

# Dynamic Bus Timetable Using GPS

Gunjal Sunil N. , Joshi Ajinkya V. , Gosavi Swapnil C. , Kshirsagar Vyanktesh B.

**Abstract**— In today's India, normally 60 to 70 or more percentage of the people travel by bus. So if time is also the concern with them, they should get the buses in exact timing. Furthermore if we consider only city area then the frequency of the buses is good but for long route travelling, this frequency decreases abruptly, and possibility of getting buses in exact time is less. How to tackle this condition? So to overcome this problem, we have developed an android application "Dynamic Bus Time-Table Using Gps". So, this ability to obtain accurate prediction of bus arrival time on real time bases plays vital role for both bus operation controller and passenger.

Several studies have been devoted to this arrival time prediction problem in many countries, however only few resulted in completely satisfactory algorithm. Our application presents an effective method that can be used to predict expected bus arrival time on website which can be viewed at home also. Dynamic bus timetable is GPS based and manual system design to display the real time location and timetable of buses which can be useful for any public transport system. The system will require working internet connection and GPS tracker also a mobile phone containing android OS. The assembly of this component will enable the tracking device to connect to internet to obtain bus location using GPS. In addition device will be portable and there will be website containing timetable for public transport system.

**Index Terms**— Smartphone, GPS, Public Transportation, Power Management.

## I. INTRODUCTION

Dynamic Bus Time-table is GPS based and manual system designed to display the real-time location and time table of buses which can be useful for any public transport system. The system will require working internet connection and may or may not be GPS tracker. For this mobile phones containing android OS will be useful. The assembly of these components will enable the tracking device to connect to internet to obtain the bus location using GPS. In addition the device will be portable. There will be website that contains timetable for the public transport system.

This application will serve viable notification information to people and depending on this notification they can exactly track location of particular bus updated by bus conductor or driver. This will require each ticket conductor of bus to be equipped with android phones containing this application. Any general internet user can access information with the help of website. It is not necessary to use android phones for user to access timetable of bus, he can easily get it on systems website.

This website will consist of dynamic time table which will serve as highlight of our application. This application will serve automatic average speed calculation of the bus

between the updates. In today's life there approximately 70% people travel through the buses, which includes government, buses as well as city buses.

There will be three privileged access levels. One for Transport manager second is for particular depot manager and last one is for conductor or driver of the bus. Duty of depot manager will be add or remove the bus from bus timetable. So none other than depot manager and transport manager will modify timetable. The role of bus conductor or driver will be manually start or stop the application.

## II. PROBLEM STATEMENT

To develop application on GPS enabled Android phone to get exact location of the bus. Main objectives of this application is to update online bus timetable periodically using data by the application. This will make easy to predict the bus arrival time of bus for passenger with the help of application and website.

## III. LITERATURE SURVAY

A number of studies have been initiated in the past to address the bus arrival time prediction problem. These efforts have resulted in three types of prediction models:

1. Models Based on Historical Data
2. Multilinear Regression Models
3. Artificial Neural Network Models.

**Model Based on Historical Data:**

The first type of prediction models infers the current and future travel time of a bus based on the historical travel time of the same bus or other buses. .

The algorithm worked by dividing each route into zones and recording the time that each bus passed through each zone. Predictions were based on the most recent observation of a bus passing through each zone. However, this algorithm was not suitable for large cities where both travel time and dwell time could be subject to large variations. Generally speaking, these models are reliable only when the traffic pattern in the area of interest is relatively stable. One of their main limitations is that it requires an extensive set of historical data, which may not be available in practice, especially when the traffic pattern varies significantly over time.

Our system is also used this algorithm to find accurate bus location

**Multilinear Regression Models:**

The second approach is applying mathematical models to predict the expected travel times between stops and then the expected bus arrival times at individual stops. These models are usually established by regressing travel times against a set of independent variables, such as traffic conditions,

ridership, number of intermediate stops, and weather condition.

However, this approach is reliable only when such equations can be established, which may not be possible for many application environments where many of the system variables are typically correlated

Artificial Neural Network Models:

The third approach is applying artificial neural networks (ANN) that are capable of capturing complex nonlinear relationships. Jeong and Rilett proposed an ANN model for predicting bus arrival times and demonstrated its superior performance as compared with other methods. However, ANN models require extensive training and testing in order to find the right network structure and determine the best parameter values.

