Bus Tracking System Based on Location Aware Services

Priyanka V. Narkhede
Student, Department of CSE, DES'SCOET, Dhamangaon Rly, India.

Radhika V. Mahalle
Student, Department of CSE, DES'SCOET, Dhamangaon Rly, India.

Priya A. Lokhande
Student, Department of CSE, DES'SCOET, Dhamangaon Rly, India.

Reetu M. Mundane
Student, Department of CSE, DES'SCOET, Dhamangaon Rly, India.

Dhiraj M. Londe
Assistant Professor, Department of CSE, DES'SCOET, Dhamangaon Rly, India.

Abstract – BUSES have become an important means of transport in cities. This public transport is used by majority of the population in cities. But as we know that nothing is perfect, buses also have one drawback that is the commuters have to wait for too much time for the bus to arrive; which in turn leads to usage of private vehicles thus leading to increase in fuel consumption. Rather than waiting for buses it would be beneficial for the passengers to know the tentative timing of the buses, so that they can plan their journey accordingly. In this paper, we proposed smart bus tracking system that any passenger with a smart phone or mobile device with the query asked by user on his personal mobile device stops to view estimated bus arrival times, bus current locations, and bus routes on a map. GPS (Global Positioning System) and Google Maps are used for navigation and display services, respectively.

Index Terms – GPRS, GPS, Interactive maps, Monitoring and Management System, Smart phones.

1. INTRODUCTION

Transportation becomes very difficult in cities. The public transports, especially BUSES are developing around the world. Such public transports reduce the usage of private vehicles thus reducing fuel consumption and mollifying traffic congestion. The problem with BUSES is that the commuters DO NOT know the exact timing of arrival of BUSES at their stops. This leads to waiting for BUSES for 30-35 minutes as the commuters are not aware at what time exactly the BUS is to arrive. The approximate arrival time of BUSES is known but there may be delay in arrival due to traffic. Seeing that people started avoiding public transports and started using private vehicles, many applications were developed; but these applications were unable to mitigate the problems. Some applications provided only the arrival time and departure time of BUSES at their source and destination. Some of them, provided time-tables, but even they were not accurate as they did not consider the delay due to unpredictable factors like – traffic, harsh weather situation, etc. the time-tables were not timely updated thus leading to waiting for BUSES. And due to all these reasons commuters opt for different alternatives to ally their problems. Real-time vehicle tracking and management system has been the focus of many researchers, and several studies have been done in this area. Verma and Bhatia [2] stated in their study that GPS could be used in many applications and it is possible to follow routes and locations driven a vehicle by means of GPS. They develop a web based system presenting vehicles' locations to the user. Gong et al. [3] improved approach to predict the public bus arrival time based on historical and real-time GPS data. After analyzing the components of bus arrival time systematically, the bus arrival time and dwell time at previous stops are chosen as the main input variables of the prediction model. They concluded that their model outperforms the historical data based model in terms of prediction accuracy. Guo et al. [4] integrated the Victoria Regional Transit System with appropriate communication technologies to develop a corresponding Smartphone application. In this smart bus system, users can access real-time passenger information such as schedules, trip planners, bus capacity estimates, bike rack availability and bus stop locations, via Smartphone, on computers and at bus stops. El-Medany et al. [5] supposed cost effective real time tracking system that provides accurate localizations of the tracked vehicle by using GPS and GPRS modules. By means of GPS receiver, proposed system has

ability of tracking current position of the vehicle in any specific time. They tested efficiency of the system in different areas on Kingdom of Bahrain using Google maps.

