

REAL-TIME BUS TRACKING ANDROID APPLICATION

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Abstract—*BUSES have become an important means of transport in cities like Mumbai. 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. Hence, for the convenience of citizens an android application is proposed, which will track the location of both the user and the BUS and then will calculate the approximate time required by the BUS to reach the stop including the traffic analysis. As almost every citizen is familiar with the working of Android phones there won't be any problem in using the application, as Android is a user-friendly operating system. The approximate time will be calculated by tracking the current location of the bus and the user. As the BEST has already installed GPS in buses, the tracking algorithm will help in locating the bus. The approximate time required by the bus will also be calculated so that the commuters will be aware about the waiting time for their respective buses. It will also be favorable for those not having GPS facilities as they will be able to know the updated bus schedule without using Internet.*

1. INTRODUCTION

Transportation becomes very difficult in cities like Mumbai. 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.

There are systems that are made to fulfill the user's needs; the chapter 2 will give the information on some of those systems, also their advantages and disadvantages.

2. EXISTING SYSTEMS

Various systems are developed so as to lessen the problems faced by commuters. Around the world numerous vehicle tracking systems are being developed. These systems are included in many public and private vehicles in urban areas.

Given below are a few of the many systems that are developed for tracking vehicles.

2.1 Ghana GPRS vehicle tracking system:

This system designed by Fleischer, Paul Benjamin, Nelson, Atso Yao, Bremag, Appah^[1], tracks the location of intercity buses. This system was developed in the city of Ghana by the University of Ghana. This GSM/GPRS and GSM based system sends SMS alerts about the location of vehicle to the users. It also provides real time tracking through web application. External database server was used to maintain the tracking data.

ADVANTAGES:

- This GSM/GPRS based system sends alerts to the students of the university about its location.
- This system also provides theft alerts which are an enhancement to its features.

DISADVANTAGES:

- The main drawback here is that the system requires external database server, hence leads to increase in cost of the system.

- Such systems can be useful for short distances like campus of some university; as long distance tracking will not provide precise location of the bus.

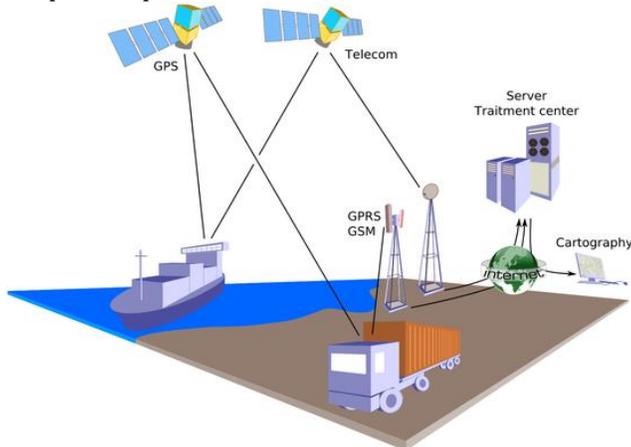


Fig -1: Ghana GPRS vehicle tracking system

2.2 Cargo tracking system:

Muruganandham and P.R.Mukesh^[2] proposed a system that uses GSM/GPRS modem and GPS system to provide real time tracking of the vehicle over the internet through Java applications developed specially for this purpose.

ADVANTAGES:

- This Java application provides real time tracking of the cargos.

DISADVANTAGES:

- It requires an external database to maintain tracking details, so this increases the cost of the system.

