

## Real Time Bus Tracking System

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**Abstract:** In the busy metropolitan cities, people don't have time to invest in waiting for transport. Waiting time for transport in such crowded cities leads to less productivity on a whole. People face this problem in their daily life where they have no idea about the current status of their transport. So the proposed solution is an android based application that will help the user to check out the current location of the bus and also will help the user to know how much time the bus will take to reach the current location of the user. The system will use IoT as the basis for the application and basic android application will be interfacing with the updated database to provide the real-time data to the user, hence enhancing the user-experience.

**Keywords:** Android Application, Enhancing, Interfacing, IoT, Proposed.

### I. Introduction

There are buses available for passengers travelling to different locations, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the vehicle to reach its destination location would assist the passengers with various routes, track the current location of the bus and give the correct time for the bus to reach its bus stop. The proposed system deals with overcoming the problems stated above. The system is an Android application that gives necessary information about all the buses travelling in Mumbai. The platform chosen for this kind of system is android, reason being Android Operating System has come up on a very large scale and is owned by almost every second person. As more and more applications of android operating system is developed day by day on large scale ever since it is advent. Android is an open source mobile software environment. There are various problems that require solution such as 'the zone in which the bus is' and 'the recorded time that each bus passed through each zone'. The limitation of this algorithm is that it is 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.

### II. Literature Survey

These are some of the technical literature in engineering and technology where people have tried to implement similar kind of Systems which are mentioned below with their shortcomings with respect to our Application.

Authors "Mr. Pradip Suresh Mane & Prof. Vaishali Khairnar" have implemented the proposed system Analysis of Bus Tracking System Using GPS on Smartphone's" which focuses more on just Tracking the vehicle module. Wherein a mobile application is used to track the nearby Vehicles & also notifies about the nearby bus stops, so that the people can plan their route & Travel options accordingly & has been implemented in-order to improve the decisions made by general people while commuting considering the "Best Transport Division" The inference drawn by this system is that the main focus is on the android application which provides all the information of the vehicle.

Authors "Mrs.Swati Chandorkar, SnehaMugade, Sanjana Sinha, MegharaniMisal, Puja Boreka" implemented the proposed system "Implementation of Real Time Bus Monitoring and Passenger Information System" track the current location of the bus/vehicle & indicate the normal user about the current location & notifies general user about the natural delay caused during transportation considering any kind of natural calamity. These messages regarding the arrival of the bus is updated on a back-end server, this information is notified to the commuters via a Smartphone app so that commuter can opt for a different route. The inference drawn by this system is that the main focus is on the location of the buses and the delay because of any calamity. Authors "ManiniKumbhar, MeghanaSurvase, Pratibha MAVdhutSalunk" have implemented "Real Time Web Based Bus Tracking System" The proposed system reduces the waiting time of remote users for bus. A system is used to track 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 web based application. This system is more user friendly for users to get information visually shown on Google Map. User can freely get this web based application for real time tracking of bus which provide interactive interface environment.This application helps remote user to just wait

or reschedule their journey according to the availability of bus. The inference drawn by this system is that the main focus is on the interactive interface environment.

Authors "M. A. Hannan, A. M. Mustapha, A. Hussain and H. Basri" have implemented the system "Intelligent Bus Monitoring and Management System" The proposed system uses Artificial intelligence with the help of RFID module which is used in-order to reduce the manual work carried out in the Bus-Management & Monitoring System where in the bus driver is allocated with an id who assigned a transport vehicle by the system as per the schedule This helps in reducing Human-errors that are present in the current system. The inference drawn by this system is that the main focus is on the RFID module used as a reference to artificial intelligence. This can be an ideal system as manual work is decreased by using artificial intelligence.

