Smart Transport Ticketing System Using IoT

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Abstract – **A Ticketing system based on RFID technology which is far better than traditional ticketing system. It works on RFID technology in which passenger have a RFID tag, which contains unique ID and related data. RFID readers placed in the vehicle detect the RFID tag when passenger gets in. Reader collects the data from the RFID tag and pass it to the Computing Device. This computing device with the help of GPS module record the location and with the help of GSM module accesses the database. After the passenger gets off the vehicle the computing device calculates the fare as per the distance travelled by the passenger and deduct the corresponding amount from the account.**

Keywords- RFID Cards, RFID Readers, GPS, GSM, Embedded Computing, Embedded Device.

1. INTRODUCTION

Every Person needs some sort of transport to reach his/her Destination and if they need transport they must take ticket for travelling. In India almost every transport system use hard tickets which are not simply waste of paper as well as time, as passenger need to contact conductor for issuing ticket, plus the paper ticket can be easily lost.

In current ticketing system there is no efficient way to check the validity of the ticket. After buying ticket person may board off the bus before or after the destination specified by him/her, in both cases there is loss to the person or the authority. Sometimes person don't even bother to buy the ticket and travel for free in the crowd.

Person need to carry hard cash for tickets and most of the people don't have change or the exact amount. This leads to wastage of time as well as argument between conductor and passenger.

Now this money change problem can be solved by using Passes. Person can pay for some time period and can travel as much as he wants in the city but again there is no efficient method to check if the validity of the pass is over or not, person may create forge pass. Many times person doesn't travel that much and cannot recover the amount he paid.

Bio-metrics and smart cards can also be used over traditional paper based ticketing system, but again they are time consuming, not completely error free and isn't user friendly Advantage of this system is that person can travel without interacting with anyone, totally hassle free travel and also passenger pays as per the distance he/she actually travelled.

Main disadvantage is that the passenger still need to interact with system which is wastage of precious time also they may get late to board the transport.

Smart cards also an alternative but each and every passenger need to swipe the smart card. As we know about the crowd in the public transports using smart card might not be a good idea and that's why smart cards aren't used that much or at over crowded cities where large portion of life are dependent on public transport.

II. LITERATURE SURVEY:

We will survey in brief in this section on the various litterateurs citing the use of RFID and agent technologies for public transportation usage. It has been expressed that passenger require to show or swipe the card to the Reader at the entrance and the exit of the bus. The idea was expressed to ensure that each and every passenger have card or not. However it should be noted that scanning one card at a time is lengthy and time consuming process and people need to be in queue for this purpose and buses can't stop at every stop for that much time. [1][8-10].

Research has also been carried out in using RFID scanners ID-1, ID-12, ID-20 for scanning RFID cards. But the problem with these RFID readers is that they scan one card at a time. In fact having 2 or more tags in the readers range will cause it to not read any tags at all. [2] There has also been research on dynamic scheduling of buses from the point of view of passenger tracking pattern, which were be noted and included in planning and scheduling the buses. The ticketing records are used to generate an estimate of occupancy in a particular bus, so that passenger can easily see the crowd in the upcoming bus. [3][5]

In another research RFID smart cards were used for the same purpose but they were only rechargeable through booths present at certain locations of the city which is not at all convenient as passenger's perspective. [4][6]

Research also looked at use of GPS for fare calculation based on distance travelled by the passenger and also were used so that commuters can check the current position of the bus on Google Maps or Android app. Commuter can also check the estimated time of arrival of the desired but at a particular bus stop and decide whether to wait for that bus or not. [5][7][8][10]

Research also focused on a conductor less bus ticketing system that uses RFID Readers and Smart cards to eliminate existing paper based ticketing system and also uses GPS for tracking current bus location. In case of any accidents current location of the bus is immediately sent to the nearest hospitals. This system might be very useful in countries like US, England etc., but in country like India removing conductors from all the buses at this much scale is not going to help. Infrared Sensors were also used in a research for keep track of the number of passengers entering in the bus and this number was compared with the number of RFID cards read by the RFID reader to check if whether people aren't travelling without RFID cards. [6]

In a research different kind of RFID module was used for the ease of visually impaired persons so that they can easily check which bus is at the stop at that time with the help of voice output to them. [8]

