Smart Traveller System For Easy Bus Ticketing-Tracking & Passenger Counting

Smart Realtime Traveller

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Abstract- *Wireless sensor networks have quality to provide remote monitoring capabilities that can benefit in controlling crowd, bus monitoring, and ticketing. Radio Frequency Identification is one of the exciting technologies that effectively improves the working practices by increasing efficiencies. It is often presented as a replacement for today's barcode system, but the technology have much greater possibilities, such as unique serial numbers for each items, and the possibility to read these numbers at a distance of several metres. They are easy to deploy than wired solution and these networks enables improved understanding of processes and environments through continual monitoring of a larger set of parameters. In this project the evolution of wireless sensor networks has been shown, using RFID,ultrasonic range finder techniques implementation in bus tracking,passengers.within the coming years, low cost RFID systems are expected to become commonplace throughout the Business -to- Consumer marketplace.*

Keywords- component; formatting; style; styling; insert

I. INTRODUCTION

The project smart traveller mainly deals with identification of vehicles and ticketing the passengers using these vehicles. The project is effectuate with the help of Radio Frequency

Identification (RFID) and Ultrasonic range finder Technology. The major area of implementation of our project is for ticketing bus passengers electronically and obtain identification of buses.On implementation these will fetch added features like speed in transaction, cost efficiency. Another feature will be the accuracy in data recorded. Human errors will be rectified thereby enhancing the efficiency of the system. These systems of manual entry and calculation can be removed and these method can be adopted to bring into action a more efficient system.This Smart traveller application identifies a particular vehicle by the RFID tag fixed on them and it will also count number of passengers entering in bus. In case of passenger getting down the bus is identified and ticketed on the basis of ID card they posses. The system could be effectively established for all the vehicles and passengers therefore a complete digital network could be established with the least of its possible errors. The tags are cost efficient and the complete setup once installed can work without any particular attention. These area of application of RFID is very wide and the technology has proved its value. Thus the implementation and practice of a digital system would always be worthy.

II. LITERATURE REVIEW

Previously There were many projects carried out related to the automated bus ticketing system using RFID and case studies has been done related to issues in PTS. Some are enlisted here. Foisal Mahedi Hasan portrays about the public transport ticketing system(PTTS) ,prevailing in the megacity Dhaka (Bangladesh) which introduces severe mal-function in the system,argument among public, corruption and most of all traffic jam. This paper actually suggests a much more public friendly, automated system of ticketing as well as the credit transaction with the use of RFID based tickets.Saurabh Chatterjee suggested that the traffic controlling system which detects a vehicle using the RFID tag attached to the vehicle and as soon as the vehicle passes by a reader, this process would lead to identification of each vehicle reducing traffic malfunction and also reducing security problems.Varun Krishna K.G et.al primarily suggests the use of RFID technology to provide an improved automatic ticketing system(ATS).we can use cyclometer which can be coupled to the wheel(s) of the bus to measure the accurate distance travelled by the user..So here we used GPS system for calculating distance. Applications of RFID technology in IoT are discussed by Xiaolin Jia. Advantages of using RFID for mobile data analysis have been verified by ZalzalaA.. This gives idea of using RFID technology in PTS.From, we get the idea about the use of Raspberry Pi mini-computer instead of PC computer in measurement systems.Advantages and application of Raspberry Pi mini-computer are discussed in this paper.

III. PROPOSED SYSTEM

A. Introduction

Now-a-days, due to growing world & importance of the time in day to day life there is need of effortless transport. So we are also providing an Android application which will provide the all system information of vehicle tracking and monitoring. It also provides the feature of density measure for the user convenience and nearest bus available on the route and will make the user up to date as bus moves

The location of the bus can be observed continuously using GPS system. The GPS satellites transmit signals to a GPS receiver. These receivers statically receive signals. GPS satellite transmits data that indicates the location and current time of the vehicle.

The Smart Card provides authentication, identification, application processing along with data storage. Every passenger will carry the smart card. The Smart Card holds information of the user such as available balance, identification number, user's information. These smart cards are capable of recharge. By integrating both GPS technology and smart cards we are going to design a whole bus ticketing system.

Whenever the passengers will enter in the bus he/she will be asked by the conductor whether he/she wants to buy ticket by using smart card or money. If smart card, then the conductor will swipe smart card. Then validity and of smart card will be checked with server and then the ticket will be issued. According to Source and destination the distance covered by passenger is get calculated and according to that bus fare amount will be reduced from smart card. The smart cards will also useful for conductor for fast issuing the tickets to the passengers.