Authors "Süleyman Eken, Ahmet Sayar" have implemented "A smart Bus Tracking System based on location-aware service and QR code." In this paper, Bus tracking system, any passenger with Smartphone can scan QR code placed at bus stop to view estimated bus arrival times, current location of bus, and have option like sign-up to receive free alerts about expected arrival of bus for interested buses and related routes via SMS and email using C4.5 algorithm for estimation of bus arrival times that minimize the passenger waiting time. GPS & Google maps are used for bus tracking and display location of bus respectively.

Authors Madhu Manikya Kumar, K. Rajesekhar, K. Pavani, have implemented "Design of punctually enhanced bus transportation system using GSM and Zigbee," The daily operation of public transport system, mainly that of buses, the movement of vehicles is influenced by different undetermined conditions as the day progresses, such as traffic congestion, unexpected delays, irregular vehicle send off to destination times and incidents. Passengers and students are often late to the destination due to poor transportation and they do not use alternate route to their destination. The bus arrival time showed by variable message sign reduces the anxiety of passengers. Displaying the bus arrival time to various devices on various platforms will help reach large no. Of consumers who can utilize the functionality of the system. GPS and the ubiquitous cellular network helps in real time vehicle tracking for better transport management have become possible. These techniques can be applied to public transport systems, especially buses, which are not able to adhere to predefined timetables due to reasons like traffic jams, breakdowns etc.

### **III. Need Of New Generation Bus Tracking System**

Main objective of New generation bus tracking systems is to get real time location coordinates of the bus and count the number of passenger in bus so that passengers can make better travel decisions and also to make user friendly system to track location and get the density of passengers in bus. Main effects of such a bus tracking system are reduced wait time, reduced uncertainty time, increased willingness to pay and customer satisfaction.

### **IV. Existing System**

Real time bus tracking systems are a group of modules that display the bus timings on the LCD screen of the bus Stop. The system comprises of the power source, battery, LEDs, RF transceiver microprocessor. RF transceiver is installed over every bus that polls a signal that contains its GPS coordinates. The data will then be processed by the microprocessor. RF transceivers are installed at every bus stop to receive information regarding bus coordinates. These will be passive circuits and will get active only when transmitter enters the range of reception. Bus location is displayed on the LCD screen along with the bus number. Also the Existing System is not giving the density in bus so that people cannot wait for Bus instead of that people take alternative transport system.

### **V. Proposed System**

Generally our system uses GPS module which is attached to the arduino system in the bus. Firstly, the satellite signals are received by it and then the position coordinates like latitude and longitude are determined by it. Proposed system uses GSM module to communicate & update data on the server. By using GPS, the geographic location of a vehicle can be determined and the related information can be transmitted to a remotely located Server.



Fig 5.1:-architecture of proposed system

The Location here is determined with the help of GPS and transmission mechanism. This location data after being received from nearby satellite and cellular towers, the tracked data can be fetched by the android application on the consumer's device. Here the commuters can not only fetch the bus location but also know estimate time taken by bus to reach its destination. Here our Android application also provides the estimated count of people in the bus. So, with the help of available information the commuters can decide whether to wait for the bus or proceed with an alternate route.

## VI. System Architecture

Application starts with instantiating Location Manager. This is needed to track user location. Detailed description regarding Location Manager is provided in this section. Next, UI and user interaction handling sets up all necessary selections. In order to provide a detailed view concerning system mechanism, project can be grouped in three segments. These are Location Manager, Fragments and sync Task & Services. The Broadcast receiver in the GPS module work in tandem to establish connection & report location, the fragments in the activity class manage all the methods in listing peers. To search for a bus, client has to enter the bus number in the search bar of the application. Then the map is displays the current location of the bus. An alert is sent as soon as bus reaches nearest stop. When the application is launched, the home Activity fetches the routes (Location) and bus No. from the server and binds it for the client to select it. When the client selects a bus, corresponding stops are fetched from the server and binded in the application for the client to select it. If the client selects "Track Bus" then the location details of the bus from that route is fetched. If the client clicks on "Show Map" then the location of the bus on the map will be displayed.

