



SMART TRANSPORT SYSTEM USING RADIO FREQUENCY IDENTIFICATION TECHNOLOGY

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Abstract: A RFID Based System allowing passengers travel without traditional ticketing system. The system will deduct amount from traveller's account just by detecting path travelled by traveller. It will work on RFID technology in which traveller will hold RFID tag having unique ID and related data inside tag. RFID Readers are placed at vehicle end to read the tags at traveller's end. RFID Readers will catch the data from tags and will process with the help of Computing Device. This device with the help of GPS and GSM module will record location coordinates and access the network database respectively. Based on the traveller's account information Computing Device will inform Conductor / TC, who will decide action to be taken.

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

I. INTRODUCTION

Transport Systems are integral part of any city as it provides travelling medium for most of citizens. Ticket is essential for any passenger to travel to any destination which comes across the route of transport vehicle. Many of the transport system still using hard tickets i.e. paper tickets. These tickets are not handy, can be easily lost and also waste of paper. Each time passenger needs to communicate with TC or Conductor for issuing ticket as well as for checking tickets. This is total waste of time for both transport organization and passenger also.

In such transport Systems fare for a passenger is decided on the destination he travels to. Whether passenger boards off the bus before or after its original destination, he will pay the same fare as for his original destination only. So there is no efficient techniques to check whether passenger is loyal or not. Also further more there is also not efficient technique to check validity of tickets and also whether passengers have purchased ticket or not.

In paper based ticket Systems passenger needs to carry Hard Cash. This is also one of major Problem in this system. Not all passengers may have perfect amount for destination. This gives rise to problem of change. So sometimes in this situation either passenger or transport organization has to compromise.

Change problem can be solved with the Solution of Pass. Pass is way in which passengers pay first Amount for purchasing a Pass with some time (generally days) validity. Within the time passenger may travel within the city wherever he want to. But on other hand again no efficient technique is built for checking pass validity. And hence one may miss-use pass by using it beyond time of validation. Also from passenger point of view one may not recover all money he paid by using pass.

Many efforts were taken to digitize the ticketing system. Many ideas like bio-metrics, Smart cards were used to identify user uniquely and then Interactive system asks for the destination and based on fare the amount is deducted from user's account. Prerequisite for such systems are database servers, an Interactive station where user need to interact with system.

The Advantage of such system over traditional paper based system is that passenger don't need hard cash to carry any more. So passenger's journey will be hassle-less further. Also database entries are kept and hence the record of journey is maintained for future use.

Main disadvantage of these digital systems is the time required for a passenger to make a Transaction and issue his ticket. In metro cities passenger generally are in hurry to board into bus so these systems fails where time is a very important factor. Also one can misuse the system to travel more than his original destination as there in no system

to check original destination of passenger. It completely depends on honesty of passengers.

In Smart Cards based Systems passengers carry a Smart RFID Card with user data in it and at the Interaction terminal user need to show the card where a Reader will data in the card and accordingly will detect entrance of passenger into transport. Also while exiting the User need to show card to Reader so System will record its exit and will make Transaction.

Smart card system needs discipline and patience before getting a ride. So this system will fail when applied in real world, where passengers are large in number and time is low. Hence this system is not adopted by passengers as well as Transport organizations.

II. GENERIC ARCHITECTURE

RFID based transport ticketing system typically consists of RFID Readers, RFID Tags, GPS system and a Computing Device. RFID Readers read these tags and send this information about entry location to the computing device and the device saves this location. GPS continuously tracks the distance travelled by the person holding that RFID tag. After the person exits the reader detects it and the computing device gets the total distance travelled from the GPS and calculates the fare. This fare is automatically deducted from the user account

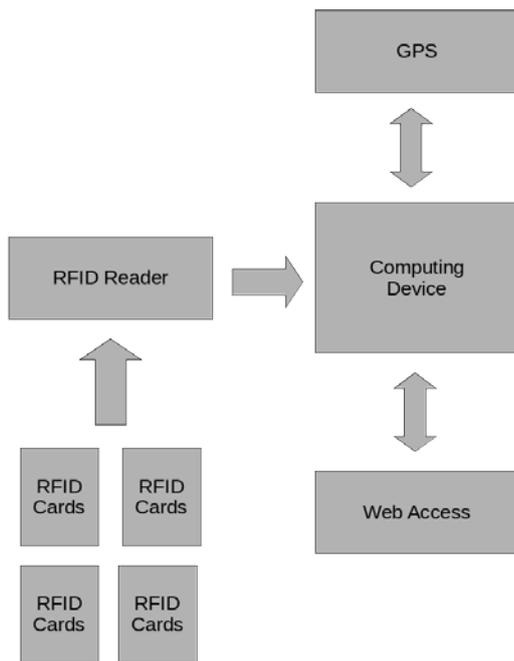


Fig 1. Basic block diagram of the system.

III. 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]

IV. TECHNICAL COMPARISON TABLE

No.	Author	Title	RFID	GPS	GSM	IR Sensor
1.	Saurabh Chatterjee, Prof. Balram Timande	Public Transport System Ticketing system using RFID and ARM Processor Perspective Mumbai bus facility B.E.S.T	✓	✗	✗	✗
2.	SB. Shriram, V.R. Sidharth, VR .Subramanian, R.Vijayaraghavan	Automated Ticket Vending System Using RFID Tags	✓	✗	✗	✗
3.	Paul Hamilton, Suresh Sankaranarayanan	Intelligent Agent Based RFID System for on Demand Bus Scheduling and Ticketing	✓	✗	✗	✗

4.	Anirban Patra, Dr. Arijit Saha	RFID Based Automated Low Cost Data Acquisition System for Public Transport	✓	✗	✗	✗
5.	Dr. Vinit Kotak, Ms. Archana Chaugule, Aakanksha Utkhede, Tushar Chemburkar, Saurabh Tendulkar	RFID-Based Bus Ticketing System	✓	✓	✓	✗
6.	T.Manikandan, PG.Kalaiyarasi, PPK.Priyadharshini PR.Priyanga	Conductor less Bus Ticketing System Using RFID and Accident Information through GPS and GSM	✓	✓	✓	✓
7.	Arun Das .S .V, K. Lingeswaran	GPS based Automated Public Transport Fare Collection Systems Based on Distance Travelled by Passenger Using Smart Card	✓	✓	✓	✗
8.	A. Oudah	RFID-BASED AUTOMATIC BUS TICKETING: FEATURES AND TRENDS	✓	✓	✓	✗
9.	Piyush Chandra, Prakhar Soni, Rakesh Kumar Keshari	RFID-based Ticketing for Public Transport System: Perspective Megacity	✓	✗	✗	✗
10.	Dr.Bos Mathew Jos, Ahammed Aslam. N, Akhil. E. P, Divya Lakshmi G, Shajla. C	RFID Based Bus Ticketing System	✓	✓	✓	✗

Table 1. Technical comparison between various proposed system

V. CONCLUSION AND FUTURE SCOPE

This presented project is fully automated, reliable, transparent and convenient system for ticketing in PTS. RFID cards being reusable are much more convenient compared to the paper based ticketing system. GPS service along with internet was used for the distance measurement and fare calculation. Database for travellers were created and accessed via internet using a USB modem. Fare is deducted from the wallet. In future this can be switched with debit or credit card so that fare can be directly deducted from bank account. Powerful program algorithm can make system to publish real time location data in internet, ensuring time keeping of services.

VI. REFERENCES

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