SURVEY ON GPS Tracking and Smart Route Selection of Public Transport

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ABSTRACT

In this modern lifestyle everyone is hurry to reach their destination. In most scenarios where the commuters use public transport to reach their destination, we see that he/she has to wait a lot for the bus to arrive. Other than this the commuters are also unaware of which bus to select to reach the desired destination. All this conditions make travelling by public transport very unreliable. So the major concern of the people who travel by public transport is to know which bus to select so that he/she can reach their desired destination in shortest time possible and also for which travelling cost is minimum. Once they are aware of this information then the other concern that arise is to know the real time location of the bus for which they are waiting and the time it will take to reach their bus stop. If all this information is readily available it will help the traveller to make better travelling decision and which in turn will increase the productivity of the work he/she is indulged in by reducing travelling time and cost.

Keyword : - Public Transport, *GPS, Location Based Services*

1. Introduction

If we have a better transportation system which is very effective in moving of people and goods it leads to better standard of living by providing social and economic growth to the society. Actually transportation system is backbone of any country or organization. It can also be called as the heart of the system. As the population is growing at very fast rates in India and world, the subsequent vehicle population is also increasing with greater speeds. This increase in vehicle population in turn results in various problems such as increase in traffic and pollution as well the consumption of natural resources is on increase. One of the very effective ways in which this problems can be reduced is by increasing the use of public transports. But encouraging more use of public transport is very difficult task. This is so because the public transport system in the country is fractured at various levels. A commuter has to undergo various hardships such as waiting for bus for a long time in queues. Also public transport schedules are unreliable and not easily available. But a public transport system will be very effective if most of this shortcomings are resolved such as providing information on number of buses available that will go to the required destination, all the bus numbers, bus stops it visits, travelling time, waiting time, ticket fare, alternate routes, etc. . Also the real time tracking of buses can be done so that the travelers gets a clear view regarding the bus's current status.

The remaining paper is organized as: Section II gives the literature survey and Section III gives the conclusion.

2. Literature Survey

In 2016 Sharmila V, Yamuna Devi M , Veera Muthu G, Hari Kalidas P, developed GPS Tracking in Public Transportation

Automated Fare collection (AFC) System additionally referred to as the Transit smart card System provides benefits over a manual fare assortment system towards lowering labor prices and increasing potency in fare assortment and management of the several information therefore collected. The will to extract additional information than simply a deduction of fare from transit good cards has led to the research efforts in extracting information like points of origin wherever a passengers would board a bus and have these information recorded because the passengers' smart cards are scanned. To attain this, a Markova chain based Bayesian decision tree algorithm has been developed during this study, whereby the algorithmic program is verified with the utilization of public transportation vehicles that are outfitted with GPS tracking and information loggers. Once and for all, it's declared that information collected to represent points of origin once a passengers' transit smart card is scanned, is crucial to the method of transit system designing. In another analysis the GPS technology is used towards tracking and scheduling of buses.

This has been achieved in Ahmadabad India, where the govt. has developed and deployed a GPS enabled Bus rapid transit System (BRTS) solution to fulfill its transportation desires in an exceedingly sustainable fashion. Introduction of the BRTS was driven by the necessity for enhanced dependableness and security with stress on reduced traveling times. The tracking and scheduling of all buses on all routes is centrally controlled from an integrated control centre. Except for GPS-enabled buses, the system boasts drive assist and automation technologies beside vehicle prioritization and traveler info systems.

In 2014 Suresh Sankarananrayanan, Paul hamilton developed Mobile Enabled Bus Tracking and Ticketing System

The current cashless system has been seeing dominantly in many countries which uses a Smart Card, which is generally placed on the ticketing machine which is installed in the bus. Thus the fare gets automatically deducted and a ticket is issued showing the amount paid along with the date and time of the transaction with the remaining value, which is achieved by the use of an Electronic Ticketing Machine i.e. (ETM). The card can be recharged and can be also personalized in case of card being lost or stolen, where it may be disabled if required.

In addition to the Smart Card which provides quick and easy cashless ticketing facility, the ability to board a bus and pay hands-free is realized when the Smart Card that is RFID enables is detectable when held in hand as well as when carried anywhere with the person. The commuter's transition on to the bus is made even easier and quicker as their ticket is printed and ready for claiming as soon as they have successfully scanned by entering through the doorway. The issued ticket shows the commuter and card data gathered from the scan with the scheduled route, date and time, bus number that is boarded.