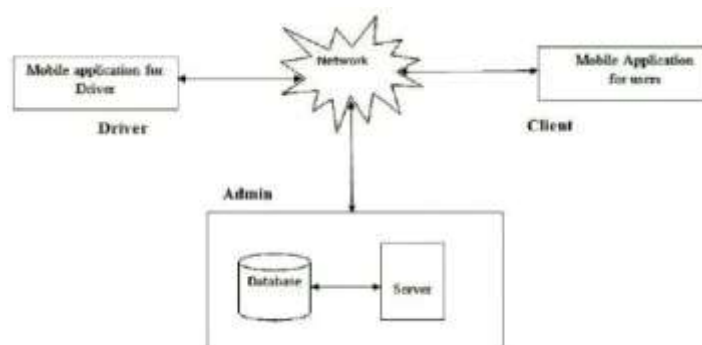


Fig 6.1:-bus tracking system architecture

## VII. Methodology

### 7.1 Location Information

The Location information is fetched from the online database which receives the data regarding the location from the arduino module in the bus. This helps in maintaining the uniqueness of the bus while displaying its location in the map.

### 7.2 Maps

The application is developed using android API which has a very simple User Interface to use it. Google maps API is the core component used in it, which is very easy to use and explore maps with simple gestures such as pinch to zoom tap to point etc.

### 7.3 Bus/Route Information

The Routes of all Buses are recorded by Bus In-charge. For this reason we have used php-server side scripting. So the management can login the website and update/modify the bus details and details regarding its routes. Now, the request made by the client for the bus information will be fetched from the database and delivered to client through server.

## VIII. Future Scope

For future enhancement, we can develop a vehicle monitoring system using GPS & GSM module with high speed processor. The system will have latest technology and optimized algorithm with moderate cost. The system may focus on accurate arrival time prediction and real time position of vehicle. The system can be installed in buses, cars and trucks this project is having a wide scope. A web based application which can be further modified using cloud. Use of video camera to this system would take this system to the next level in the field of security. It will help to monitor the crimes that happen nowadays which is witnessed by common people every day. This would prove a major breakthrough in reducing the crime rates. Also, with use of motion sensors the speed of the bus can be calculated presently only SMS feature is available, we can include the Call feature for ease of operation. Microphone can be induced in the GSM module so that during theft activity, voice can be recorded in the bus for evidence purpose.

## IX. Result & Discussions

The main goal of the proposed work is to improve the Bus Tracking system by adding the necessary features to our project, like projecting accurate bus timings, presenting correct bus numbers and by adding a GPS tracker into it for accurate locations. This concept accepts input in the form of text/Bus No, destination and selection of the bus travelling to the Location to display the entire details about the routes/Stops and also track the location of the bus and display it on the map for the same. The last two decades have seen growing interest in the development of Android based platform. Our analysis on this Project shows that there have been very few vendors that provide automated tools for the functioning of the Application. Also we can estimate count of people with the help of proximity sensor at the entrance point and exit point. Normally, proximity sensors are used in devices like in phone,etc. Here, it is used to Increment count of the people entering the bus and decrement the count of people exiting the bus. We are setting the timer on the proximity sensor using arduino software. So that we can get the approximate count of people. Let other passengers know the count of people in the bus and can decide whether to wait for bus or take alternate transport route.

## X. Conclusion

The conclusion of this study suggests that knowledge of specific domain improves the results. Also, different attributes have been added to the project which will prove to be advantageous to the system. The requirements and specifications have been listed above. This project is implemented using Android and the SQL domain. Using the GPS system, the application will automatically display the buses on map and its routes to the different locations and also track the bus location using client-server technology and forward it to the client device. It uses latitude & longitude as measurement to calculate distance between two locations and provides necessary details of each and every route for people to easily catch-up with the buses or any other conveyance possible on the specified route. Specific location details are provided to the user along with the bus location so that the person can identify the bus correctly. It uses remote server as its database. Due to this, the records can be easily presented on the client's device itself so that the server burden get reduced.

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