2. RELATED WORK

Our review of this area shows that there have been only few approaches that provide automated tools for the functioning of the application:

- An application has been implemented in Pune, named "Pune Bus Guide". This application gives the way to the destination correctly, but the number of drawbacks that it has is greater than the number of advantages. It does not show the passengers current location even if he/she is connected to the GPS. Also, this application has been proven useless as it does not display the bus numbers, so the passengers find it very hard to know the number and time of arrival of the respective buses. It does not have a real time bus tracking service or does not even generate maps for the users ease. This application has never been updated ever since its development. Moreover, this application has bugs which makes it all the more difficult for the user to use it.
- Another application that was implemented in Mumbai, named "M-Indicator – Mumbai" has drawbacks like: It displays matter which is the same as what is online. Its latest updates have given issues on every Android mobile supporting even the most recent device version. The "A to B" module of buses has given problems. Whenever an option for the source to destination is selected, the field still remains blank, i.e. no bus routes are displayed.
- The application built in Delhi named "Delhi Bus Navigator" has drawbacks like: The application works smoothly when offline, but works very badly when connected to the Internet. The application gives information about direct routes only. It does not give information about the alternate routes. This application has bugs due to which it lags all the time. Most of the time the application crashes when requested for specific bus routes.
- The application developed in Bengaluru named "Bangalore BMTC Info" has drawbacks like: The application is never in an updated condition. The application has fed in wrong routes on several buses and given no updates to fix them. After the minimization and restoration of the application, it cannot search anything. This application crashes almost always. The application is not user friendly with a complicated User Interface (UI). 5. The application developed in Chennai named "Chennai Bus Route" has the following drawbacks: The application works fine, but the bus timings have not been mentioned. Not all bus stops are updated. The application does not display maps.

3. PORPOSED MODELLING

3.1 Block Diagram of Bus Tracking System

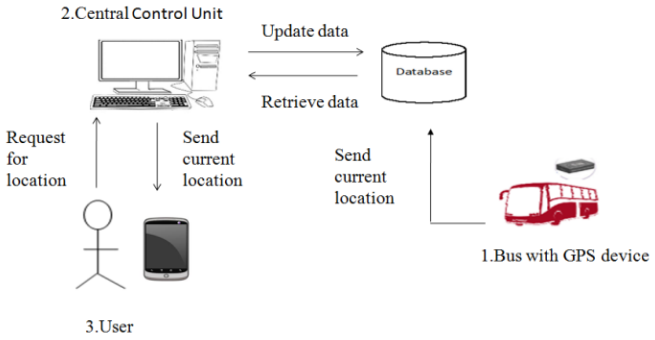

Fig.1 Block Diagram of Bus Tracking System

In order to overcome the above drawbacks, a system is proposed. This is an android based system which will provide all required information about BUSES travelling in cities. The reason behind selecting android as a platform for developing this system is that android based mobile phones are used on a very large scale among people. Android is easy to handle and is user friendly, and hence the application will be used by maximum number of citizens. Android is an open source operating system for mobile phones. The application will be based on user friendly environment and hence any one can access it free of charge. The primary idea here is to provide routes and bus timings to the users. All possible stops between source and destination of user and the map for the same will also be provided. Also real-time tracking of the bus will be done.

The goal is to mitigate the problems of the commuters and overcome the drawbacks of previous systems to generate accurate results in less time. Adding a GPS tracker to track the bus and provide accurate timings and updating the information timely is also a goal of the system. Input will be selection of source and destination and output will be display of possible routes with maps and location tracking of the bus.

The features that we plan to include in our system are as follows:

- The details of buses will be stored in the database and be retrieved whenever needed.
- Information of all routes in cities will be included in the application.
- As the application is based on android, it will be easy enough for the user to understand.
- The application will be updated from time to time, so that all changes in the bus timings and the routes are recorded.

- The tracker will track the location of the passenger as well as the bus so that approximate time required by the bus to reach the stop will be calculated.
- The tracker will also guide the passenger the route to his/her destination.

The proposed system consists of following two modules:

1. Bus module
2. Client side application (User module)
3. Server module

1. Bus module:

The bus is tracked by installing a special device or GPS transceivers in the bus. GPS works in any weather conditions, anywhere in the world, 24 hours a day. To use GPS there are no subscription fees or setup charges. To calculate the position GPS receiver is capable of receiving signals from at least three satellites. This device receives the GPS data and sends the data at regular intervals to the server. Then the server analyses the data. Then to receive the signals from the satellite the GPS device is turned on. Now the device is capable of receiving the latitude and longitude values of the location of the bus.

