

# Real-Time Bus Tracking System

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**Abstract** - Unusual and unexpected conditions on the roads affect the smooth operation of the bus system and the movement of vehicles. Also, everyday problems such as traffic congestion, unexpected delays, randomness in passenger demand, irregular vehicle dispatching times take place and as a result of which the schedule of the passengers are affected and they inevitably have to wait for the arrival of their respective bus. This passenger inconvenience can be avoided by introducing a system which provides real-time information about the location and estimated time of arrival of the buses. This project focuses on the implementation of a Real-Time bus Tracking System (RTBTS), by installing GPS (Global Positioning System)-module devices on college buses which will transmit the current location on the GPS Receiver. Now the GPS Receiver will be interfaced with a computer and an interface driver will auto save data in a dot text (.txt) file which will continue to do so until the GPS module is connected to a bus. From here the application will retrieve data and store it in web server from where the system will display real-time information of the bus. The real-time bus tracking system is a standalone system designed to display the real-time location(s) of the buses provided by the college.

**Key Words:** Passenger inconvenience, real-time information, Real-Time Bus Tracking System (RTBTS), GPS module, web server.

of passengers waiting for the bus. With the advent of GPS and the omnipresent cellular network, real-time vehicle tracking for better transport management has become possible. These technologies can be applied to transport systems especially buses, which are not able to adhere to predefined timetables due to reasons like traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival make public transport system unattractive and impractical for passengers to manage their daily transportation. The real-time bus tracking system uses GPS (Global Positioning System) technology to fetch data and displays the data using a software allowing a user to monitor a particular bus on a particular route. When this information is presented to the passenger by wireless media or online web media, they can manage their time efficiently and reach the bus stop just before the bus arrives, or take an alternate means of transport if the bus is delayed. They can even plan their journeys long before they actually initiate them. The real-time tracking of the bus can be done by our proposed system and this information is then given to a remote user who wants to know the real-time bus information. The system provides web-based application, which gives the real-time location of a bus on user interface screen to the remote user. This will make the college transport system smooth and passenger friendly.

## 1. INTRODUCTION

The movement of college buses is affected by different uncertain conditions as the day progresses such as traffic congestion, unexpected delays, and randomness in passenger demand, irregular vehicle-dispatching times and many more incidents. Many students and staff members are often late for college because they decide to wait for the bus instead of using an alternate transportation. To reduce this confusion and inconvenience, a message will be shown on the web that will provide the real-time information about the bus showing its arrival time which could reduce the anxiety

## 2. LITERATURE SURVEY

**Paper 1:** "Real Time Bus Position and Time Monitoring System" IJSTE-International Journal of Science Technology Engineering, Volume 1, Issue 10, April 2015. Many passengers are usually late to work, students are late for classes as a result of they decide to anticipate the bus rather than simply merely using another alternate transportation. A variable message shown on the web which will be real time info regarding the bus showing the time of arrival at a particular bus stop might scale back the anxiety of passengers expecting the bus. With the advent of GPS and

also the ubiquitous cellular network, real time vehicle tracking for higher transport management has become attainable. These technologies can be applied to conveyance systems particularly buses, which are not ready to adhere to predefined timetables owing to reasons like traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival build conveyance system unattractive for passengers. The real-time bus position and time observance system uses GPS technology alongside totally different application to fetch knowledge and with code that displays the information online on with different buses on a special route to the user. When this info is conferred to the traveler by wired or wireless media or online internet media, they can use their time with efficiency and reach the stop simply before the bus arrives, or take alternate means of transport if the bus is delayed. They can even arrange their journeys long before they really undertake them. This will build the general public transport system competitive and passenger- friendly. The use of personal vehicles is reduced when additional individuals use transit vehicles, which in turn reduces traffic and pollution.

**Paper 2: M. B. M. Kamel, "Real-time GPS/GPRS based vehicle tracking system," International Journal Of Engineering And Computer Science, Aug. 2015**" The Real Time Bus Monitoring and Passenger Information bus tracking device will serve as a viable notification system that will effectively assist pedestrians in making the decision of whether to wait for the bus or walk. This device is a standalone system designed to display the real-time location(s) of the buses in Mumbai city. The system will consist of a transmitter module installed on the buses, receiver boards installed on the bus stops, LED embedded map of the BEST bus transportation routes at the centralized controller. It will also have passenger information system software installed at the bus stops, which will provide a user the relevant information regarding all the bus numbers going for his source to destination along with the route details and the cost. Assembly of these modules will enable the tracking device to obtain GPS data from the bus locations, which will then transfer it to the centralized control unit and depict it by activating LEDs in the approximate geographic positions of the buses on the route map. It will also transmit its bus numbers and route names continuously as soon as the bus comes within the range of the receiver at the bus stop. In addition, the device will be portable and sustainable; it will not require an external power source, which will eliminate long-term energy costs.

