [1]. In system the girl's security and healthcare are very important point. So in the system we are tracing the person location while click on button and send the notification to nearby police station or hospital coming to that range. In n-map system provides clear view of all the information which passenger required before travel and after travel. RFID offers greater data-collection capabilities. Smart tickets could combine a variety of different form so enable transit operators to provide additional services on that and customer-loyalty schemes. There will be lot of function which makes passengers very helpful throughout the bus journey. Rfid reduce the expansive and harmless journey with relevance chart and data of routes and travel. In fig 3
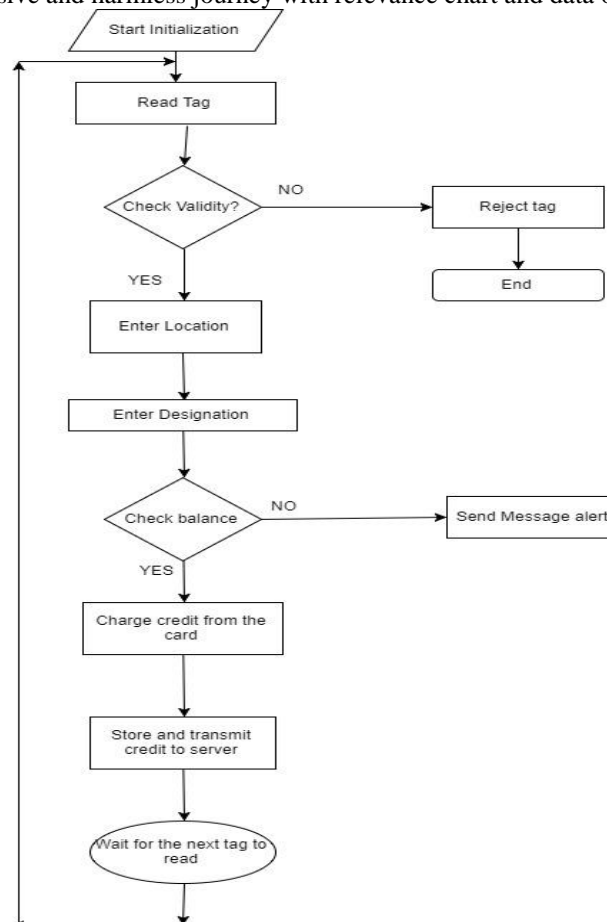

FIG 3-Typical RFID Processing

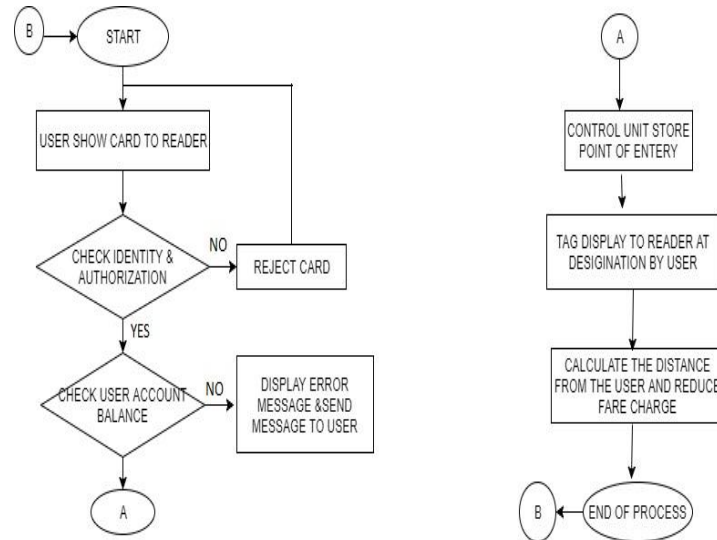## V.   DETECTION AND PROCESSING ALGORITHM