There has also been a Research in which passengers have to enter the location manually into the keypad after entering a bus and the ticket was generated with appropriate fare deduction from account. This is really time consuming process because for each station bus would have to stop for long time until every passenger gets an e-ticket. [9]

SYSTEM ARCHITECTURE:

Smart Transport System using RFID mainly consist of RFID Reader capable of reading RFID tag. RFID tag contains unique id used for passenger identification. Each Transport vehicle is installed with RFID Scanner along with GPS and GSM technology. A micro computing device handles RFID scanner, GPS, GSM modules. A Server is established to handle all transaction and related queries. Along with Server a passenger Database is maintained. When User scans RFID while boarding in bus

System sends data to server about this user activity and also when user scans while user boards off the bus.
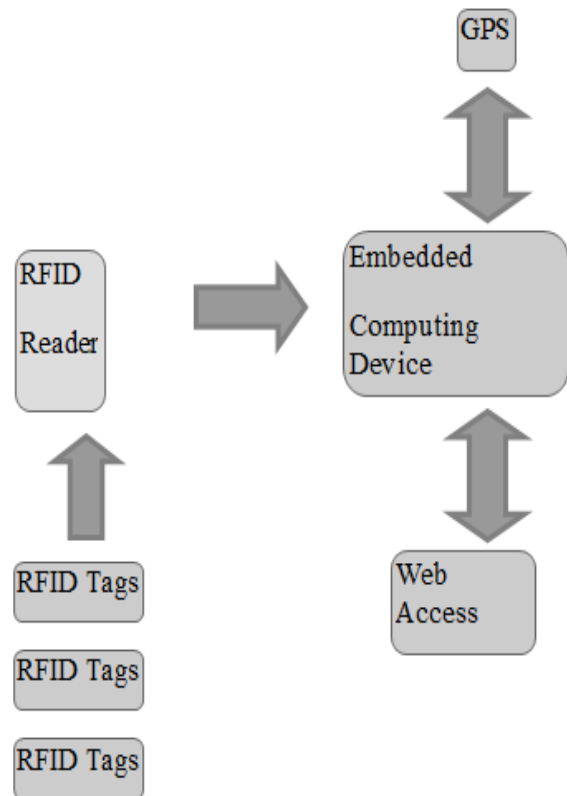

*Fig 1.Basic block diagram of the system.*

IMPLEMENTATION:

