Real Time Bus Tracker which gives the Exact Location and Estimated Time of the Bus

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Abstract— In today's world, Transportation is one of the major fact which need to be taken into consideration. It plays important role in economy. But now-a-days public Transportation is neglected by all people due to time management and lack of knowing bus time table. People should get buses in exact time. If we consider only city area the frequency of the public transportation is good but for long route it goes on decreasing. Therefore the possibility of getting the bus in exact time is less. To handle the situation we have developed an Android application for users to get the estimated arrival time of buses and to get the exact location of the bus on Google map using GPS. People should be aware of exact location of bus, arrival time of bus and number of passengers in bus. So, to solve this problem we are going to implement a Bus Tracking System that any passenger with a smart phone or mobile device can estimate arrival time of bus with their current location and bus routes on a map. Our system handles all the data like current location of bus, management of buses and its schedule. This information is then given to remote user who wants to know the real time bus information.

Key words: GPS, ETA, Latitude, Longitude, Android, Google Map

I. INTRODUCTION

The people who uses the public buses for transportation but due to uncertain conditions like traffic congestion, irregular vehicle dispatching time, accidents, randomness and other certain instances they often get let for their work. This system is proposed to know the passenger the exact location and arrival time of it along with available seats in the bus. So that they should manage their time. The main purpose of this system is to get users the exact location of required bus on Google Map besides providing bus information such as number of passengers in the bus, bus number, driver details, stops.

In today's world time is important for all of us but due to this situation it may get wasted. Now-a-days smart android phones are widely used by all.

So it is more convenient to make an android application rather than any other device for the same system. Due to certain conditions people have to wait for their bus at the bus stops for a long time without even knowing when the bus will arrive. By using QR code placed on the bus stop user can scan the code by scanner available on mobile phone can find the bus details.[15]. For addressing this need we propose to develop this application which will meet these requirement. For that we will use Android studio, Django framework, GPS, Smart phone.

Most of the private transportation systems provide their service information on their websites, user need to visit that website and access the vehicle details. In traditional transportation method they provide printed maps and schedule cards and the "rider guide". Then onwards the system is diverted to internet and now it is get connected to the Google transit. Dynamic Bus Time-table Using GPS [2] is a GPS based and manual system designed to display the real-time location and timetable of buses which can be useful for any public transport system Real time vehicle tracking and management system has been focused by many researchers and developer.[1] And several studies have been done on the same area. Global Positioning system (GPS) technology is widely for location tracking and furthermore due to smart phones GPS is available easily. This technology was developed by the Department of Defense of the United States in the early 70s for military applications and is maintained by the United States government.[3]

II. SYSTEM ARCHITECTURE

The main objective of the project is to create an application that will synthesize the Source and Destination and produce the output in the form of user's requirement. This information will give us the proper idea about the bus location and accordingly user can manage his/her time. The system will give you the distance travelled by bus along with its speed, bus number and route details.

We would be creating an android application which will provide interface to the user for accessing the required information. User will login into the android application. It will ask for the source and destination of its choice. The application will take the current time and give the information about the buses after that particular time and even the number of buses. We are going to use the GPS trackers from smart phone of the bus driver. Then user will select its required bus and here our application gets connected to the GPS. The GPS receives the satellite signals and then the position co-ordinates with latitude and longitude are determined by it. The GPS trackers in the buses which will give us exact location and we will need a database to store the complete data of the buses location and time and we would also have a GPS receiver which will get the geographical co-ordinates from the GPS tracker and convert it into user's understandable format. After receiving the data, the tracking data can be transmitted using any wireless communications systems. GSM is used generally to transmit the data. This data about the location and time of the buses will be stored in the database which will be updated regularly according to the time which we will provide from which the user retrieve the information about the buses.[7] Following figure 1 shows architectural diagram of the system.
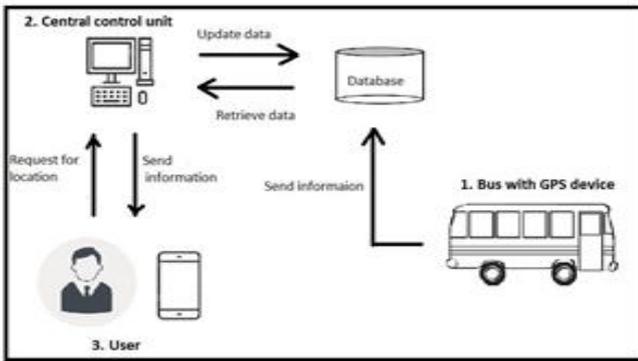
Fig. 1: Architecture Diagram of System

The proposed system consists of total three modules which are as follows:
1) Bus Module
2) Server Side Module
3) User Module

A. Bus Module

This module is Android app provided to the driver and its GPS is need to on continuously. The authorized bus drivers are provided with their own login credentials. They need to enter all bus details such as route of the travelling, stops passed by the route, bus number, driver's personal details.