Research has also been conducted on privacy concerns with respect to the collection of personal information along with the aggregation and centralization of private information. Cards that have RFID which are used in public transportation makes the tracking of individuals with tracking data which is stored on a central server possible. This allows an individual's entire history to be displayed and can be used as desired. Also In one another research, proxy re-encryption, application of electronic payments, along with anonymity to the problem of privacy in public transportation systems that employ electronic ticketing has been proposed. The architecture have proposed the needs of atypical metropolitan transportation system that preserves the security requirements of the user and the company, while increasing the privacy of the passengers. The use of passive RFID devices and smart phones enables the use of active devices which also allows for more security and privacy that overcomes the general passive RFID transponder architecture.

Research have been also done on the proper security and privacy requirements for e-ticketing with use of RFID technology while showing the less capacity of existing proposals and presenting solutions that preserves privacy of e-tickets based on RFID technology, along with cryptographic techniques that are known which will help to discourage ticket fraud and forgery. E-ticket use is used to help lower operation and maintenance costs for the transit authority and thus allowing faster and much more convenient verification methods for passengers than traditional paper-based and cash-based payment methods.

In addition RFID Technology has gained favor in ticketing, through a cashless system usage due to hassle free methods.

In 2014 K. Sujata, KJ Sruthi Design and Development of android mobile based Bus Tracking System

This System was proposed by K.Sujata and K.J.Sruthi in 2014 that was implemented in Vizag that used GPS and GSM technology combined to notify the user of the information and whereabouts of the buses in real time location along with the time of arrival as well as the time of waiting. The server would calculate the users time of travel. Developers used Web technologies such as JSP to fetch data from the server to the users android mobile phone.

As Most real time arrival systems, which are currently in more use, are being completely web based. Many of bus tracking service in India are providing passengers a website where user can login to find out the real time location of the buses and textual estimated times which projects the next bus arrival at a given stop. These displays many times are misleading as there is no clear information of where the bus is actually present and whether there are potential delays happening.

The combined usage of GPS and GSM are unique which can be put to a much greater extend. Thus this project will provide help to the passengers for finding out all the information without any more expense.

In 2013 Paul Hamilton, Suresh Sankaranarayanan developed Intelligent Agent Based RFID System for on Demand Bus Scheduling and Ticketing

RFID technology contains the following three things: Tag, Reader and the Middleware which has interaction with the back-end database. There are many applications for RFID technology have been proposed over many years. However, these types of efforts have been challenged with regard to feasibility, management, privacy and security, development. One such research has been applying RFID towards potential passengers passing through a portal in different levels of crowds (simulated bus door) with help of commercial off-the-shelf RFID readers and antennas and passengers as they board the bus and exit the bus. It was found that the RFID technology can be used for this type of application effectively , however, it should be noted that in some cases of no "line of sight" between smart cards and readers with according to the radiation patterns and positions of antennas, there may be performance shortcomings as these factors are very important to recognition. Research has been also focused on how RFID Technology can be used to solve problems which are faced by public transportation authorities in metropolitan cities by using automated tracking of buses that can be used to provide useful estimates of bus arrival times in turn for enhanced and convenient passenger convenience. A real time tracking along with the monitoring system is employed which uses an Event and Condition and Action (ECA) framework. This helps in efficiently filtering data to remove inaccurate instances and then categorizing useful data by aggregation. Also, it is discussed how collected data can be used to predict movement of bus in an effort to improve the service and performance.

4. CONCLUSIONS

We reviewed various papers which has previously worked on this topic and studied them thoroughly. There were some papers which worked only on GPS tracking of buses. Some papers showed the works wherein the RFID technology was used to display the current location of buses and other information on bus stops. Some worked on Automatic fare collection technology. All this works can prove to be very useful in improving the public transport if implemented properly. But there were some shortcomings like none of the paper showed the user or at least helped him in finding the optimal bus route so that he can reach his destination faster and effectively. So in future there can be some work which will give the user an optimal path to reach its destination effectively keeping in mind various user requirements.

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