**Paper 3:"Real Time Availability System" International Journal of Advanced Research in Computer Engineering Technology (IJARCET) Volume 4 Issue 3, March 2015,** This Paper is a survey to implement a method that makes transport much convenient for individuals who commute daily using the public bus transport of the city, for effective time management and making it trouble-free, not just for the commuters but the Transport Department to create an efficient public transport system. There are applications available in the market today which specifies the route and the timings, predict arrival times of different buses But the survey presented here aims to build an application that takes it to the next step by making information about the vacant seats and the current location of any bus in Real-Time, accessible to the daily commuters with a novel and economical wireless system. These methodologies offer incremental improvements in bus system to meet the capacity requirements of different size cities and presents a review of strategies which can be employed to satisfy public transport demands of different city sizes. Their aim is to build a flexible, comfortable, easily available and reliable bus service which may encourage shift from private vehicles to public transport.

### 3. OVERVIEW OF THE PROPOSED SYSTEM

#### 3.1 Problem Statement

To design a web based application for the users who want real time information about the estimated time of arrival (ETA) buses in the college. Use of centralized server to share the calculated ETA to bus passenger through any convenient way.

#### 3.2 Architecture of Proposed System

The system is operated by GPS which is attached to the bus. Firstly it receives the satellite signals and then the position coordinates with latitude and longitude are determined. This system uses Automatic Vehicle Location (AVL). By using AVL the geographic location of a vehicle can be determined and this data can be transmitted to a remotely placed server. With the help of GPS and transmission mechanism, the location is determined. The data may be received by satellite or a terrestrial radio cellular connection from the bus to a radio receiver. After receiving the location the tracking information can be transmitted using any wireless communications systems. This system uses GSM to transmit the info. Generally, a remote user can access the data on a bus based on user's supply and destination. The proposed system provides the precise location of

the bus. Bus pursuit technology is advantageous for tracking and monitoring a bus.

The proposed system consists of three vital modules:-

1. Bus Unit
2. Central Control Unit
3. Client-Side Application

In bus unit, a bus has GPS device attached to it that sends its coordinates i.e. longitude and altitude after every fixed interval of time to the main server. 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. Depending on the kind of application the GPS transceivers may be a data Loggers, data Pullers or Data Pushers. This device receives the GPS information and sends the data at regular intervals to the server. On receiving, the server analyses the data. To receive signals in the appropriate place, the GPS antenna is connected to the right jack and fixes the antennas. One slot is allocated for SIM card and it receives the signals from the GSM towers to respond to the users. The positive and negative wire is connected to 12V or 24V vehicle power system. Then to receive the signals from the satellite the tracker device is turned on. Now the device is capable of receiving the latitude and longitude values of the location of the bus. At any point of time, the GPS receiver gives the location values. Now the bus unit has the coordinates with a timestamp which is then compared with the previous coordinates and if there is any distinction then the coordinates are updated and sent to a server over GPRS network (internet).

regarding bus it includes bus routes, actual arrival/departure time and real time location of the bus.

The user side module is nothing but an interactive web-based application that services the various function of the system to remote users. The user side module takes two inputs i.e. one is the source that indicates wherever the remote user is now and second is the destination user wants to travel. When a user sends a request the appliance fires a query to the server for accessing the data stored within the server database and provides the list of obtainable buses in keeping with remote users supply and destination. Now it's user's task to choose or select explicit bus range to understand the real time location of the bus or other information. After choosing an explicit bus number the application shows the real-time location of that bus on the user screen. This application gives support and interacts with varied clients to offer service to user's requests. The system facilitates the real-time pursuit of the bus.

