# Enhancing The Functionality Of Bus Monitoring And Tracking System

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**ABSTRACT:** Due to the high cost of time, several methods are proposed to reduce the wastage of time on the bus station. So, we proposed GPS based Bus Tracking and Monitoring system in which the tracking is done using Adroid technology and we will create Android Application which gives User interface to Passengers where they can access/view the Daily timetable of Bus, Bus route, Location of Bus, and Bus Arrival and Delay Timing information. The Base Station also gives response to passenger's request when they ask for some information about Bus, Bus Driver, Route of bus, and Timing of bus.

## 1. INTRODUCTION

The current scenario is that passengers have to keep waiting for the bus to arrive at the bus stop. The waiting time varies a lot depending upon various parameters. According to the current system the passenger does not have any information about the bus, its expected arrival time, the expected waiting time and what exactly is the current position of the bus. The waiting time of every passenger keeps on increasing every now and then. Thus there is a strong need to build such a system which will work in favour of the user and especially reduce his waiting time at the bus stop. Our main focus is to provide the user with such a system which will for sure reduce his waiting time and will provide him with all necessary details regarding the arrival time of the bus, its exact location and expected waiting time. Thus we have proposed a system which will work for the same. The previous work done in this field is as follows:

### A) RFID based Intelligent bus Management and Monitoring system

This system summarizes the work on design and implementation of RFID-based system for tracking the location of buses provided for public transportation. The system consists of three main modules: In-Bus Module, Bus-Stop Module and Base-Station Module. When bus leaves from BASE-Station, the RFID tag at BASE-Station is read by the RFID reader in the In-Bus Module and the tag data is then sent to BASE-Station via GSM [3].

### B) How Long to Wait? Predicting Bus Arrival Time With Mobile Phone Based Participatory Sensing

The bus arrival time is primary information to most city transport travelers. Excessively long waiting time at bus stops often discourages the travelers and makes them reluctant to take buses. In this paper, we present a bus arrival time prediction system based on bus passengers' participatory sensing. With commodity mobile phones, the bus passengers' surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops [4].

### 1.1 Proposed System

The proposed architecture helps in understanding The Bus monitoring system. The components of the following architecture are: GPS Tracking Device (Adroid Device with Internet facility), a Server and a Database, Android/Java Phones, and Backup Database. The descriptions of the above named components are as follows:

### A) GPS Technology :

Global positioning system (GPS) i.e. Android Device is system composed of 24 communication satellites of United States. Once a location is computed, it can calculate an average speed and direction of traveling. Therefore, Adroid device is a key technology for giving device its position. Among the many ways, GPS tracking devices are used for tracking city bus. Many cities have found that using GPS tracking systems has helped them to improve the efficiency of city bus operation.

### B) Bus Station Monitoring System :

The main part of the architecture is Bus Station Monitoring system, where actually central management of Bus is done, optimal route designing & real-time monitoring of traffic. The Central Monitoring System also saves the information about Bus Drivers, Conductor, and Other person who are the employee of Bus Station.The Monitoring system divided into two parts :
  i. System Database
  ii. Monitoring System

### i. System Database:

The System database stores the information about the buses, bus drivers, and information about the employee who are working in Bus Station. It's very important to store the correct and accurate information in the sorted format so server system can handle it properly and make changes according to requirements.

