RFID based Smart Bus using Embedded System

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Abstract: **In this paper, RFID based ticketing system aims at providing comfort, tension free and easy way of travelling and also to reduce the man power. In this automated system, we replace the traditional ticket system by smart card that contains all details of the user including bank account information. This is similar to the ATM card. If the people confirm to go in certain bus, by using smart card the person can receive the tickets employing RFID technique and by showing the ticket in front of the bus the door opens automatically and after some predetermined seconds it gets closed. By using LCD display we can be know about the count of passengers inside the bus and free spaces. If the passengers count exceeding the limit, bus can't be move from that place. Voice talking GPS proposed in the transport make the passenger to identify their departing location.**

Keywords: RFID reader, GPS, LCD and PIC Microcontroller

1. INTRODUCTION

Ticket friend solution mainly proposed to overcome the tricky problems in traditional ticketing method like transferring tickets from one person to another, sharing of tickets, to avoid confrontation. Ticket friendly machine holds the details about the events provided by promoters, so that consumer can purchase tickets in their personal account using smartcards, Time and money are precious every time we strive to find best way to avoid issues likewise. When it come to travel by the bus without carrying change, this proposed technique need only one identification card.Once if the passenger insert the smart card to ticket friend machine the RFID reader in smart card contains pay mode terms, which check for the amount in the account. This payment system automatically recharges all pre-issued card with the amount preferred by the authorized person and also when the person used to scan the card. After receiving details from RFID transmits the data of transport facilities through huge display. Real time us information system (RTBIS) may also employed in this system that uses satellite technology to predict the time of bus which will arrive at a stop. can be get from electronic displays at bus station and stops. The data's related to bus routes along with bus fares and seats available in the bus will be displayed on the display of the machine make the passenger to choose or book the tickets with more care.

Here the counter is employed to count the seats entering into the bus along with this alcoholic sensing system is provided to ensure safer journey. Once the destination place is reached, that is intimated to the passenger through voice command from GPS system provided in the bus. One of the benefits of portable navigation system is voice guided directions and if we get into the bus GPS that has text to speech functionality, meaning the system will speak actual street names that may be useful to uneducated and blind peoples even better.The system comprises of two IR Transmitter-Receiver pairs, one of which is located in front of the door. The other pair is located back door. Whenever a person tries to enter into the bus, the receiver of first IR pair identifies the person and pre programmed controller used to show the availability in the bus. If the passenger count exceeds the count bus can't be move from that place.

2. LITERATURE SURVEY

Ben Ammar Hatem, *et al*the paper titled as" Bus Management System Using RFID In WSN" which describes a novel approach to integrate RFID (Radio Frequency Identification) in WSN (Wireless sensor network). WSN is used to support RFID identification process by extending the read range of an RFID system. Besides, by the use of the WSN we can monitor the environment of an object and optimize RFID reader's performance and energy. Then methodology to integrate RFID technology, wireless sensor network to form an intelligent bus tracking application is studied. The proposed system can monitor bus traffic inside spacious bus stations, and can inform administrators whether the bus is arriving on time, early or late. This information is then displayed on the different wireless displays inside and outside the bus station.

Md. Foisal Mahedi Hasan, *et al* the paper titled as" RFID-based Ticketing for Public Transport System: Perspective Mega city Dhaka", which portrays about The public transport ticketing system, prevailing in the megacity Dhaka (Bangladesh),introduces severe malfunction in the system, malicious 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. The total system mainly acts to bring out the consistency among various bus agencies that will conclude in uniform access of passengers in daily rides through an automated server being updated every single time the passengers travel by carrying the RFID based tickets.