#### 4. WORKFLOW OF THE SYSYTEM

The workflow of this system proceeds as follows. First, the GPS module which is fixated in the bus starts sending data in the form of latitude and longitude which is stored in the computer system. At the same time, a user can enter the source and destination of the bus number of which it seeks the location. This search will result in the all the bus routes through which the bus will travel. Alongside, the computer system will update the longitude and latitude of the required bus. This search will then look up for the range of bus from the user to its current location. If the bus is in range, the search also looks up for the in-between bus stops and the active buses in that particular range. After this, it matches the bus location with the passenger's source location and calculates the time required for the active bus to reach the passenger location as shown in Fig. 2. The GUI will display the bus location and the estimated time of arrival to the user. This process follows a repetitive cycle for every search performed by the user.

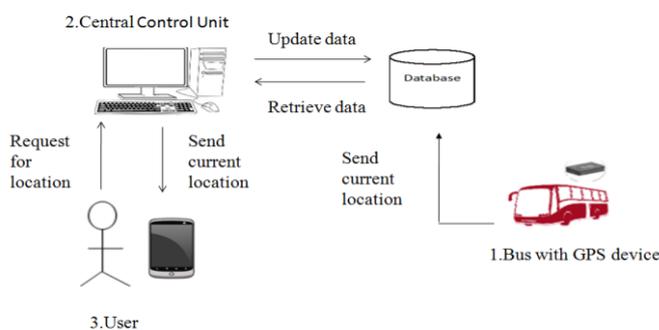


Fig -1: Architecture of proposed system.

The location details are stored on a server in the format such as ID, longitude, latitude, timestamp, etc. To identify every bus among the varied buses here ID is taken. Each bus has given one distinctive identification number. The server is the most significant module during this system which acts as a central repository of the system. In this system, the whole information is stored and maintained by the server. The server is the intermediate between bus module and user module. These databases consist of real-time information

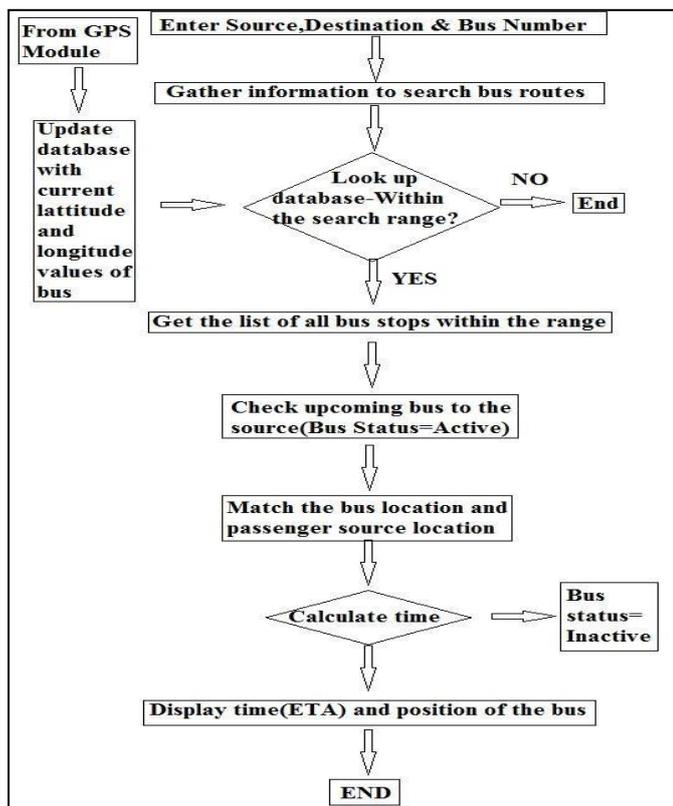


Fig -2: Workflow diagram

## 5. CONCLUSION

With the implementation of the project, a complete track can be kept of the buses of the college. The display at the passenger's end acts as a time saver. Due to this, an ideal system of bus transport is established by us for college purposes. By implementing our system, a passenger can plan their journey more efficiently before time as the waiting time at the bus stops is reduced. This system also throws a light on the frequency of the buses on the same route. The main features of this systems are the efficient usage of time, real-time information on the availability of buses, traffic acknowledgment, and commuter satisfaction. A general question arises in mind that is if the bus is stuck in a traffic or it broke down somewhere in the middle how our system will inform the traveler. The answer to this problem is that when a user will query the central server, the server will show the same location and ETA of the bus as previous so by this method, it is self-explanatory that the bus must have got stuck in a traffic or there might be an unknown problem with it. Thus in this system, we have shown that transit information collected in real time can be shown on the server for tracking and monitoring. Internet-enabled mobile phones can receive real-time transit information and will help the passenger to monitor their time more effectively and precisely.

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