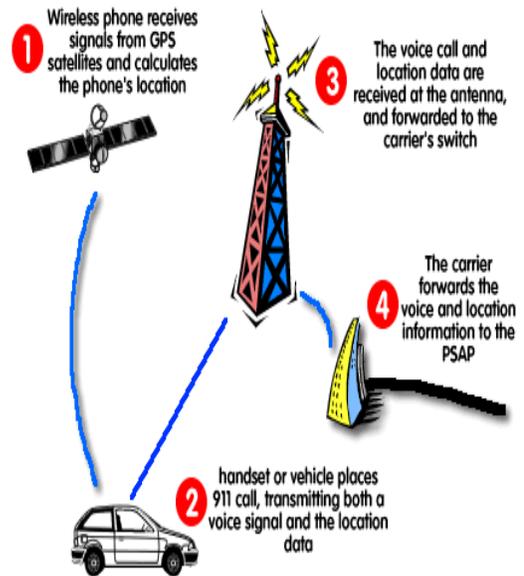


Fig -2: Cargo tracking system

2.3 BMTC bus tracking system:

Bangalore Metropolitan Transport Corporation ^[3] buses have a real time bus tracker. The online application that involved a small device on top of buses was tried on experimental basis. This device will calculate distance travelled and time taken. Later the electronic display boards will announce the arrival and departure timing at bus stops.

ADVANTAGES:

- This application will give real-time location of the bus.
- This is not an SMS based system so there won't be any interruption in sending the data.

- No external databases are required for this system.
- It ensures that drivers will not deviate from their fixed routes.

DISADVANTAGES:

- The GPS tracker is set up on the bus; so it fails whenever the buses pass from under the trees or flyovers and even when the buses are in their sheds.

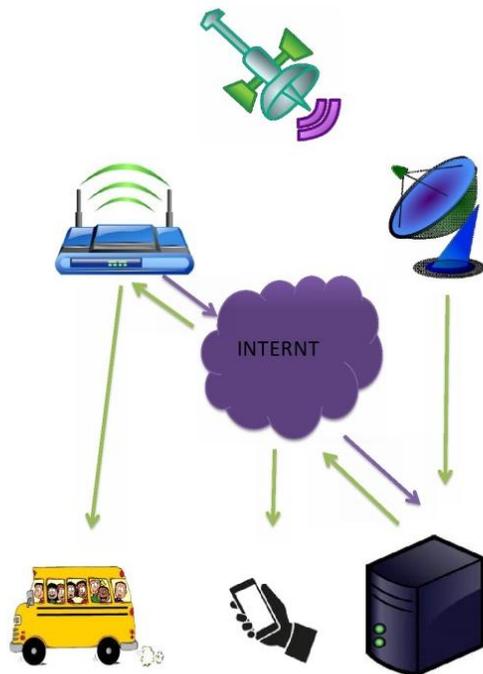


Fig -3: BMTC bus tracking system

2.4 RFID based tracking system:

RFID stickers [4] are installed on every bus, these stickers are installed for identification at bus terminals. Every bus stop is assigned by a unique ID, this unique ID is transmitted around some distance around it RF transmitters and when the PF receiver on the bus comes within the range of the transmitters, it will receive signal that is generated by bus stop and it will indicate the passengers the next stop. Here real-time tracking is not possible and also it can only be used for short distance.

ADVANTAGES:

- The RF transmits the signals whenever the bus is nearing the bus stop so that the passengers are aware of the arrival of bus.

DISADVANTAGES:

- This method will only be helpful for short distances.
- The passengers cannot get the exact location of the bus, they will only be notified when the buses are nearing the stop.

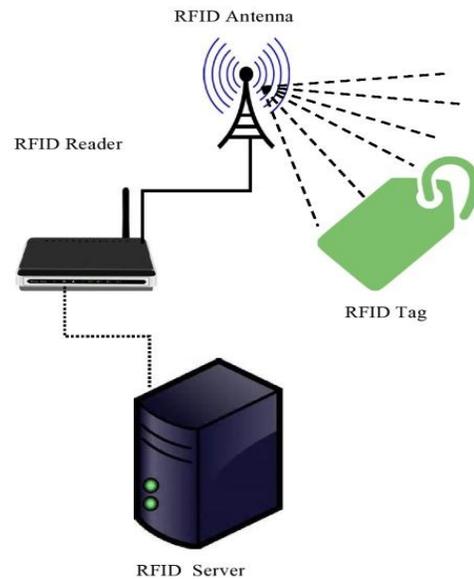


Fig -4: RFID based tracking system

2.5 BESTPIS app:

The BEST [5] launched a bus tracking system which will be able to access the position, speed and expected arrival time of buses by sending a code number specified to each bus stop, via SMS. It is GPS enabled navigation system which will track the location of the buses. The user will have to register to the website first in order to access the details. After the user has logged in he/she will be able to send the SMS to the given number specifying the code number on the bus stop.