Ameer H. Morad,*et al* the paper is titled as" GPS Talking For Blind People",In this paper, a device is designed to help the blind people to navigate the environment without asking any one. The device based on GPS (Global Positioning System), the raw data for location coordinate where the blind people stands is detected by GPS receiver, processing these data by PIC microcontroller to calculate real coordinate related with current position, then translate it to specific voice message which are presorted in voice recorder and the blind person hears voice message through the headset. Our design aims are to produce device that is more cheap by using little number of components and easy to use so that the blind person need not to do any thing just hearing the voice message. The device be practically tested by some blind people who are members of Abdallah Bin Maktoom blinds school in Jordan, they gives good opinion about device.

Dhruba Ningombam, *et al the paper is titled as* " An Intelligent Voice Enabled Distance to Empty and navigation System" ,which describes about the Recent years have witnessed a fast growth in automobile sector, leading to increased urge for an intelligent man machine interaction system for navigation. This paper describes the development and implementation of an intelligent speech agent based navigation system and distance to empty (DTE) calculation for autonomous land vehicle applications. This system, initially determines the current location using Global Positioning System (GPS). The GPS outputs NMEA (National Marine Electronics association)sentence that contains information about current location including longitude and latitude. The input to the system i.e. the desired destination is through voice command and outputs the following-(i) the road distance and the amount of fuel required, through speech, (ii)the altitude difference between the current location and the destination, which is further used to calculate the mileage variation with altitude and (iii)displays the route from the current location to the destination on a map along with the prediction whether the user will be able to reach the desired destination with fuel left in the automobile, how much distance it can travel with the remaining fuel and how much additional fuel is required to be filled up to reach the destination.

Karin Siebenhadl *et. al* this paper titled as "A User- Centred Design Approach to Self-Service Ticket Vending Machines" describes about the, self-service ticket vending machines (TVMs) have become an important distribution channel in the public transport sector, progressively replacing the traditional ticket counter. In a public transport setting, where ticket counter closures have left different groups of people dependent on TVM to meet their mobility needs, a single, effective system is required. Research questions: (1) Which barriers do currently hinder the usage of TVM? (2) Which requirements should a barrier-free TVM full fill? (3) How can we design a new self service TVM for a nationwide public railway company? (4) How can we ensure that the usability and user experience (UX) is high for all users, especially for those with low levels of technological affinity? Situating the case: Most other studies on the use and usability of TVMs were conducted as post-hoc evaluations. In contrast, our case study presents a user centred design (UCD) approach that takes the needs of the different target groups into account throughout the whole development process.

3. OBJECTIVE

Main objective of this project is to provide automation in the ticket system for the transport sector. This project provides concept of e-currency and it reduces the human effort. Interacting with the initial ideas and sculptures of the databases involved in the past this project faces serious troubles when used without RFID cards. So, this RFID cards plays a visionary role of highlighting the vital storage of data elements. Thus, getting the perspective of the idea behind mutual computation of interlinking databases with the radio frequency card would enable a great contribution towards service based computing. Enriching formats, extended connections, everlasting working phase algorithms are all made easy. On the brink of a glorious environment of interconnected personal computers and standalone operators, This multi-frame architecture using system booms the virtue of great interoperability among its software components. One side faces extensive computation and data links while the other side sustains the equity between the devices. The relationship model proposed in this project maintains the integrity of the resources along with its scalable nature of quality assurance and quality of service best suited for every business applications related software. Any system of theoretically denoted and practically implemented data sharing modules will be benefitted by the objective listed for this project.

The aim of this project is to implement an intelligent smart card system to automate the transport ticketing system (E-Transport) for public transport. To implement this smart card system RFID technology is used. Using this smart card any one can travel in the public transport like Bus, train etc without buying tickets. RFID technology is used to automatically detect the smart card and the distance travelled by the passenger. Based on the distance travelled the transport charges will be deducted from their account. It is like our mobile phone system wherein we can top up our mobile any time we want and when it is in use the amount will be deducted based on the usage time. Same concept is implemented here. This smart card can be topped up using the internet. When we travel instead of carrying money, we can use this smart card. By TOUCH ON and TOUCH OFF the RFID reader the status of the card will be known to the user. This smart card is nothing but RFID tags.

