

# Real Time Bus Monitoring System

Pratima KedarnathYadav, Dr. Neetu Sharma

Maharshi Dayanand University, Rohtak

Pratimayadav49@yahoo.com

**Abstract** – In this days the daily operation of a bus monitoring system, the travelling of vehicles is affected by some conditions such as traffic jam, unexpected late departure and arrival, and irregular in passenger demand, irregular vehicle departure times, and many other incidents. The real time bus tracking system is designed to serve as a tracking system for the bus passengers using a data fetched by bus conductor. This paper mainly focuses on a system that helps passengers and bus depot administration, to locate the current location of the buses and estimated arrival time of the busses to their next bus stop. The complete system is worked through a single mobile app. The bus depot administrator will keep the complete travelling history of the busses. This paper discusses the real time bus monitoring in India and explores the difference between the real time bus monitoring and other bus monitoring.

**Keywords** – real time tracking, bus monitoring, expected arrival time of the bus.

## I. INTRODUCTION

In today's environment, the time is very important and everybody knows how transportation waste our most of the time in India, and therefore the real time bus monitoring system is introduced. Many travelers are often late to work; studies are additionally late for their classes since they doesn't choose to sit tight for the transport or rather than that basically take another method of transport. Indicating a normal appearance time data through easy to understand interfaces, for example, cell phone gadget could make the open vehicle framework exceptionally simple. The ongoing transport observing framework is essentially utilizes an information which is brought by transport conductor. Essentially the transport conductor login in the framework, select their bus station and enters the takeoff time of the transport. The areas appearance and takeoff times are put away in the database server and afterward it is recovered on the traveler's screen, when the traveler scan for their flight stop and he will get the assessed appearance time of the following approaching transports.

These innovations can be applied on the present open vehicle frameworks, particularly transports, which can't run on the given timetables because of numerous reasons like congested driving conditions, breakdowns, motor disappointment and some more. At the point when the right data identified with next approaching transports to their takeoff transport stops are given to travelers by any medium, at that point traveler can invest their energy in any work and arrive at the bus station not long before a couple of moments minutes of the transport shows up, or take different methods of transport if the transport is late or not accessible. They can even arrangement their excursions some time before they really attempt them.

This will make the transport framework serious and easy to use for travelers. The utilization of other private vehicle transports is diminished when most extreme individuals utilizes open vehicle transports, due to that lessens traffic and contamination.

### 1. Related Work

A large amount of money is wasted on IT-based hardware applications such as real time, incoming busses on stop displays on public transport. There are numerous explores done on vehicle tracking system. Each new research utilizes some equipment which will be introduced on the transports, however what happens when this equipment got harm because of substantial downpour, violent wind or because of sun beams. In every one of these cases they won't work accurately. All the equipment based application require enormous measure of assets for procurement, establishment and furthermore require auspicious support. Furthermore, in this way, all these equipment based application isn't gainful for open transport framework.

And many other technologies uses GPRS technologies which also faces many problems such as they doesn't give the actual situation information when the bus fails because of tyre puncture or engine problem.

All the hardware based system is applicable in the some targeted areas of maximum 5 meters to 15 meters and therefore the bus information out off the range will not be predicted very well through all these tracking devices which are installed on the roof of busses. And therefore, there is a need to find such application which is totally independent of any hardware.

## II. MOTIVATION

Bus passengers many a time faces many problems in getting the bus position or they will wait for a long time at

the bus stop for the arrival of bus even the bus is running or not. They are very confused in taking the right decisions of whether to wait for the bus arrival or take an auto/taxi/cab/rickshaw and because of that they are many a time late to their destination. Students are always late for their classes.

A small survey was taken within the friend circle of a University student about their opinion about the current public bus transportation system and the following conclusion was found:

1. 40% friends said that they have been late to their departure location because they have to wait for the busses instead of walking or taking an auto.
2. 93% friends said that knowing the exact location and time of arrival of the buses will help them taking the correct decision of whether to wait or walk or to take an auto or any other.
3. 98% friends said that using a mobile device is very easy to find whether there is any busses at this time or after some time or not.