2. User module:

The user side module is nothing but an interactive application which services the various function of system to remote users. The user side module takes two inputs i.e. one is source which indicates where the remote user is now and second is destination which indicate where he/she wish to go. When user send a request the application fires a query to the server for accessing the information stored in server database and gives the list of available buses according to remote users source and destination. Now it's users task to select or choose particular bus number to know the real time location of bus or other information. After selecting a particular bus number the application shows the real time location of that bus on Google map.

3. Server module:

In this system the whole information is stored and maintained by server. Server is the intermediate between bus module and user module. This database consists of real time information about bus it includes bus routes and real time location of bus. Server provides service to the user module by providing required information to it.

4. RESULTS AND DISCUSSIONS

The details of buses will be stored in the database and be retrieved whenever needed. Information of all routes in cities will be included in the application. As the application is based on android, it will be easy enough for the user to understand. The application will be updated from time to time, so that all changes in the bus timings and the routes are recorded. The tracker will track the location of the passenger as well as the bus so that approximate time required by the bus to reach the stop will be calculated. The tracker will also guide the passenger the route to his/her destination.

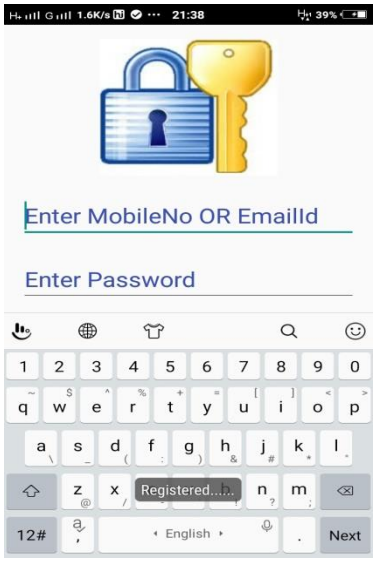

Fig. 2 Index Page

The index page displays the login panel for the user to login the system.

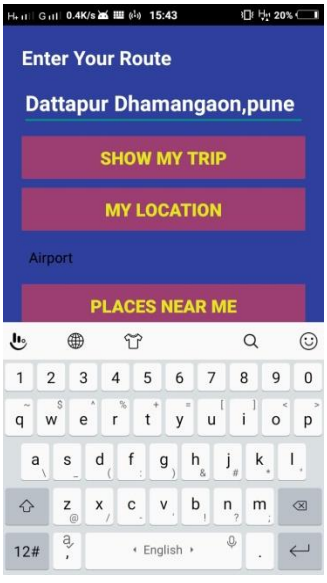

Fig. 3 Search Route

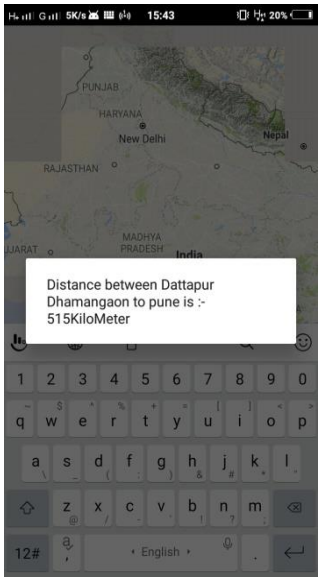

Fig. 4 Index Page

On this page user enter the cities separated by commas then the distance between two cities will displayed first then it will display the route on the map. Fig.4 shows the distance between two cities entered by the user.