4. SYSTEM DESCRIPTION

Radio Frequency Identification (RFID) is a generic term for technologies that use radio waves to automatically identify and track product, animal, or person by means of using RFID tags that are applied or incorporated on them. An RFID system consists of a tag, basically a microchip with an antenna. RFID uses RF to identify "tagged" items. This data is then collected and transmitted to a host system using an RF Reader. The data transmitted by the tag may provide identification or location information, or specifics about the product tagged, such as price, color, date of purchase, etc." For the purpose of Bus Identification, the tags are embedded into the bus. Each bus will have two tags: one is at front and other is at rear. The front tag will inform the reader about its arrival to the bus stop whereas the rear one informs its departure. Each bus will also have a reader that is connected to the main server for charging of ticket fare from the passengers through a keypad attached with the reader on which the passengers give the information of their departure & destination locations. The reader sends the electromagnetic waves

to the tag. The tags draw the power from this wave and return back the bus information, which are stored in its memory to reader. The readers again demodulate this wave and convert it as a digital data.

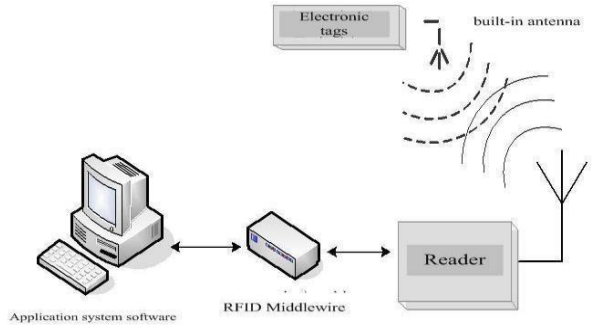


Figure 1. Typical RFID system components

For the purpose of Ticketing, the operational feature of the cards is almost the same but here the tags are attached to special cards carried by the passengers and the reader collects the detail from them. By using RFID technology in ticketing system, allowing passengers to "tag on" and "tag off" and be charged automatically, according to how many zones they have travelled.

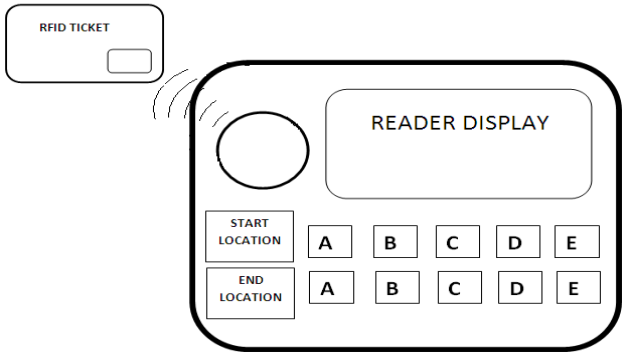


Figure 2. Reader with keypad for selecting location attached to each bus

Programmed PIC16F877A MICROCONTROLLER used to monitor the count of passengers in the bus and also visible this information through LCD. If count of passengers exceeds the limit, Bus Can't be move from that starting point.

5. HARDWARE DISCRIPTION

Once if the passenger inserts the smart card to the ticket friendly machine the RFID reader reads the user account. This happens only after the destination place is chosen by the passengers through the huge display. IR Sensor pair is placed on the steps of the bus which is used to know the passengers incoming and out going. After this RFID reader in smart card pay mode transfers to the bank. At first glance, the problem of finding the fastest route that travels through a subset of nodes in a graph might be solved in two steps. First, the best paths between every two nodes in the subset is calculated. Then, a graph with only those nodes is formed and the best route found. However, the large number of nodes in a network limits the applicability of most theoretical approaches to the case of a PTN. So another solution had to be found that enables the calculation of the all pairs shortest paths in real time. We took an hierarchical approach, as is suggested in, which enables optimal shortest paths to be calculated in real time. The stations of the PTN are nodes in a weighted graph, with edges representing the possible connections between them whose weight is the travel time. The points of interest are also mapped as nodes in the graph, connected to station nodes and between them by edges whose weight is the corresponding walking time. Average travel times between nodes (stations) of the PTN were obtained from the PTN. Walking times between geographically indexed nodes were supplied by an external entity, e. g. Google Maps API in our case. Average waiting times for each transport connection were calculated from amount of transports and their frequencies between every two nodes.