B. Architecture

Architecture of GPS supported city bus tracking & Smart ticketing system includes

1. Architecture of Bus Tracking System
2. Architecture of Bus Ticketing System
3. Architecture of Passenger Counting System

Following figure1 shows the architecture of Bus tracking system:

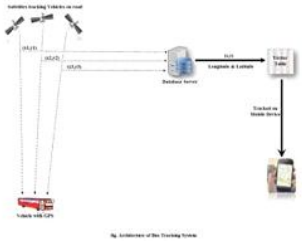


Figure 1: Architecture of bus tracking system

The fig.1 shows the tracking system architecture, which defines the intercommunication among these components. The basic level components include server, databases, and communication networks along with satellite. User application is android based application which will include the GPS tracker, crowd measure algorithm. The general information feed is given by the user application which will send to the server for further operation. The general feed may include the current location, destination location, timing, etc. In fig.1 the Server includes the database containing the vector table of location name and it's coordinates along with the number of buses available at that location at a specific time. It also include the database of the Smart Card which holds the basic information of the user along with the balance just same as the credit card. This database on the server automatically updates using GSM. The current location coordinates are directly taken by the application and search for the nearest bus. If the nearest bus is crowded then it again performs the search current location. operation to locate the next available bus with its time and

Following figure2 shows the architecture of Bus ticketing system:

Figure 2: Architecture of city bus ticketing system

Fig.2 shows the proposed ticketing system which consists of different parts like smart card, GPRS, palm tech machine, severs at the main station.

When the person is going to enter in the bus, he/she is going to choose the way to buying ticket like by cash or by smart card. If by smart card, the smart card is going to be swap by the conductor, the data related to customer along with his/her present route will be track down and as per the station associated with the route the ticket amount will be withdrawn from the smart card.

There is data, account storage capacity along with it. We can carry out the financial activity through it. The entire data will be stored on the server database which is located at the main station in the city. The entire database of will be centralized at head office server for the storage.

Following figure2 shows the architecture of Bus ticketing system

Algorithm:

Step 1: Traveller scan Rfid card while boarding on bus

Step 2: If (Traveller card is Valid):
Goto Step 4 Else: Go to step 5

Step 3: Alert for invalid user and notify Conductore

Step 4: Get the user data(card no) and Gps position and send it conductore app

Step 5: check for available balance in Traveller account

Step 6: if (Traveller account have low balance):
conductore will collect manual fare otherwise traveler can recharge his account from Coductore
Else :
Traveler confirm by conductore

Step 7: While Getting down Traveller will scan card at Exit

Step 8: Calculate distance

Step 9: collect fare according distance travelled by traveler

Step 10: Notify traveler about deduction of travelling fare

Step 11: End For Ticketing:-

Algorithm . Bus Ticketing System

Input:
Δ, N, $
Output: Issued ticket

Problem Statement: To issue the ticket of desired destination

location via Δ or $

for p = 1 to N do

//loop will iterate for all passengers (p) from 1 to No. of passengers N

If Pm == $ then

Issue ticket by taking cash amount of desired location

If change_remain == true then
Insert remaining amount to Δ
Return;
End
if
End if
If Pm == Δ then
// the case when passenger doesn't go for $