In this System user needs to be registered with system. First stage of Implementation consist Registration of users. Users will browse to the registration page and will register with valid information. By registering user now can login and access the account. Both Desktop Website and mobile application is available. System assigns a RFID card to registered user. For this user should visit the allocation center nearby. Registered users are verified and then RFID card is assigned to it. Now user can use this RFID card for traveling. Scanner in Bus will detect the RFID card and fetch the data from it. User Information, Bus Locations, Transaction histories are managed into database.
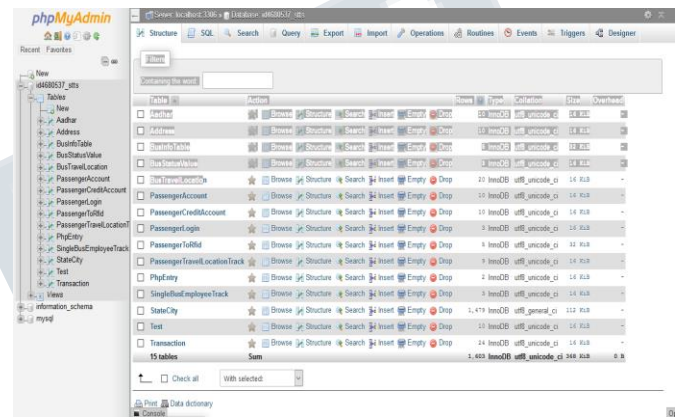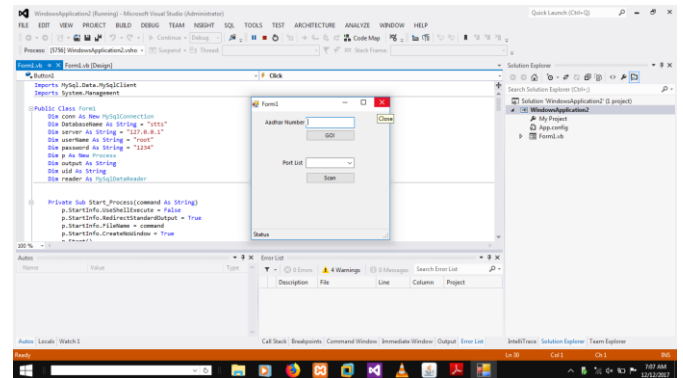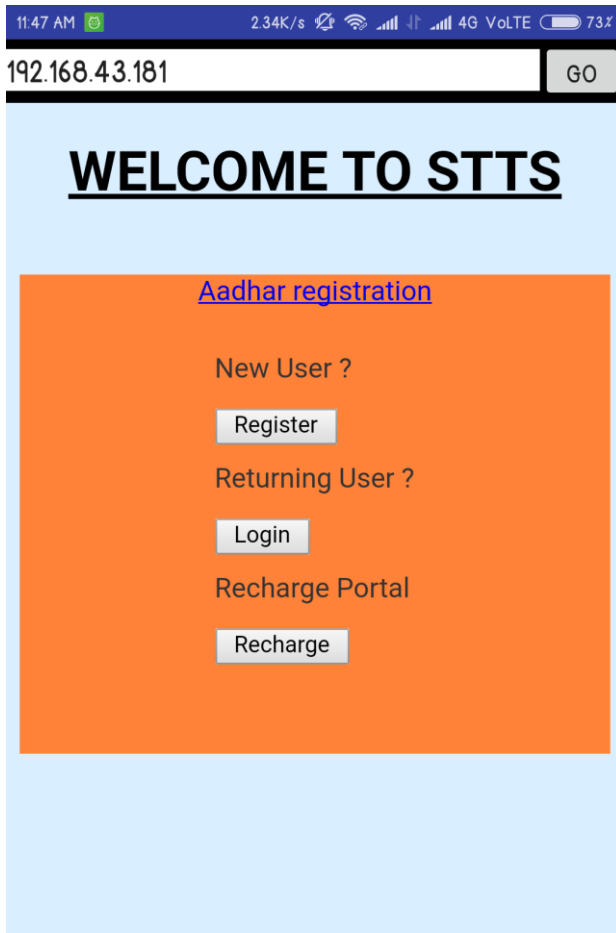
CONCLUSION AND FUTURE SCOPE:

- Existing ticketing System is inefficient and inconvenient too.
- Use of proposed system brings up many new features.
- No more use of hard cash and hence stepping towards cashless future.
- Real time tracking of buses and passenger which brings up concepts of IoT
- No more inconvenience for passenger.
- Increase in employability.
- Efficient Transport ticketing System.
- System can be used for any kind of ticketing and pass system with just few modifications.
- System expansion will lead to IoT and objects can be tracked through Internet applications.
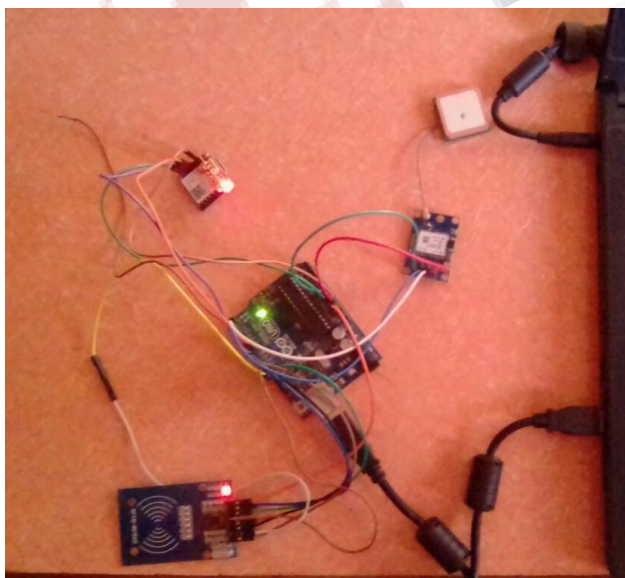
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