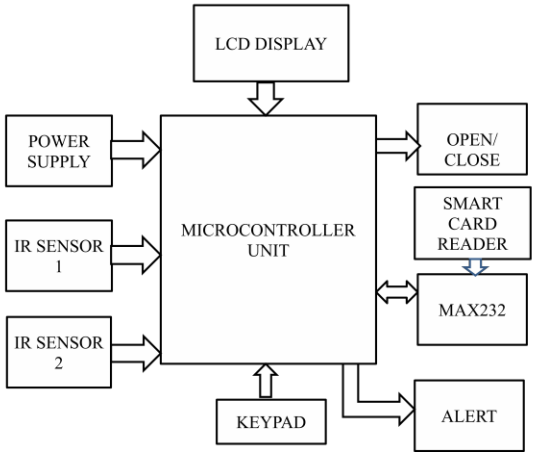


Fig.3. Block Diagram For Automatic Ticket Vending Machine

This payment system recharges all pre issued card with preferred by the authorized person once when user scans his smartcard. Further it transfer the data to GSM which transfers the data to the promoters account and also transfers the information related to seating arrangement and billing receipt. The entire system is controlled by PIC microcontroller. For that controller is pre- programmed to do the operations simultaneously.

5.1. RFID Readers

High frequency RFID readers are installed above the roads prior to every traffic light system in all directions in such a manner that the entire area comes under the range of RFID reader.

5.2. UART Communication

Serial data communication uses two methods, asynchronous and synchronous. The synchronous method transfers a block of data (characters) at a time while the asynchronous transfers a single byte at a time. It is possible to write software to use either of these methods, but the programs can be tedious and long. For this reason, there are special IC chips made by many manufacturers for serial data transfer communications. These chips are commonly referred to as UART (Universal Asynchronous Receiver-Transmitter) and USART (Universal Synchronous- Asynchronous Receiver-Transmitter). The ARM chip has a built- in UART.

5.3. Data transfer rate

The rate of data transfer in serial data communication is stated in bps (bits per second). Another widely used terminology for bps is baud rate. The baud rate used in this DHLS for data transmission is 9600.

5.4. RS232

standards RS232 is the most widely used serial I/O interfacing standard. This standard is used in PCs and numerous types of equipment. However, since the standard was set long before the advent of the TTL logic family, its input and output voltage levels are not TTL compatible. In RS232, a 1 is represented by -3 to - 25V, while a 0 bit is +3 to +25V, making -3 to +3 undefined. For this reason, to connect any RS232 to a microcontroller system we must use voltage converters such as MAX232 to convert the TTL The LCD's are lightweight with logic levels to the RS232 voltage level, and vice versa IC chips are commonly referred to as line drivers.

5.5. Transmitting and receiving

Full duplex or simultaneous two-way Operation is not possible with these modules. If transmit and receive module are in close proximity and data is sent to a remote receive module while attempting to simultaneously receive data from a remote transmit module, the receiver will be overloaded by its close proximity transmitter. This will happen even if encoders and decoders are used with different address settings for each transmitter and receiver pair. If two way communications is required, only half duplex operation is allowed.

5.6. Max232

MAX232 is compatible with RS-232 standard, have dual transceiver. Each receiver converts TIA/EIA-232-E levels into TTL/CMOS levels. Each driver converts TTL/CMOS levels into TIA/EIA-232-E levels. The MAX3232 is characterized for operation from -40°C to +85°C for all packages.MAX3232 is purposed for application in high-performance information processing systems and control devices of wide application.