#### IV. CURRENT SYSTEM

Bus timetable updating is currently done in following ways:

1. On-board bus timetable
2. Bus stop
3. Current applications

On-board bus timetable:

In this method, the bus timetable can be written on the board. The timetable of buses is changes according to daily routine buses. That all things are done in static manner means it is static system to displaying timetable of bus.

Advantages:

1. All the passengers can get timetable of buses easily.
2. Easy to understand, which bus is going where, and at which particular time.
3. Passengers don't need to ask time of the bus to any person or controller of the bus station.

Disadvantages:

1. At the time of emergency means if mechanical failure occurs to any of the bus, then time management fails.
2. We never get actual location of the bus.
3. Most of the times people have to wait for particular bus on stations and this are the big problem of the current system.

Bus Stations:

In recent times, for more convenience state transport have decided that the maximum distance between two depots should not be more than 60 km.

They have also decided that at least 2 control points should be there within this distance...

Also for every bus stations they have provided announcement systems, so that passengers can get information about which bus is standing on which platform and can get its location easily.

Advantages:

1. With the bus depot and control points provided, we can easily predict nearby location of the bus by making call to the depot or control point on that particular route.

2. With the help of announcement system, we can easily get the idea about which bus is standing on which platform and so on.
3. We can make in advance reservation of any bus on the bus depot office.

Disadvantages:

1. To make use of any such services discussed above, we compulsory have to go at the bus station.
2. We never get the exact location of the bus.

Current applications:

In current applications, there are some several application are develop for predicting the next bus. Now this movement no other application display timetable on website. For this we required smartphone at passenger site. If passenger not has smartphone so he is not able to see the current location of the bus. There are some application providing online bus tickets booking, through which we can book tickets in advance in any of the bus company.

Applications also provide offline centres along India for tickets booking. There is some application also providing location of bus through SMS but only those people who had reservation of bus. It sends notification of bus only recreated bus not to other buses. Ex. Redbus, Pytham.

Redbus application required from both side that means it required from passenger as well as conductor of bus. This means passenger must required

Advantages:

1. We can book tickets in advance of any of the bus company in India.
2. Online as well as offline booking options are provided.
- 3.

Disadvantages:

1. Bus location tracking service is not provided.
2. So we can never get exact location of the bus using this bus application.
3. This application does not show the map of current location of bus.
4. Passenger must require smartphone to see bus location.

#### V. OUR SYSTEM

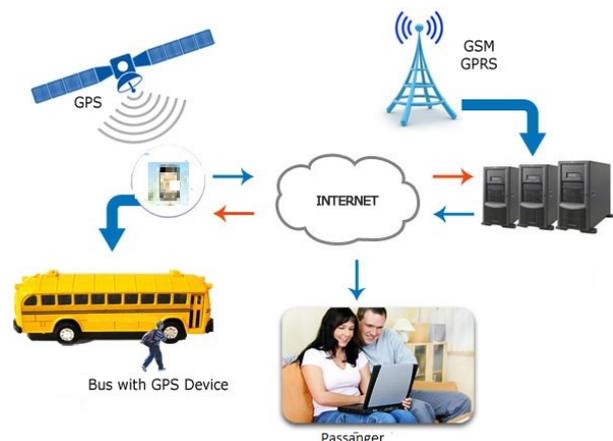


Fig. 1. Architecture

Our system takes the advantages of all the above systems. Our system commonly divided into three models.

1. Android Application
2. Remote Database
3. Website

Android Application:

In First model we are creating android application for getting current location of bus. Location can be access through Global Positioning System. The main work of application is get current location of bus and send to remote database. Application contain three sections. It contains Admin, Bus Conductor and user side. Admin control the timetables of all buses. Only admin can add or removing the bus from timetable. Admin can assign a unique id for route so bus conductor can access it. Bus conductor also had his personal id and password. Main work of bus conductor is selecting the bus route and start application when bus is ready to go. If user used this application then they can see only timetable of required buses. User can't modify timetable of buses. They also see the bus location on graphical manner or on maps. This location of bus can be access in two modes i.e. manually and automatic. In manual mode bus conductor manually update bus location and if selecting automatic mode GPS is started automatically for particular time period and get location of bus.