This is the easy path for a traveler to look through the approaching transports on the bus station. Subsequent to knowing the genuine circumstance travelers will take a right choice whether to sit tight for the open vehicle transport or take an auto. This Real-time transport observing framework will give travelers one android application which gives the administration to discover the transport through a cell phone.

In this framework, all the transports will be associated with the Central database server utilizing a web association and the transport conductor will send the present flight stop area to an information server where the bus station area and time will be put away in the database. After that the travelers on the stop can recover the approaching transports on the bus stations.

#### Project Description and Goals

The main aim of the project is to give the correct expected arrival time of bus to the passengers, who will help them to find the bus position and shows the estimated arrival time of the bus to their waiting bus stop. The expected arrival time of a bus will be shown on your mobile phone application.

The main goals of this system will be:

1. To provide the accurate estimated arrival time of a bus to the passenger.
2. To be the cheapest than all the available systems in market.
3. Easily available in the hand of all the bus conductors.
4. Low power consumption.
5. It does not require any extra hardware through which monitoring will be done.
6. Data is very well protected as the application will be stored by the Microsoft based servers and can be only accessible to network administrator of the bus.

### III. PROPOSED ARCHITECTURE

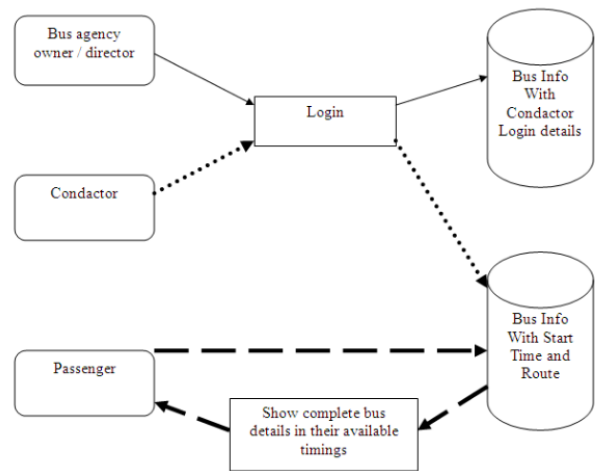


Fig.1. Architecture diagram.

In the above diagram as shown in the figure, the bus conductor phone is installed with the real time bus monitoring system app. This app obtains the spatial data using an internet connection of its next bus stop. It calculates the location with the nearest point from the last bus departure time to the road next bus stop. The time, distance and average speed is required to arrive at the bus stop is calculated using the given formula as

$$\text{Dist} = \text{Dist-of-stop}(n) - \text{Dist-of-stop}(n-1)$$

$$\text{Time} = \text{Distance} / \text{Average Speed of Bus}$$

The bus departure location and their departure time are then sent to the hosting server using the mobile application. The mobile app is connected with the database Sql server. Hence the expected arrival time of bus is displayed on the mobile device using the using the above formula and the data submitted by bus conductor.

### IV. COMPONENTS USED

The components such as mobile device, web server, internet connection, and web based android application; etc are used at the time of implementation of this system which is given below:

#### 1. Mobile device

The mobile device is the main mediator in the entire unit. The model used in the project is the Android based mobile device.

#### 2. Web server

The Web server we are using is a windows web server known as Windows plesk panel. And the backend application is stored on Google play store. Windows plesk panel module will be used to calculate the expected time of arrival at the submitted bus stop by passengers query. This module uses current departure time submitted by bus

conductor on mobile application through internet connection.

### 3. Internet connection

Internet connection will be used to connect passengers to database server and program and also bus conductor to database server. This module is totally based on mobile tower

### 4. Web based Android application

Android application is the main utility by which bus conductor updates the departure location and time of the bus and passengers search the incoming busses on the stop for their destinations.

### 5. Server utilities

The android application will be designed and programmed to display location and time of the buses with their estimated arrival time. The application will be designed using ASP.NET and SQL Server and later uses Android technology and is easily accessible through the Android based mobile application which is installed in the passengers phone.

The server requires toolkits such as Microsoft based visual studio and Microsoft SQL Server and therefore we uses a plesk panel to store location of the buses. This application is used to track the location from web based mobile application for the users to track the estimated arrival time of the bus on the submitted bus stop.