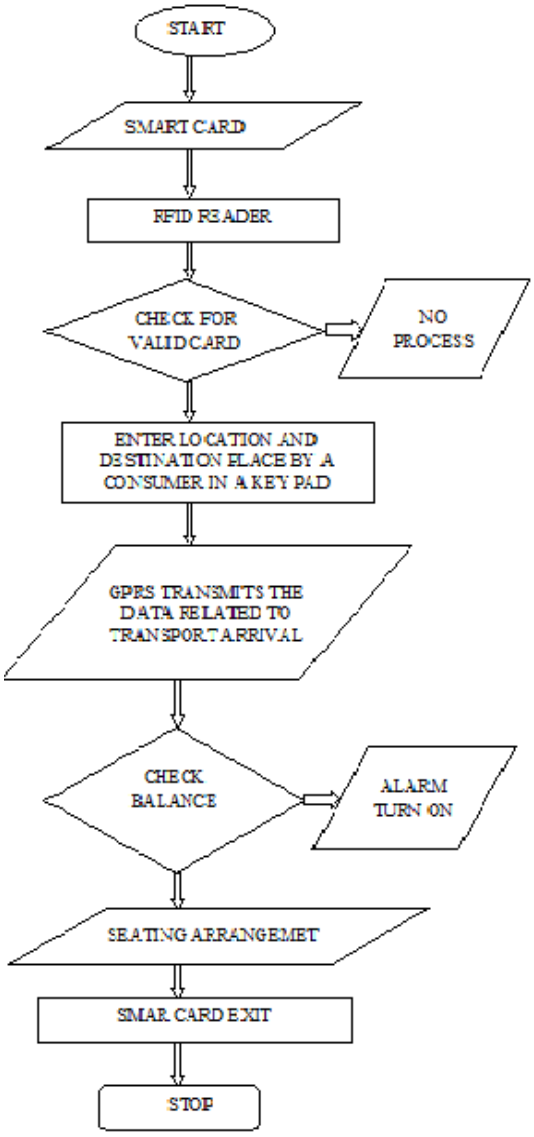
5.7. Lcd Display

LCD MODULE (2X 16 CHARACTERS)Dot matrix LCD modules is used for display the parameters and fault condition.16 characters 2 lines display is used. It has controller which interface data's and LCD panel. Liquid crystal displays (LCD's) have materials, which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. One each polarizer's are pasted outside the two glass panels. These polarizer's would rotate the light rays passing through them to a definite angle, in a particular direction When the LCD is in the off state, light rays are rotated by the two polarizes and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned on a specific direction. The light rays passing through the LCD would be rotated by the polarizes, which would result inactivating /highlighting the desired characters.

only a few millimeters thickness. since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations .The LCD's don't generate light is needed to read the display. By using backlighting, reading is possible in the dark

.The LCD's have long life and a wide operating temperature range. One of the most popular output devices for embedded electronics is LCD. The LCD interface has become very simple. This is due to the availability modules for LCDs. The LCD along with necessary controller (LCD Controller) and mounting facility is made available in the module itself. The LCD controller takes care of everything necessary for the LCD. We communicate with the LCD controller with the help of a command set provided by the manufacturer.