ADVANTAGES:

- SMS service provides real-time bus arrival information for convenience of passengers.
- Bus passengers can schedule their journey accordingly.
- Increase the use of mass Transport leads to fuel savings, and increase in the operational revenue.

DISADVANTAGES:

- The code numbers which the commuters are supposed to send as a SMS to the required number were not painted on the bus stops.
- Also the registration process is too complicated and is difficult to access the service.
- Even though it provides real-time bus arrival information through SMS, there are chances that the SMS will not reach the user. It is not always trustworthy.

2.6 SmartShehar Bus:

This is an android application created by SmartShehar [6], which gives the timing of the buses along with their arrival

and departure times. It also provides the bus numbers which are nearing the current location of the user. But this system will not track the location on the map.

ADVANTAGES:

- The bus numbers of the buses which are near the location of the user, so that the user is able to plan the journey.
- There is also an option where GPS is not required, where the user will have to enter the current bus stop where he is.

DISADVANTAGES:

- Real-time tracking of the bus is not available here.
- Traffic analysis of the bus is not present.

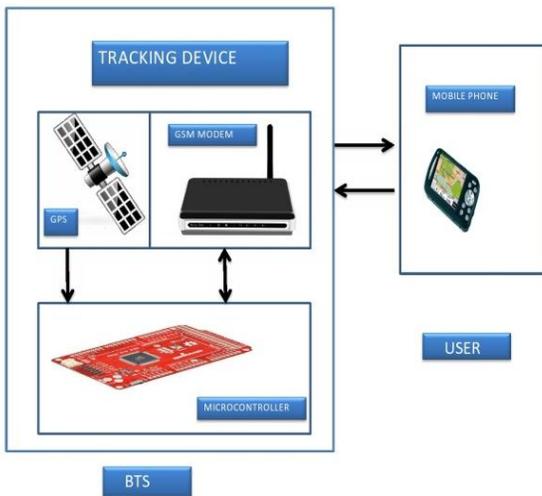


Fig -5: SmartShehar Bus

Based on the drawbacks and some advantages we provide the proposed system. The next chapter will give the details of the proposed system.

3. PROPOSED 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 MUMBAI. 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.

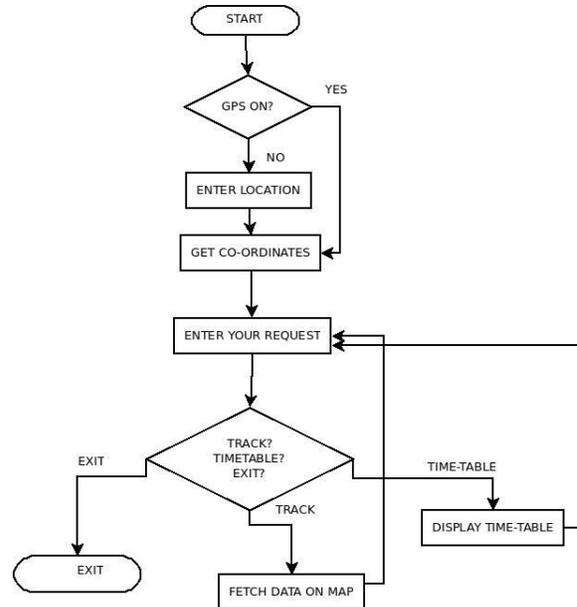


Fig -6: Workflow of proposed system

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 MUMBAI 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.

- If the user needs the route, then there is no need for internet connection.

4. CONCLUSION

It is very important for the people residing in cities to use the public means of transport so as to reduce pollution, consumption of fuel and traffic. The bus tracking system will be useful and more secure compared to other systems. This system is easy to implement on vehicles, also it will be effective. This system grants us to get equipped with work custom, eco-system and person. This application will provide great assistance for the commuters to plan their journey effectively and thus leading to minimum waiting time for the buses.

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