### ii. Monitoring System:

This part is the central part of the Bus Station Monitoring system and consists of a Server computer connected to the Internet through Router or Modem. It accepts the location information of the buses via respective Adroid Device placed in Buses and stores it in the database. It sends the data about bus, its current location and route of bus with Google map which helps passengers to get arrival time of particular bus with optimized route of bus via Internet. The System generated message is sent to passengers when they ask for some information about buses and bus route. Passengers can also give feedback to the system by sending acknowledgement messages on getting a notification from the system.
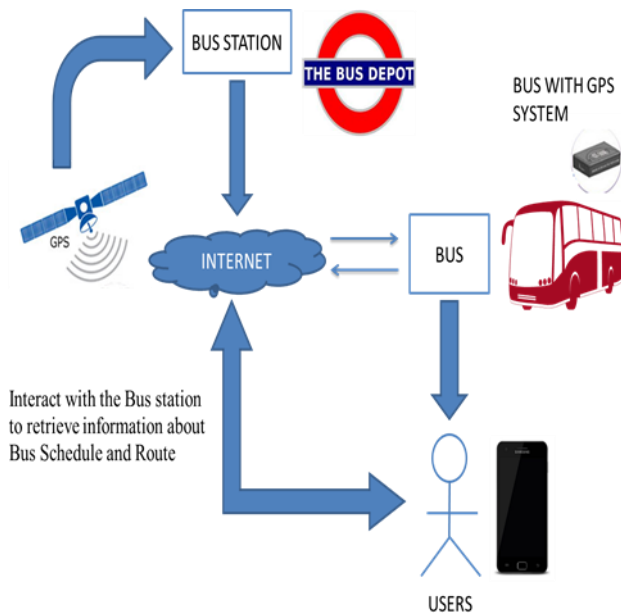
***Figure 1.*** *Architecture of Proposed System*

## 1.2 Algorithms

### i.    IR² Tree Algorithm:

Information retrieval $(IR)^2$ Tree Algorithm is finding shortest distance of Bus Stops from Passennger's current location. $IR^2$ Tree algorithm is exactly an unstructured nature that satisfies an information need from within large collections (usually stored on Database). Information retrieval is a problem-oriented discipline, concerned with the problem of the effective and efficient transfer of desired information. In other words:

• The indexing and retrieval of textual documents.
• Concerned firstly with retrieving relevant documents to a query.
• Concerned secondly with retrieving from large sets of documents efficiently.

### 1.3 Comparison of existing system and proposed system

The existing bus arrival time prediction system based on bus passengers' participatory sensing. With commodity mobile phones, the bus passengers' surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops. The proposed system reduces the wastage of time on the bus station or waiting for the bus for more time is not preferred. So, we proposed Adroid Device based Bus Travelling and Management system in which the tracking using GPS technology. We will create Android Application which gives User interface to Passengers where they can access/view the Daily timetable of Bus, Bus route, Location of Bus, and Bus Arrival and Delay Timing information. The Bus Station also gives response to passenger's request when they ask for some information about Bus, Bus Driver, route of bus, Timing of bus. The   Proposed   system   is easy to use and provide effective management tool for Passengers in which they can find optimal route of bus, monitoring system for Bus Station where all central management done, optimal route designing & real-time monitoring of traffic. The Central Monitoring System also saves the information about Bus Drivers, Conductor, and Other person who are the employee of Bus Station.

## 2.  RESULT

The Proposed system result into three parts :
i.      Base Station System
ii.     Passenger Application
iii.    Adroid Application for Driver

### i.    Base Station System:

In this System, we provide website for Admin which have following area to Controling and Monitoring :

• Admin have Login before they use the System for Authentication.
• Admin can add new bus into particular Depo and modify bus details.
• They can see how many buses available to Depo and make daily schedule for bus and driver.
• They can add new route form one Bus Station to another, and modify it.
• Admin can add new locations and new bus stops for new route.
• Also add new Driver details to perticulr Depo and modify it.



***Figure 1.*** *Screenshot of Base Station Application*

### ii.    Passenger Application:

This is Android application which passenser have in their phone through which they can have following facilities:

• Passenger can search the available route from nearest bus stop to the destination
• Passenger can request for nearest bus stops from current location so they reach to the bus stop
• according to their time.
• Passenger can enter source, destination and time so they see available buses from bus stop according their time.
• If passenger want to navigate the bus through map then they can do this.
• If passenger want to see the Driver's detail then they can see it.