Swipe the Δ

If Δ == valid then

Display passenger details

If Balance > 50 then

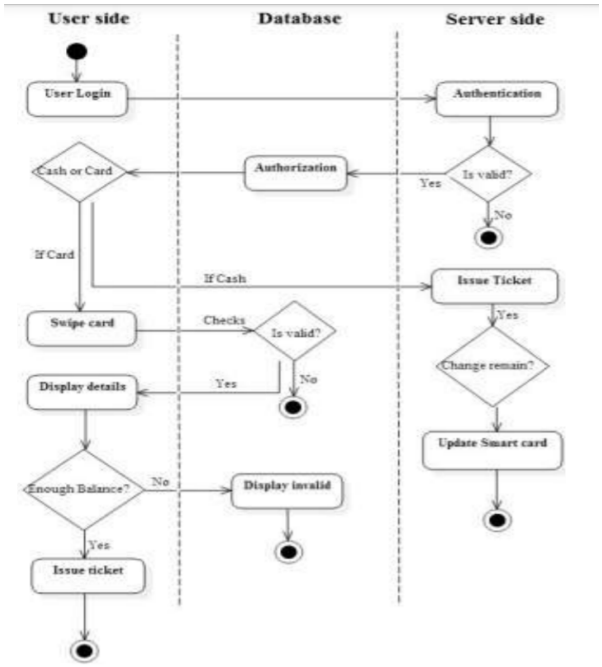
Issue Ticket of Desired Location

End if

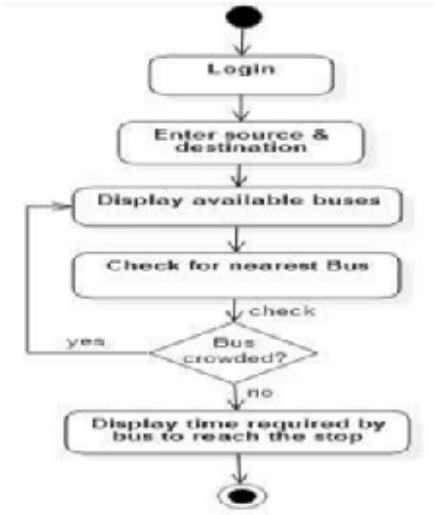
End if
End if
End for
Return passenger_count

C. Activity Diagrams

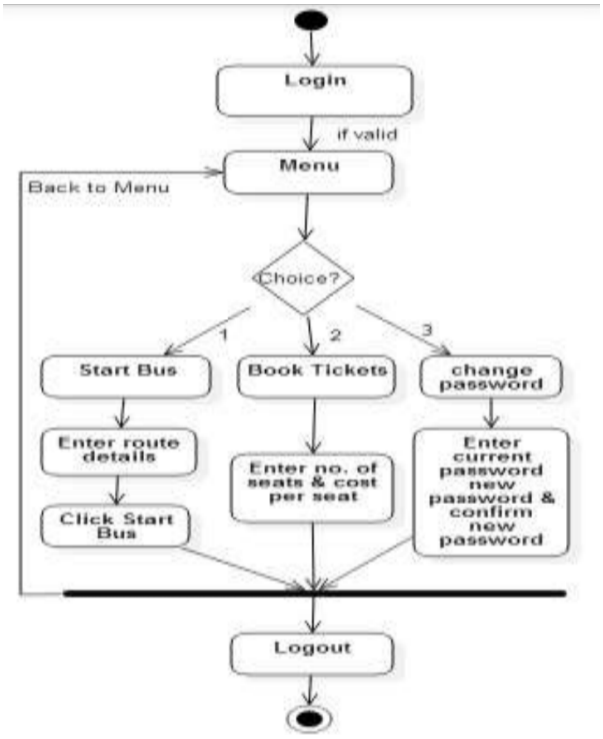
Bus Ticketing System:



Bus Tracking (User):



Bus tracking (admin):



D. Mathematical Model

• Input :

- Smart Traveler RFID Card Scanning
- User choice selection of App Feature
- Login Information

• Output :

- Display Request
- Processing Card Data and provide notification
- Connect to Server and showing the result

• Mathematical Formulation :

Let the M I the universal state which contains,

M = Q, S, F, Q1, QF Where,

Q = No. of States Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9

Q1 = Initial State

S = Success State

F = Finish State Where,

Q1 = Start

Q2 = user Scan RFID Card Using the Reader placed within entry door of bus automatically.

Q3 = Entry reader validates card if valid goto state Q4 else Q5.

Q4 = if user has minimum card balance then goto Q6 else Q5

Q5 = invalid card, no minimum RFID balance info is send to conductor for manual fare collection.

Q6 = User travelling session is created and their start location is noted and info is send to conductor

Q7 = At destination user Scan RFID at exit gate reader

Q8 = if valid scan user destination location is noted, fare is calculated, money is deducted from user account and info is send to conductor and fare deduction notification is send to user.

Q9 = End

IV. CONCLUSION

Bus tracking & ticketing system is very useful and important mainly in cities. This system has many advantages like easy to use, wide area range, easy to implement in vehicles, more effective, huge capacity etc. This system was made of a tracking module containing GPS-GSM model to access dynamic vehicle location and send it to server. Then people can access this information from their android mobile phones. Smart card based ticketing is also a very convenient option for traveling in bus. With the help of this facility, people can do moneyless traveling, which is secure one

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