6. FLOW CHART



7. OPERATIONAL PRINCIPLE OF PROPOSED SYSTEM

Ticket friendly machine holds the details about the events provided by the promoters so that the consumers can purchase tickets in their personal account using smart cards. It is a type of chip or plastic card (an embedded computerized chip either a memory or microprocessor) that stores or transacts data which improve the convenience and security of any transaction. It also holds the user account identity. Once if the passenger inserts the smart card to the ticket friendly machine the RFID reader reads the user account. This happens only after the destination place is chosen by the passengers through the huge display. This display also used to show the available vacancy of the bus.In conventional paper based ticketing, each & everyday lots of tickets are being printed and sealed showing that date manually by the person sitting in the bus stoppage counter. After finish travelling, the passengers usually through away the used paper made tickets here & there which ultimately pollutes the environment. Again large number of trees is being destroyed since the current system uses paper based ticketing and the used tickets are just wasted. But in our proposed system the RFID tagged card carried out by the passengers does everything automatically and eventually based ticketing system over conventional system (both paper based tickets & magnetic tickets) are mentioned below: Using automatic ticket systems enables operators such as transportation authorities to save time and personnel costs; fare collection can be organized much more efficiently.

Each bus has certain limit of seats availability depends upon the size of the bus. If the count of incoming passenger exceeding the limit, The bus won't be move to another place. Here the embedded middleware is used in mobility applications. It consists of real time bus information system which uses satellite technology to predict the time of bus arrives at a stop. RTBI can be obtained from electronic displays at bus station and stops. After this RFID reader in smartcard pay mode transfers to the bank. This payment system recharges all pre issued card with preferred by the authorized person once when user scans his smartcard. Further it transfer the data to GSM which transfers the data to the promoters account. The entire system is controlled by PIC microcontroller.GPS receives the signal from GSM and if the particular location is reached or crossed by the transport then through voice talking GPS the passengers can identify their destination place. The display present in the bus displays the name of the location they are in.

8. RELATED WORK

The estimation of O-D matrices from entry-only AFC system data is a topic that has received substantial research interest. Reliable O-D information is vital for the monitoring and planning of public transport systems as it depicts travel demand, but is generally challenging to obtain. Destination estimation and O-D matrix estimation are not the same issue, but the designations are often used interchangeably. The difference falls upon the level of data aggregation. The objective of O-D matrix estimation is to determine aggregate travel counts between O-D pairs, whereas destination estimation looks at each journey individually. However, most O-D matrix estimation works rely on a destination estimation algorithm, which outputs are subsequently aggregated.

Hence, the subjects are intertwined. The creation of O-D matrices traditionally relies on extensive travel surveys carried out in a periodic basis, which are expensive to conduct and prone to response bias. Barry *et al.* proposed a methodology to overcome both of those problems with a set of algorithms applied to entry- only AFC data from the New York City subway system . Their approach introduced two seminal assumptions that have been applied in several studies afterward, and which are based on the fact that passenger journey origins are known from entry-only AFC data, but destinations are not. The first of these assumptions is that the most likely destination of a passenger journey is the origin of the next journey. The second is that the most likely final daily destination of a passenger is the first daily origin. From these assumptions they were able to infer the destination for 83% of boarding transactions in a single day sample. Barry *et al.* later expanded this approach including both New York City subway and bus data. The addition of bus data required a slight modification to the aforementioned assumptions, to consider that an estimated destination may not be the same but the nearest stop to the related origin.

Evidently these assumptions do not always hold. A public transport passenger may travel an intermediate journey segment on foot or by car for instance, which will break the assumption of the destination being nearest to the next origin. Similarly, if a public transport passenger stays in different places overnight the second assumption of the final daily destination being nearest to the first origin will likely be broken. Therefore, the validity of results obtained from O-D estimation methodologies should be verified. Barry *et al.* validated their methodology using travel diary information and found that the assumptions held for 90% of users surveyed. These authors compared their inferred destination totals with exit counts at the stations, and estimated peak load point passenger volumes to increase the robustness of their assessment. This sort of validations has been called exogenous because they rely on external data sets instead of the actual AFC system data to which the assumptions were applied. The aforementioned assumptions have been used in later research work on the topic. Trépanier*et al.* applied a compara-ble methodology to bus service data from Gatineau, Québec, but introduced an endogenous validation step with their methodology. It required the candidate destination to be within a 2000 m Euclidean distance from the related origin, or else it was assumed that an intermediate journey segment in an unrecorded mode of transport might have taken place. Another difference is how boarding transactions that are single in a day for a particular passenger were dealt with; instead of not infer-ring the destination for those records, the authors opted to carry out a journey regularity analysis for the passenger and estimate the destination on that basis whenever enough data was avail-able. They were able to infer the destination for 66% of journeys. Zhao *et al.* use a comparable methodology on Chicago Transit Authority rail system data, but with a stricter candidate destination cutoff Euclidean distance of only 400 m. Al-though these authors did not attempt to infer destinations of single day journeys, they were still able to infer the destination of 71% of journeys over a six-day period, and their method was partially validated at aggregate level using O-D survey data.