Remote Database:

In second model we are required remote database to get location from application. Application send or update the location of bus periodically. For these purpose we required web space to store timetable of buses, and other information of buses. In our system we used MySQL database.

Website:

To make different and unique system we are creating our own website to display timetable of buses. The main purpose to creating website is suppose passenger not having smartphone then he can also access location of bus by accessing website on computer, laptop or any internet enable mobile. This website is connected to remote database using in the system. So when application sending or updating location of bus on remote server or database then it automatically displayed on website. When refreshing website after particular time period timetable also updated.

Advantages:

1. The bus location or timetable can be accessed from anywhere the passenger maybe.
2. The passenger can see the route of bus on smartphone.
3. If user not has smartphone, still he can see the timetable of bus on website.
4. Application also provides emergency help for bus.
5. Multiple routes are added efficiently.

Disadvantages:

1. The problems with the network coverage for mobile may be the interfering factor for the continuity of the bus timetable.

2. The perfection of GPS coordinates in rural area is going to effect the bus location.
3. Sometime require the use of Google fencing.

## VI. FEATURES

In our system we are providing some outstanding features. In this 'emergency help' is one of them. If some functional or non-functional problem occurs on bus and bus conductor required help of technical person then this feature will be used. In our application we are providing one button when pressing this button we can get pop of list of nearest bus depot. When we click on any or nearest bus depot then there will be another pop of list display it showing some helpful contact number such as service van no., ambulance no., nearest police station no. , depot office no. etc. So as per required conductor can get help using application.

## VII. CONCLUSION

Accurate prediction of bus arrival time can not only help passengers time their departure times from work places and homes and make successful transfers by reducing waiting times at stops, but also help transit agencies manage and operate their systems in a more responsive manner such as real-time dispatching and scheduling.

The system is capable of tracking a large number of buses simultaneously, detecting their service routes and directions automatically, and predicting their arrival time.

## REFERENCES

- [1] Sun, D., and L. Fu. Cellular Phone Based Real-Time Bus Arrival Information System. Pros., Eighth International Conference on Applications of Advanced Technologies in Transportation Engineering, Beijing, May 2004.
- [2] Lin, W.-H. and J. Zeng. Experimental Study on Real-Time Bus Arrival Time Prediction with GPS Data. In Transportation Research Record: Journal of the Transportation Research Board, No. 1666, TRB, National Research Council, Washington, D.C., 1999, pp. 101-109.
- [3] Fu, L., and X. Yang. Design and Implementation of Bus-Holding Control Strategies with Real-Time Information. In Transportation Research Record: Journal of the Transportation Research Board, No.1791, Transportation Research Board of the National Academies, Washington, D.C., 2002, pp. 612.
- [4] <http://www.redbus.in>
- [5] Jeong, R., and L. R. Rilett. Bus Arrival Time Prediction Using Artificial Neural Network Model. *Proc., IEEE Intelligent Transportation Systems Conference*, Washington, D.C., 2004, pp. 988-993.
- [6] [www.bustracking.org](http://www.bustracking.org)

**Author:**



Gunjal Sunil N.  
B.E.Computer,  
University of Pune,  
Department of Computer Engg.  
Govt. College of Engg. & Research,  
Awasari (kd),  
Tal- Ambegaon, Dist-Pune. India.



Kshirsagar Vyanktesh B.  
B.E.Computer,  
University of Pune,  
Department of Computer Engg.  
Govt. College of Engg. & Research,  
Awasari (kd),  
Tal- Ambegaon, Dist-Pune. India.



Joshi Ajinkya V.  
B.E.Computer  
University of Pune  
Department of Computer Engg.  
Govt. College of Engg. & Research,  
Awasari (kd),  
Tal- Ambegaon, Dist-Pune. India.



Gosavi Swapnil C.  
B.E.Computer,  
University of Pune ,  
Department of Computer Engg.  
Govt. College of Engg. & Research,  
Awasari (kd),  
Tal- Ambegaon, Dist-Pune. India.