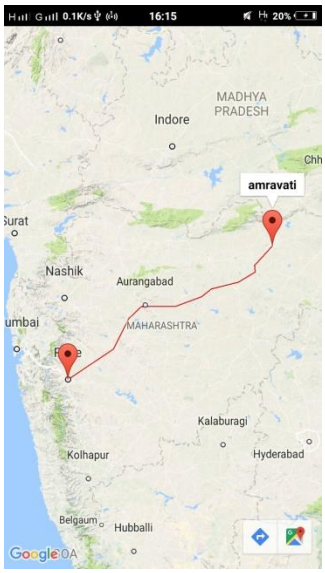

Fig. 5 Map of route

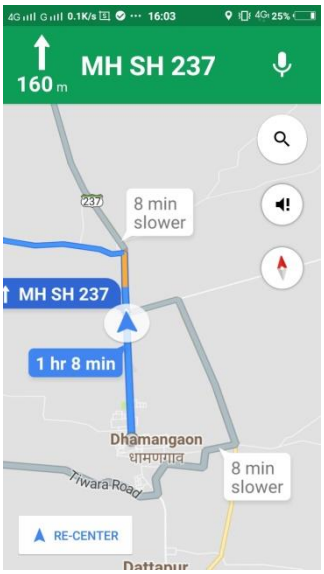

Fig. 6 Bus location

Fig. 5 shows the route between two cities on the map. Fig. 6 shows the bus location on the route. The route is displayed on the map from the source location which is entered by the user.

5. CONCLUSION

In this paper, we have proposed a system in which users can be more comfortable and satisfied in their bus travel to reach the required destination in a quicker manner. Simple aspects of optimization are described clearly in this system. This system is completely integrated and it becomes possible to the user to track his bus very easily at any time and from anywhere. In this paper, we have presented a smart bus tracking system. The proposed system, basically tracks the busses, estimates their arrival times at specific bus stops and informs the users through prevents passengers unnecessarily to wait at bus stops and enables them to use their time more efficiently. Basically in all these system the GPS & GSM are used to track the bus. Using this system the user can determine where the bus is, how much time it require to arrive. The user is able to access the position of his bus at any instant of time. This system is reliable any very secure.

REFERENCES

[1] P. Verma, J.S.Bhatia, "Design and Develo Tracking System with Google Map based Monitoring", International Journal of Computer Science, Engineering and Applications (IJCSEA), vol. 3, no. 3, pp. 33-40, 2013.
[2] J. Gong, M. Liu, S. Zhang, "Hybrid dynamic prediction model of bus arrival time based on weighted of historical and real 2013 25th Chinese Control and Decision Conference (CCDC), pp. 972 976, 2013.
[3] X. Guo, E. Huang, B. Hung, L. Juras, Design a Smart Bus System, Dept. Electrical and Computer Engineering, Uni 2012.
[4] W. El-Medany, A. Al-Omary, R. Al "A Cost Effective Real-Time Tracking System Prototype Using Integrated GPS/GPRS Module", Sixth International Conference on Wireless and Mobile Communication Valencia, 2010.
[5] http://www.flightradar24.com/ (accessed 19 January 2014).
[6] http://traintimes.org.uk/map/tube/
[7] http://www.marinetraffic.com/ais/hom
[8] S. Pooja, "Vehicle Tracking System Using GPS", International Journal of Science and Research (IJSR), vol. 2, no. 9, pp. 128 ONCLUSION DISCUSSIONS -mails and SMSs. The system prevents might be EFERENCES Development of GPS-GSM based rrival real-time GPS Data", 972- University of Victoria, Canada, Al-Hakim, S. Al-Irhayim, M.Nusaif, Communications, pp. 521-525, 20-25 September, (accessed 19 January 2014). (accessed 20 January 2014). 128-130, 2013.
[9] T. Le-Tien, V. Phung-The, "Routing and Tracking System for Mobile Vehicles in Large Area", Fifth IEEE International Symposium on Electronic Design, Test & Applications, pp. 297-300, 2010.
[10] F.M. Franczyk, J.D. Vanstone, "Vehicle warning system", Patent number: 7362239, Issue date: 22 April 2008.
[11] Lin Yu-Hsun, Chang Yu-Pei, Wu Ja-Ling, "Appearance- Based QR Code Beautifier," IEEE Transactions on Multimedia, vol. 15, no. 8, pp. 2198-2207, 2013,
[12] D. Haisler and P. Tate, "Physical hyperlinks for citizen interaction," in Proc. ACM MM'10, pp. 1529-1530, 2010.
[13] T. Nikolaos and T. Kiyoshi, "Qr-code calibration for mobile augmented reality applications: Linking a unique physical location to the digital world," in Proc. ACM SIGGRAPH 2010 Posters, ser. SIGGRAPH '10, 2010.