Further studies have applied similar logic. Farzim applied an O-D estimation methodology to bus system data in São Paulo and attempted to validate the results with an O-D household survey. However, the conclusions were hampered by the scarcity of buses equipped with Automated Vehicle Location (AVL) technology and by a time gap between data sets. A methodology proposed by Li *et al.* using bus data from Jinan, China, is claimed to have inferred the destination of 75% of journeys, but appears to rely exclusively on a transfer distance based endogenous validation. Wang *et al.* have applied their methodology to AFC bus system data from Transport for London (TfL) combining two types of validations.The first consisted of a maximum transfer Euclidean distance, whereas the second was a comparison of the results obtained from applying their methodology with an extensive bus O-D survey, which yielded promising results. Their method did not attempt to infer destinations of single day journeys, and was able to infer the destination of 57% of journeys. Drawing from several of the previous methodologies, Gordon proposed a sophisticated algorithm to infer both the destination and time of arrival of bus passenger journeys that was similarly tested with TfL data. Inclusion of the time aspect enabled an additional validation if the passenger had enough time to transfer on foot or not. Destinations were inferred for 74% of journeys.

Munizaga and Palma propose a methodology with a slight variation that considers generalized time (a combination of walking time and vehicle travel time) in addition to distance in determining the potential destination of a journey. It has been applied to AFC bus and metro system data in Santiago and obtained around 80% inference rate in two weekly samples considering a maximum transfer Euclidean distance of 1000 m. The methodology was later used by Devillaine to estimate the location, time, and purpose of activities of public transport users. Munizaga*et al.* later built on that methodology by proposing more robust endogenous validations methods, and presented encouraging results from exogenous validation at a disaggregate level from an O-D survey and an experiment with volunteers. Recent research has sought to expand the use of AFC system data beyond destination inference to deduct route choices. Another new stream of research is automated passenger tracking, which has shown to be a promising addition to entry-only systems for recording alighting location without egress gates. Lastly, it is noted that the estimation of O-D matrices is a topic of interest in other transport domains, including private vehicular transport, freight transport, and pedestrian movement, using count data sources or mobile phone traces. Whereas First buses in the West of England have already made it. Distance-based fare structures are likely to become increasingly common because they deliver fairer pricing for users.

In summary, previous work on the topic has focused on a number of urban public transport systems around the world, all of which have their own specificities regarding travel behavior, data set availability, and degree of integration between systems. The proposed methodologies equally have specificities, namely interms terms of the variety and strictness of validation rules that are aligned with their particular goals. Hence, the outcomes are varied and not directly comparable, but there is general belief that the main assumptions are valid in the majority of instances. However, all of these works have been applied to entry-only systems with flat fare structures, hence no previous attempts have been made to use additional data resulting from the operation of distance-based fares to increase the accuracy of the destination inference results. Increasing the accuracy raises confidence that destinations are correctly inferred, yet decreases the overall inference rate

9. USER INTERFACE

The user interacts with the systems in two ways: initially he communicates the destinations he intendsto visit to the system, and during his trip he receivesthe navigation indications. The first occurs over theInternet on the user's computer or mobile device, oron kiosks placed at PTN stations or other points inthe city; the latter occurs per SMS, with text messages being sent by the system to the user to guide him in real time.

