

Intelligent Dynamic Bus Transportation System

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Abstract: Android is the latest and a rapid growing technology available for all the users or customers in today's market. Every Person uses smart phones to make his life luxurious. Now-a-days management of increased public transportation is one of the major issue. There are buses made available for passengers travelling distances, but not many passengers have complete information about these buses. These days Smartphone plays vital role in everyone's life. Through these Smart phones, Passenger can get complete information about buses such as accurate bus timings, correct bus numbers, GPS tracker which will improve current bus system. This application works on GPS enabled Android Phone to get exact location of bus on Google map and this data is used to update on-line bus timetable dynamically which will make easy to predict bus arrival time of bus for passengers. It will allocate bus dynamically by considering parameters such as count of persons who want to go to the same destination and number of vacant seats of bus going to the same destination. Every bus-stop will have one android application which will take mobile number and destination name as input which will be used for dynamic allocation of buses. After that server will allocate bus and calculate fare and send it to the user on specified mobile number through SMS. If there are less number of passengers than available seats then allocation will be done normally like current bus transportation system.

Keywords: GPS Device, G-Map, PMT Buses.

I. INTRODUCTION

Transportation is not just a tool, It connects everything to everyone from different stages of life with different needs and requirements. Bus Transportation system is one of the most widely used transportation system in India. People from metropolitan cities like Pune, Mumbai etc. make use of bus transportation system in their day to day life to fulfill their daily transportation needs.

Though we are in 21st century and our country is progressing towards Digital India, PMT Bus System have not meet expectations of its regular passengers as PMT Bus users faces problems like overloaded Buses during Peak hours, Crowded Bus-stop, Inconsistent arrival time etc. Considering all these problems PM modi has decided to place GPS Device in every PMT Buses to get its real time into which will overcome above mentioned problem.

II. BLOCK DIAGRAM

The proposed system consists of their modules namely Bus Tracking module, Dynamic allocation module, and android application for Smartphone users:

1. Bus Tracking Module:

Though there are numerous applications on bus transportation system, real-time bus tracking is not including in anyone of them. Hence this is very important module in the proposed system which make use of GPS Device which shown in following figure 2. To get exact location of bus to the passenger onto their Smartphone through this application, Google Map is integrated with this bus tracking module.

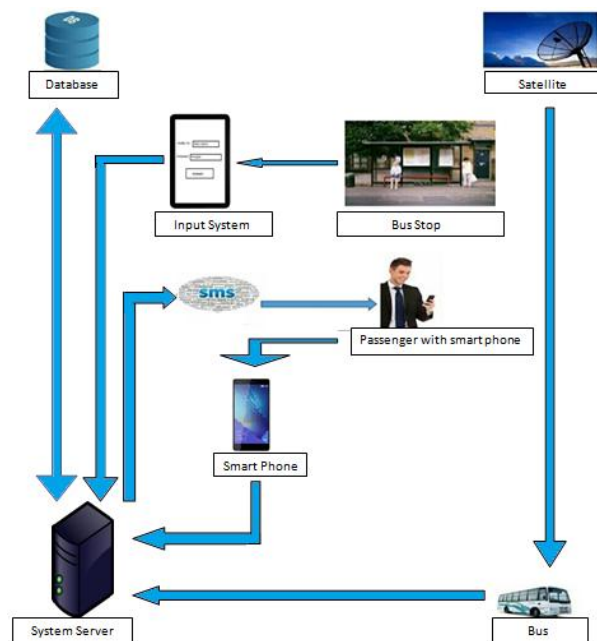


Fig.1.Block Diagram



Fig 2. GPS Device

A GPS tracking system uses the Global Navigation Satellite System (GNSS) network. This Network incorporates a range of satellites that use microwave signals that are transmitted to GPS devices to give information on location, vehical speed, time and direction. So, GPS tracking system can potentially give both real-time and historic navigation data on any kind of journey.

To show tracking location of buses to enduser on their smartphones, Haversnie Formula is used. It Calculate geographic distance on earth. If you have two different latitude – longitude values of two different point on earth, then with the help of Haversine Formula, you can easily compute the great-circle distance (The shortest distance between two points on the surface of a Sphere). The term Haversine was coined by Prof. James Inman in 1835. Haversine is very popular and frequently used formula when developing GISApplication or analyzing path and fields.

For any two points on a sphere, the haversine of the central angle between them is given by

$$\text{hav}(d/r) = \text{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1) \cos(\varphi_2) \text{hav}(\lambda_2 - \lambda_1)$$

- d is the distance between the two points along a great circle of the sphere (spherical Distance),
- r is the radius of the sphere,
- φ_1, φ_2 : latitude of point 1 and latitude of point 2, in radians.
- λ_1, λ_2 : longitude of point 1 and longitude of point 2, in radians.

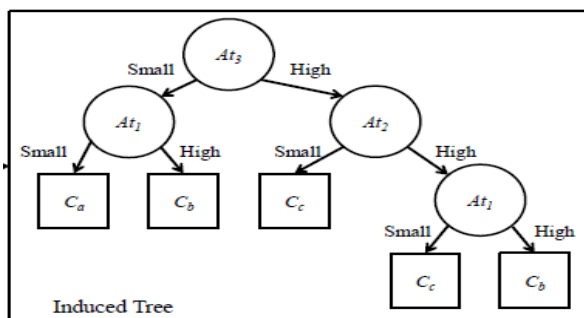


Fig.3.Fuzzy Decision Tree

2. Dynamic Allocation of Buses:

Today’s exiting system doesn’t support for dynamic allocation of buses. This module will detect passenger’s flow by considering parameters such as user requests and capacity of bus and then take decision to rearrange another bus for extra passengers with the help of fuzzy Decision trees. These decision trees are especially used for classification problems as it computes fast with low computation power. In fig.3, Leaves represent classes and Interior nodes indicate attributes to measure uncertainty. In this tree, Each branch can be seen as rules whose conditions are formed by their attributes and respective tests.

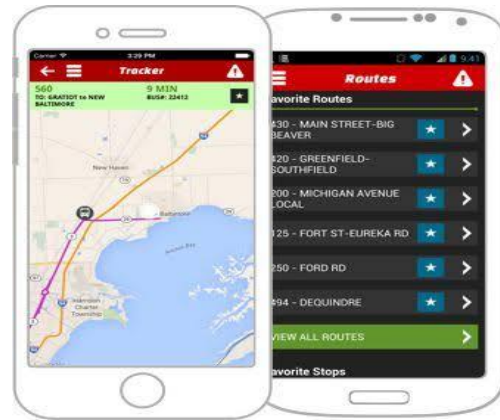


Fig.4.Android Application

3. Android Application:

This application is beneficial for both Smartphone users and non-Smartphone users as proposed system provides one Input Device on every bus-stop which allows passengers to reserve a seat and notify about confirmation of a seat through sms. This Android application provides functionalities such as tracking of bus, Dynamic updation of bus schedules, Reminder for arrival destination, Nearby Bus stops to those passengers who have their own smart phone. This application needs authorized credentials to send regular notification for passenger’s favorite buses. This credentials stored at server using MD5 Algorithm which make use of digital signature mechanism.

III. CONCLUSION

Henceforth, the proposed System is used to update online bus timetable periodically which will make easy to predict the bus arrival time of bus for passenger with the help of application. This system is capable of tracking a large number of buses simultaneously, scheduling those buses dynamically and allocating to appropriate passengers

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