ENHANCEMENT OF BUS SERVICES USING GPS

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ABSTRACT:

Today passenger facing problem of finding the bus of his root and he does not know about exact arrival time of bus. We can solve this problem by using GPS using android system. GSM modem, provided with a SIM card uses the same communication process as we are using in regular phone. We are using Google API which send the Vehicles current location based on its IP address. This paper proposes a real-time vehicle tracking system using a global positioning system (GPS) technology system to receive the location of the vehicle. Trilateration is used to determine absolute or relative locations of points by measuring the distances using geometry of circles, spheres and triangle. To calculate the arriving time haversine distance formula is used.

Keywords: Google API, GPRS, GPS, GSM, Tracking, Vehicles.

[1] INTRODUCTION

The real time vehicle tracking for better transport management has become possible. These technologies can be applied to public transport systems, especially buses, which are not able to adhere to predefined timetables due to reasons like traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival make public transport system unattractive for passengers. A bus service uses a variety of technologies to track the locations of buses in real time and uses this information to generate predictions of bus arrivals at stops along the route. When this information is disseminated to passengers by wired or wireless media, they can spend their time efficiently and reach the bus stop just before the bus arrives, or take alternate means of transport if the bus is delayed. They can even plan their journeys long before they actually undertake them. This will make the public transport system competitive and passenger-friendly. The use of private vehicles is reduced when more people use public transit vehicles, which in turn reduces traffic and pollution.

There are 3 modules of this project. In first module we are allocating one smart phone with GPS for particular bus. In second module administrator can manage the bus system. He has all the information about that bus. In third module user application is implemented. There are the GPS and GPRS modules, the GPS module will locate the vehicles via the satellite antenna. The GPS receiver gets a signal from each GPS satellite and transmit exact time of the signals are sent. The time is subtracting from time that the signal was transmitted from the time it was received,
the GPS can tell how long it is placed from each satellite. The GPS receiver also knows the accurate position in the sky of the satellites, when they sent their signals. From three satellites and their exact position in the sky we get the travel time of the GPS signals. From this GPS receiver can determine your position in three dimensions - east, north and altitude. The GPRS module will assemble all data and send it to the system. The GPRS core network allows the all mobile networks to transmit IP packets to external networks such as the Internet. The GPRS system is an integrated part of the GSM network switching subsystem. Trilateration is used to determine absolute or relative locations of Bus. In geometric problem, trilateration does have practical applications in surveying and navigation, including global positioning systems (GPS). In variance to triangulation, it does not involve the measurement of angles. Trilateration describes a method for determining the crossing of three sphere surfaces given the centers and radii of the three spheres. The administrator system has three responsibilities: receiving data from the GPS, securely storing it, and calculate arrival time of bus and send to the user.

[2] LITERATURE SURVEY

Here we present some of the ideas from different research papers from which we have developed our idea.

Arijit Chowdhury[1] The GPS receivers are now an integral part of smartphones. In this paper, they have presented a method to estimate the true speed of a moving vehicle derived solely from GPS measurements.

HUANG Yan[2] in this paper the high real-time multi-channel GPS time transfer receiver and the real-time data processing algorithms are introduced.

Vigneshwaran.K[3]. In automobile field, the security and theft prevention are one of the big issue in now days. In this paper the security goals are fulfilled by tracking and monitoring the vehicle by using the GSM, GPS technology. GPS is used to get the vehicle current position and data will be send to the user mobile phone through the GSM.

Pengfei Zhou[4], In this paper, they present a bus arrival time prediction system based on bus travelers participation. In this paper they have estimated bus traveling routes and predicted bus arrival time at various bus stops by effectively collecting and utilizing bus passengers surrounding environmental context.

Mathieu Sinn, JiWon Yoon, Francesco Calabrese and Eric Bouillet[5], in this paper they have shown dependencies between position updates and the arrival times at bus stops by using a Kernel Regression model.

Prawat Chaiprapa, SupapornKiattisin[6] in this paper they have presented idea of vehicle tracking by using GPS and showing on google map web site. They used GPS for the location and GPRS to send signal to google web site and they used RS232 for connectivity of GPS and GPRS.

Pankaj Verma.[7] In this paper they have shown use of GPS system for tracking and monitoring vehicle. This system can provide information about the location and route travelled by vehicle which can be observed from remote location. They have designed web application that provides exact location of target. This system uses GPS and GSM technologies, Atmega microcontroller MAX 232,16x2 LCD and software part is used for interfacing and a web application is also developed at the client side.
Linzhouting Chen. [8]. A hybrid prediction method for bridging GPS outages in high-precision POS application has been proposed, which uses RBF neural network and time series analysis to accurately predict the measurement for aiding the POS KF to obtain accurate position, velocity, and attitude navigation information during GPS outages.