9.1. Kiosk And Web Interface

AJAX is used to provide an intuitive interactive interface that is platform independent and, thus, offers the same visual aspect on the kiosk and web. The only differences in the available possibilities are due to the fact that the hardware available at a kiosk cannot be assumed to be available at home. The kiosk has an RFID reader and a touch screen as only peripherals. The interface is developed specially for the touch screen, having big buttons with clear functions placed consistently, making them easy to use even for babies. There is a set of pre-defined routes with different durations for tourists that want to check out the city highlights fast. But there is also the possibility to personalize the destinations. The user is then prompted for his RFID ticket card and for the phone number and receives the first indications after a final confirmation screen. At home, the user can program a route in a similar way, but he can only associate it with his phone number. The exit screen directs him to a kiosk to associate his route with his RFID ticket. At the kiosk, the user can load his pre- programmed route by entering his phone number, he can edit it if necessary, and finally is prompted to associate the route with his RFID ticket. Both interfaces have been tested by several people by now, most of them fully unfamiliar with the project, and has been found intuitive and easy to use. Of course, the current interface is already the result of several improvements motivated by user suggestions to usability improvement.

9.2. Navigation Intructions Per Sms

Although the ubiquitous availability of broadbandwireless communications would enable a more sophisticated interface, SMS were chosen because they are familiar to most people and represent no additional cost even for roamers. These facts are important since city visitors are a main target group of the system. Each time the user passes his RFID ticket in a reader at the entrance of a transport, the answer SMS is automatically calculated by a service adjacent to route calculation. First, it is verified whether the user is where he is expected to be and the next destination to be visited is determined. If the user is where the system expects him to be, the route to the next unvisited destination is calculated.If the user has lost his way, the whole route is re-calculated with the current station as starting point and

all unvisited destinies as list of destinations. Then, the user is guided as if he were not lost. Each time, after the system knows the route to the next destination, the SMS text is automatically built, containing the necessary information to guide the user to the next ticket validation.That information is:

1) The station to get off the current transport;
2) The destinations to visit by foot next to that station, if any;
3) The station to take the next transport, if different from the one to get off;
4) The next transport to take. With this information, the user knows what he needs to visit the places he esires and reach the next RFID reader, that Functions as the "positioning" device and triggers the next navigation information.

10. CONCLUSION

In proposed system, the design and development of a low cost transportation management system based on integration of RFID and GSM. The system consists of different modules which are wirelessly linked with GSM modems. SMS service of GSM network is cost effective which is used for the transfer of data between different modules. To facilitate the people, a new service is introduced to make use of public transport for traveling, is introduced inside the city. User is provided with the service, which gives them the current location information of desired buses based on which the user can adjust his schedule accordingly.

The service therefore vanishes the need of waiting at the bus stop and hence it saves lot of time. For the passengers not utilizing the service, to let them know the buses location coming towards that stop, displays are installed at every Bus stop. . The system is also efficient and beneficial in handling an error and the emergency situations e.g., in case some kind of technical fault occurred in bus, the operator at bus terminal is informed and the departure time between the buses is reduced so that it will save time of the passengers. It is believed that by the implementation of this system, problems such as underutilization of buses fleet and long waiting time at the bus station will be reduced. So, both passenger and bus station administrators will benefit from the system as real time information is provided.

11. ACKNOWLEDGMENT

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12. FUTURE WORK

An automatic route guider display can be installed in buses to better update the alternative route in case of serious road congestions. We can connect RFID reader wirelessly to the host application. There are different advanced wireless technologies that can be used such as Bluetooth (802.15.3) and ZigBee (802.15.4) to extend the range of an RFID reader. Fare collecting system can also be automated by providing another mobile service to which all the passengers using public transport are subscribed.

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