Whenever bus starts from the source point Bus Module get updated by driver according to required details. Then onwards the location and speed of the bus automatically will get send to the server with passenger details. In this application driver need to update the passenger data that is new passengers are boarded or not need to update at the stop in the route. Whenever driver logged on into the application it will get connected to the server and send the details to the server using GSM.
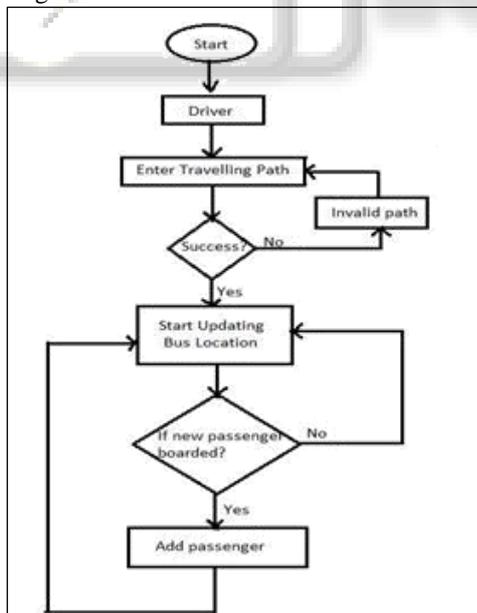

Fig. 2: Flow diagram for Bus Module

B. Server Side Module

This is the administration module which will provide the connectivity between the User side application and driver side module. It is at the centre of the Real Time Bus Tracker which gives the exact location and estimated time of the bus.

The database of all the buses and their information is maintained at the server side. The server side database contain the available bus details, route of individual bus and stops passing by are also available in the same. It continuously receive location parameters such as latitude and longitude of bus at current time along with the speed of the vehicle. At the computation level it will provide the estimated arrival time of selected bus with its required data. It will handle the request which is send by the user. The data storage structure required for storing the user details is the Sqlite server 5.5. Database and the various tables for storing different entries such as user credentials, entered route logs, storing the bus information etc. The additional requirement of storing the user privileges is required for maintaining the track of the privileges the users are granted by the admin. Sqlite Server is used to create the back-end database. To calculate the estimated arrival time (ETA) of all the buses at their next and subsequent bus stops. To reply to the android Google based queries requesting ETA of buses running between the two specific stop from users. A GSM mode connected to the server transfers these queries to the server which processes them and reply the time.

C. User Module

This is the user module in which an Android application is provided to each user to access the related search. Firstly user need to login into the app and then enter the source and destination of its travelling route. Then the user module get connected to the server module for further connectivity with Google map. The user request is send to the server and according to the co-ordinates send by the Bus Module and other bus details with current time will get send to the Google API's and then the Google Map is viewed on the user's smartphone on which he can see where the bus actually is at the same time, how many seats are available, how much time it will take to reach at the destination so that he can manage his time. Input can only be taken so that when the user request for the bus information related to the given route, the particular bus which' is convenient to him is get selected. Following figure 3 shows flow diagram of user module.
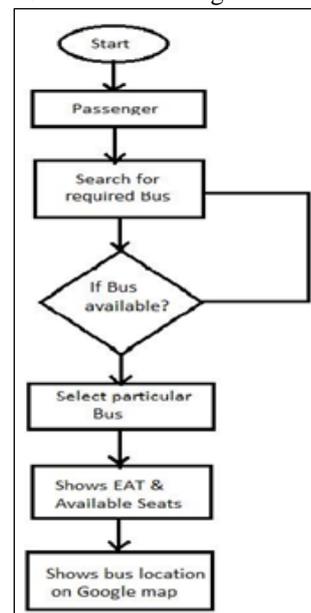

Fig. 3: Flow diagram for User Module

III. APPLICATION

The proposed system is used by the general rural as well as urban users who are using the public bus transportation system. In today's world, everyone wants technology on fingertips. This system is providing a mobile application which will help the passengers to get bus arrivals at a particular stop.

IV. RESULT

This project presents a system which provides high practical value in the modern fast era. The system has high practical value and cost efficient. This system is more user friendly for users to get information visually shown on Google Map. User can freely get this android application for real time tracking of bus which provide interactive interface environment.

The proposed project uses Django framework instead of JSP framework. JSP technology that helps software developers to create web pages dynamically based on HTML, XML or other document types. JSP is quite similar to PHP, but the thing which makes it different is the programming language it works with. JSP uses the Java when it comes to programming language. Django is a web framework written in Python programming language. It's again a platform which provides an ability to create static and dynamic webpages in a very short period of time. The use of Django makes an application as fast as possible. The use of Django helps in making this proposed project cost effective and efficient. The Django framework is used to meet the heaviest traffic demand.

Earlier system uses QR code for providing locations of bus stops. QR code contains location information in the form of latitude and longitude. The proposed system uses REST framework and JASON format for providing location of buses. The use of REST makes it easy for the application to provide the location in a much faster and efficient manner as compared to QR code.

V. CONCLUSION

Our system reduces the waiting time of remote users for bus. The system tracks the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via android based application. So by using this application remote user can just wait or they may reschedule their journey according to the availability of bus.

VI. FUTURE SCOPE

The proposed system uses computer, Mobile Phones etc., there is a possibility of Denial of Service (DoS) attack by malicious agents who might try to disrupt the function of the system. Ad Hoc Networks can be used and to prevent this kind of attack. Also we can enhance the system by some other estimation tools and statistical analysis. Since the system is developed with open standards and open sources, it is easily extended with future technologies according to users' needs.

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