Fig 4- Flow Chart

After the tag is placed before the reader is attached to the bus door, the tag will get important information to the reader on it. An automatic tag carrier will enter the start location and end location information of the bus through the keypad when bus driver press button. The reader will accept the card if the card has required credit balance to travel that distance with that amount on it. The data required by the reader will be stored in its first memory and transferred to the main server database of the controller. After the full day, the initial internal memory of the reader will be reset for the next day of the calculation of the fare charges.
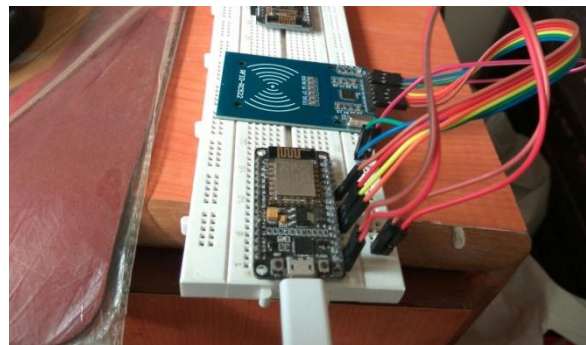
Hardware part inside the bus:
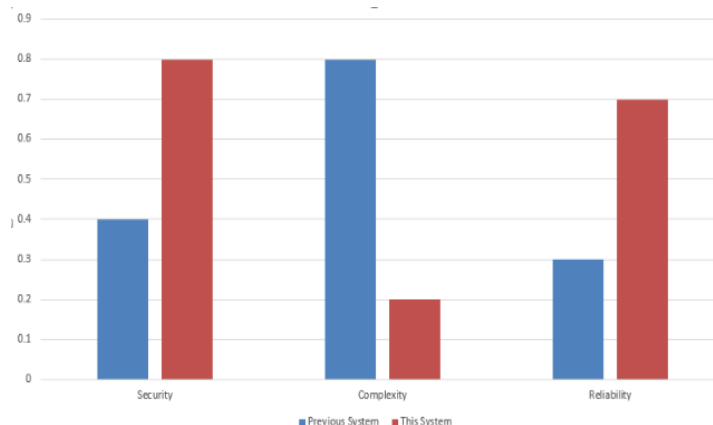

fig 5 Hardware setup component

Fig 6 Graphical Representation

VI. RESULT AND DISCUSSION

Above I have already discussed THE project topic along with its proposed system, and also we have surveyed different related kind of papers for the same. After all, this paper contains. RFID based ticketing system which stays closer to future ticketing system. It has presented a fully automated, reliable, transparent and convenient system for ticketing in public transportation system. RFID cards being reusable are much more convenient compared to the paper based ticketing. It makes human effort easy and even more convenient. Additionally we have added health care services and girls security which had brought an efficient and drastic result to our topic. Further this system will be slightly modified to obtain safe travel of any transportation system.

VII. FUTURE SCOPE

The major advantage of this system when compared to previously suggested RFID based ticketing system is that this stays closer to future ticketing system. This paper has presented a fully automated, reliable, transparent and convenient system for ticketing in public transportation system. 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. So implementation of such a system can be considered as primary step towards fully operational IoT. The program can be slightly modified to obtain safe travel of any transportation system such as Railways, school buses etc. Addition of speed controlling materials is preferable in cases of buses.

VIII. CONCLUSION

In conclusion here we have seen that there has been quite an amount of research carried out towards tracking of bus featuring with RFID and GPS technologies. Also presently in many countries around the world display system is available at bus stop to know expected time of arrival and delay if any. But with advancement of mobile technology it has been become easier for the travelers to know the near location of the bus stop. Even there are many health care providing services available and also safety security for girls, but by the application provided it will be of more comfort and secured about the health care and girls security, As their current location will be provided to the nearby police stations and family members as required and this was the major contribution of our research. Further in future it may be primary step towards fully operational IOT. It will access your own information about every journey, it will just take a second to decide or plan your journey. This system will be slightly modified to obtain safe travel of any transportation system. It also provide real time location information in internet, ensuring in time keeping of services.

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