Sandeep Kumar [9] In this paper they have used GIS processing tools in Android to process LBS services and they have SQLite database to store information as android also supports this technology.

[3] EXISTING SYSTEM

In Pune if we look at present public transport system, it is very inefficient. Buses do not arrive on time, do not reach on time, fail at any time and due to all of this buses are overcrowded that increases danger of accidents. As Pune is now nominated for Govt. Of India “Smart City” project the system is improving now. In BRT now they have fixed GPS system which will trace the route and give updates about next coming bus stop to passenger in bus. But, this is still inefficient. Because it is giving information to passengers only in bus not to one who is on bus stop. Person on bus stop has no way idea about arrival time, delay time. So he/she keep on waiting which results in time and energy, this hampers his/her productivity.

[4] PROPOSED SYSTEM

In our system we are allocating one smart phone with GPS for particular bus and administrator can manage the bus system. He has all the information about that bus, For user one application is implemented. On which user can get information and arrival time of bus. There are the GPS and GPRS modules, the GPS module will locate the bus via the satellite, and all data send it to the system.

ARCHITECTURE

The proposed system has 3 Module

1. Module Inside the bus
   - Location based advertisement.
   - Due time to next stop, either in countdown format or time.
   - Next stop and distance to next stop.
   - Current time and date.
   - Route number and final destination of vehicle.

2. Module on server side
   - It will Record bus arrival time at every bus stop.
   - Efficient monitoring of buses via maps.
   - Estimates bus travel time using previous bus information.
   - Calculates arrival times for approaching buses to all bus stops.

3. Module on bus stops
   - Latest bus arriving at the bus stops.
   - Arrival time of the bus to reach the stop.
   - Bus going to different stops.
This system there is bus module in which there is dedicated android device for GPS location and Speed sensing of bus. It provides fault notification to admin. All this data or information is stored and further calculation on server. After getting location and speed of bus server will calculate the ETA of bus. This processing in server will be monitored by admin. When user will enquire for the bus through user application. Then admin fetch that particular information from server and provide to the user.

[5] CONCLUSION
In this paper, we present the real time prediction of arrival time and delay time of buses using GPS and Mobile Computing. We comprehensively evaluate the system through an Android prototype system. In previous system there was no way to passenger to get information about arrival time and route of buses. Our system overcome this drawback of existing system. To achieve this we are using trilateration algorithm and Haversine formula. The use of real time data obtained through this technique generates belief in users. User can decide whether to wait at a bus stop or not, thus their problems and delays are reduced. They can even plan their journeys long before they actually undertake them. This will make the public transport system competitive and passenger-friendly. The use of private vehicles is reduced when more people use public transit vehicles, which in turn reduces traffic and pollution.

[6] FUTURE SCOPE
As we know that today’s passenger information systems are the basic communication link between transport corporations and the travelling public. Along with system reliability, safety, and general appearance, the ability for operators to provide accurate, current information on arrival and departure times and gates information the traveler needs to keep moving efficiently is a key component of customer satisfaction.

- Reliable traffic data can be generated for statistical purpose.
• Same system can be implemented for multiple cities using distributed and parallel computing.
• Ticket booking facilities can be provided on the app itself.
• We plan to investigate further strategies to reduce the computational burden, both in terms of memory and computational time.

[7] ACKNOWLEDGMENT

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REFERENCES

[3] Receiver HUANG Yan, YAO Hejun, GAO Yuan, ZHANG Han, XU Yuan” Development of the High Real-time GPS Time Transfer”National metrology center for industry of GNSS.
[7] Sandeep Kumar, Mohammed Abdul Qadeer, Archana Gupta,” Location Based Services using Android” Department of Computer Engineering ZakirHussain College of Engineering and Technology Aligarh Muslim University, Aligarh 202002, India sandeepkumar@zhcet.ac.in, maqadeer@ieee.org, archanagupta@zhcet.ac.in
[8] Pengfei Zhou, Student Member, IEEE, Yuanqing Zheng, Student Member, IEEE, and Mo Li, Member, IEEE,” “How Long to Wait? Predicting Bus Arrival Time With Mobile Phone Based Participatory Sensing”, published in: IEEE TRANSACTIONS ON MOBILE COMPUTING, VOL. 13, NO. 6, JUNE 2014, publisher:IEEE.
Author[s] brief Introduction

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