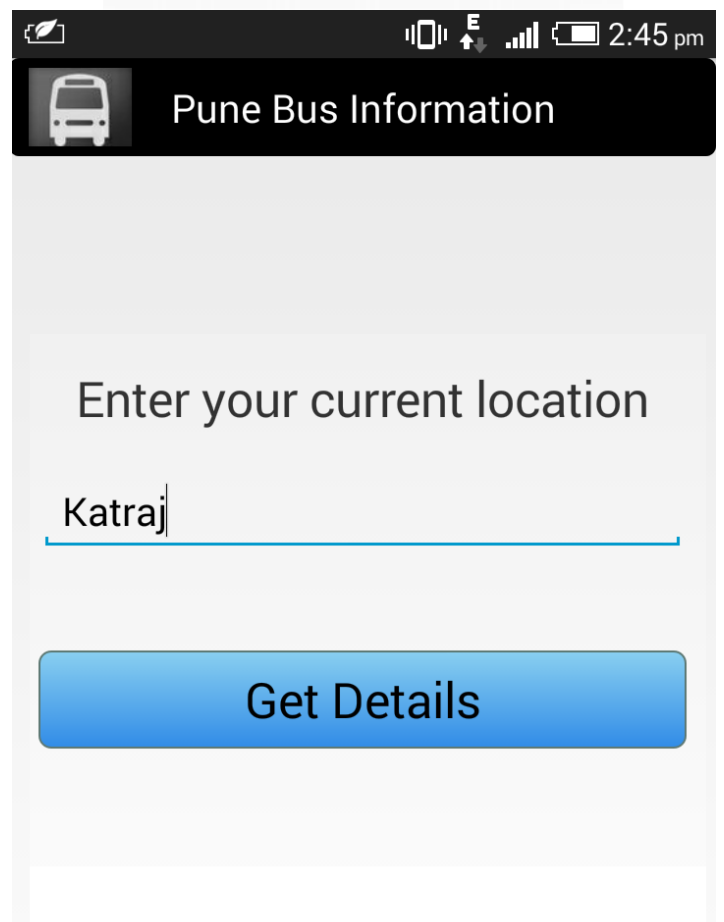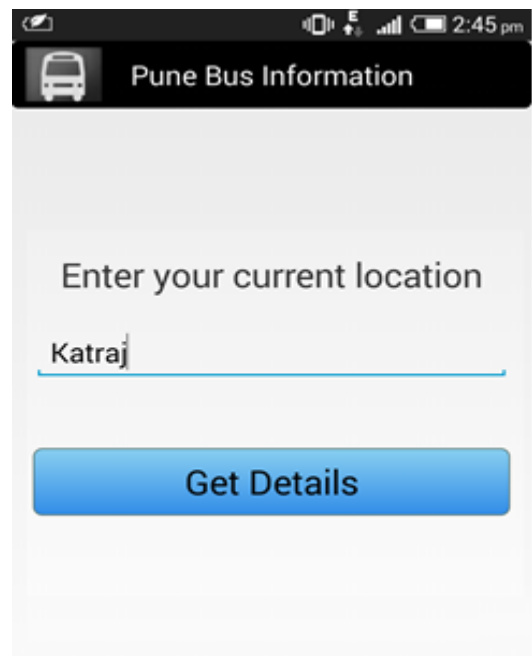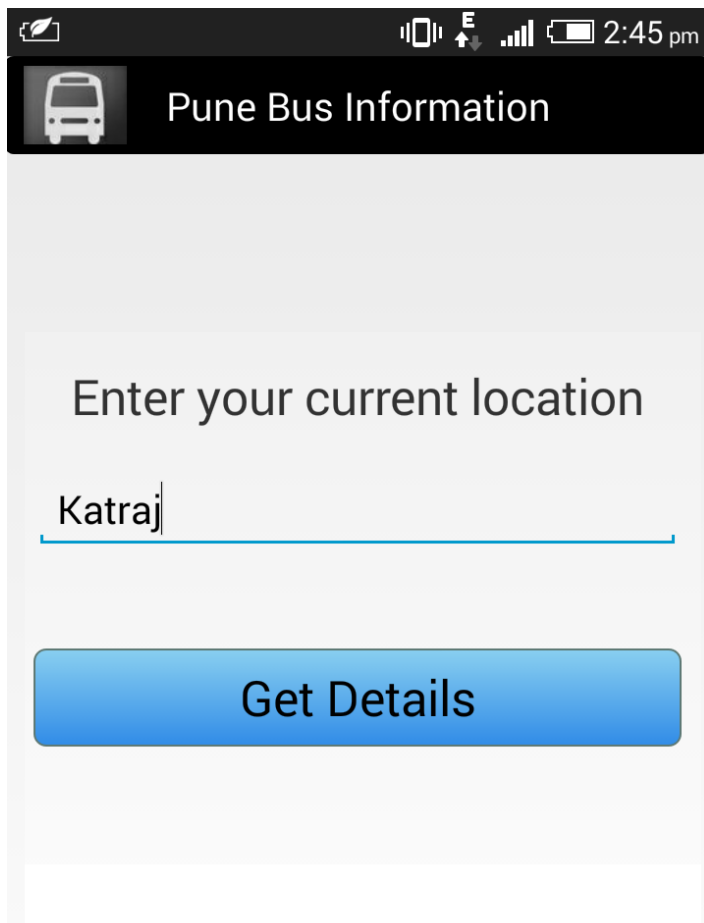*Figure 2. Screenshort of Android Application*
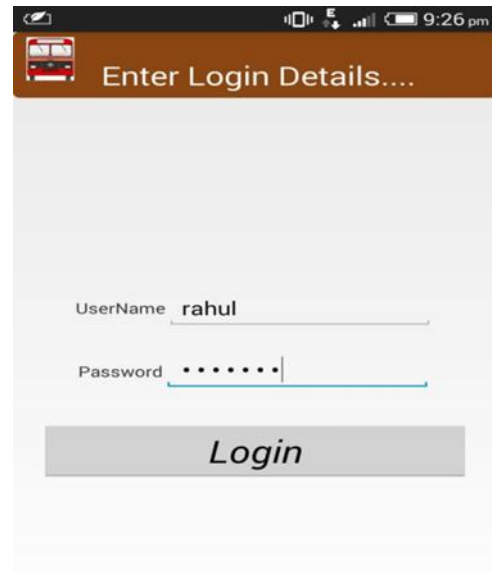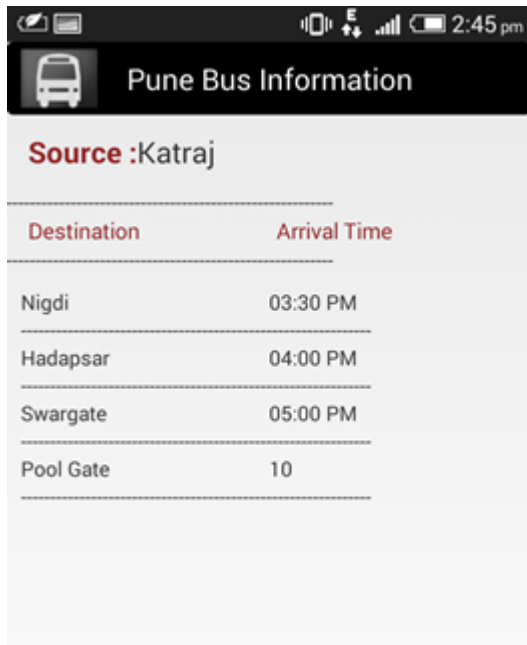


*Figure 3. Screenshort of Search by Address*

**Figure 5**. *Screenshot of Driver Application*

## 4   CONCLUSION

The project titled "Enhancing the functionality of Bus Monitoring and Tracking System" is the system for Bus tracking and routing with the help of Android device. Bus Tracking System resulted in improving overall productivity. System provides better scheduling or route planning can enable Bus station to handle larger jobs loads within a particular time. Bus tracking and routing both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. The system also reduces waiting time on Bus stop and provides shortest route bus from source bus stop to destination bus stop. The proposed system has a bright future in transportation field as it finds out the shortest path and takes the user to the destination in minimum time thus reducing his waiting time.

**Figure 4**. *Screenshot of Destination Bus Station*

**iii.** Android Application for Driver
In this application, Android device is placed in Bus and on same device we provide login and log out function for Driver.

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