### 6. Conductor end

The bus conductor is first login to the application using mobile device, after that he/she will update the departure location of the busses from time to time and therefore database server will store the exact location and time of a bus.

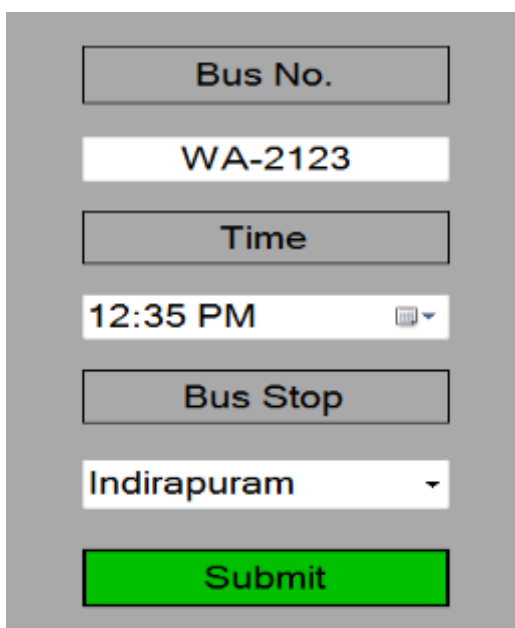


Fig.2. User interface for bus conductor.

### 7. Passenger end

The passenger is simply open the application and select the arrival and departure stop and clicked on search button. After the search click the application is simply get the last departure stop location and time and start calculations and show the expected arrival time of bus if available on the given arrival and departure stop.

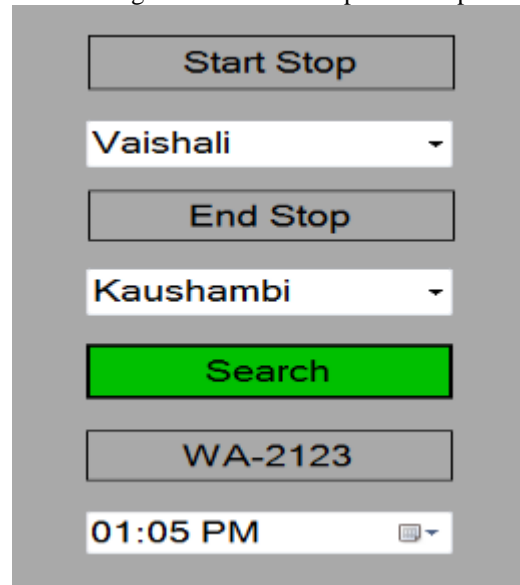


Fig.3. User interface for passengers.

## V. IMPLEMENTATION

### Algorithms

Route Creation: Route creation method is developed to automate the process of creating new routes and populating to the database, with the help of bus conductors. To create any route, we are using a bidirectional graph. This graph will be used to find out the estimated arrival time of a bus. The bus stoppages will be defined as nodes and the route will be in the form of links in between two nodes.

Node 2  
 Node1 Node 3  
 Node 7Node 4  
 Node 6Node 5

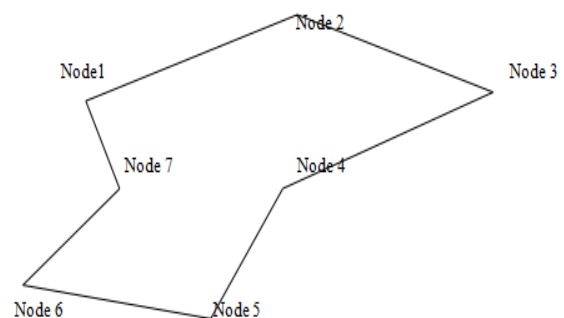


Fig.4. Route creation algorithm.

## VI. CONCLUSION

With the implementation of this bus monitoring system project we can keep a record of complete track and also get some conclusions like how much traffic in different stoppages takes how much time to reach the next stop. The application will be hosted on the web server. As the stop location of the bus is in the hand of bus conductor itself, and therefore the accuracy and exact situation of the bus will be calculated through this app.

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