

# Real Time College Bus Tracking Application for Android Smartphone

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**Abstract:** This paper proposes a Real-Time College Bus Tracking Application which runs on Android smart phones. This enables students to find out the location of the bus so that they won't get late or won't arrive at the stop too early. The main purpose of this application is to provide exact location of the student's respective buses in Google Maps besides providing information like bus details, driver details, stops, contact number, routes, etc. This application may be widely used by the college students since Android smart phones have become common and affordable for all. It is a real time system as the current location of the bus is updated every moment in the form of latitude and longitude which is received by the students through their application on Google maps. The application also estimates the time required to reach a particular stop on its route. The application uses client-server technology

**Keywords:** GPS, Google Maps, JVM.

## 1. Introduction

Android has become very popular in the world since it is an open source and there are no extra fees for Java Virtual Machine (JVM). In today's world, the time is more important for students. Being a product of high technology, mobile phones are more widely used and are becoming more and more popular. A vehicle tracking system is a commonly used application for tracking vehicles. Due to traffic congestion and road works, most of the buses are delayed. People have to wait for their bus at the bus stops for a long time without even knowing when the bus will arrive. Thus, the arrival time of the bus cannot be guaranteed. The main focus of the project is to save the waiting time of students and provide them the details of the bus.

## 2. Literature Survey

Dynamic Bus Time-table Using GPS [1] 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. The system requires working internet connection and may or may not be GPS tracker.

Bus Locator via SMS using Android Application [2] uploads the current location of the bus to the server. The server then sends an SMS to all the registered students those are about to board at the bus stop. Here the driver's mobile phone is used as a GPS receiver. It is a tiresome process where the details of all the students are to be kept and updated time to time. The server is overloaded every now and then to get details of student at every stop.

Real time Bus Monitoring System using GPS [3] displays the current locations of the bus. The system consisted of a transmitter installed on the buses and receiver boards installed on the bus stops. It provided the relevant bus routes and other information their clients.

Real Time Web Based Bus Tracking System [9] provides the relevant information regarding all the bus going from user's source to destination. The system is operated by GPS which is

attached with every bus. It uses external hardware set-up for its implementation.

## 3. Android

Android is an open source and Linux based operating system for smart phones, tablet computers and android wearable devices like watches. It is developed by Google and later the OHA (Open Handset Alliance). The main focus of android project is to create a fruitful real-world product that enhances the mobile experience for users. [11]

The important features of android are given below:

- Open Source
- Easy to customize the Android Platform.
- A lot of mobile applications can be chosen by the customer.
- Provides many appealing features like weather details, opening screen, live RSS (Really Simple Syndication) feeds etc.
- Provides support for messaging services(SMS and MMS), web browser, storage (SQLite), connectivity (GSM, CDMA, Blue Tooth, Wi-Fi etc.), media, handset layout etc.

## 4. Proposed System

The proposed system provides the exact location of the bus to the students and staffs from their location. Along with this, it also provides the following features:

- Details like Bus Number, Driver's Contact Number, Bus Route, Stops, etc.
- Authentication for Admin, Driver, Registered College Students and college staffs.
- Admin has the facility to send SMS to intended driver and students in case of emergency.
- If the driver is not in network area, still the system will update the location of the bus to the students and staffs by using average speed of bus and the fixed route

## 5. System Description

### 5.1 System Architecture

There are three modules in our application:

1. Administration
2. Driver
3. Bus Information



Figure 1: System Architecture

### 5.2 Modules Description

#### 1) Administration:

This module is for the bus administrator for updating the information that is there in the server when required. It includes authority to update Driver name, Driver Contact Number, Route, Stops, etc. The administrator needs to log in before editing or updating details. Only administrator is the authorized user of this module. The administrator has been given a privilege of sending text messages to bus drivers and to the students of a particular route. It won't be charged to the administrator provided that his internet connection is in enabled mode. We are using way2sms services to accomplish this.

The following figure shows the flow of this module.

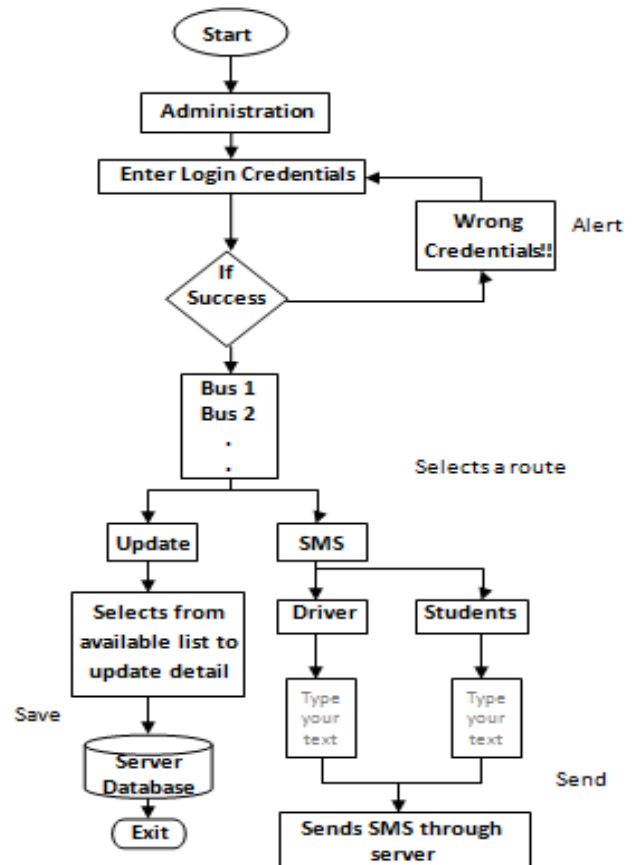


Figure 2: Flow Diagram for Administration Module

When Administrator enters into the Administration module, following screen will be provided for him to enter login credentials.

The screenshot shows the Administration Login Page. At the top, it says 'JD College Of Engineering & Management'. Below that, there is a section titled 'Admin Details :'. It contains four input fields: 'Name :', 'Contact No. :', 'Email Id :', and 'Address :'. At the bottom of the form, there are two buttons: 'LOGIN' and 'CLEAR'. The page is displayed on a mobile device, as indicated by the status bar at the top showing the time as 1:39.

Figure 3: Administration Login Page

#### 2) Driver:

This module is for the bus driver. The authorized bus drivers are provided with their unique log in credentials. They need to log in and then have to start their location service before driving. The current location of the bus will be updated from driver's mobile to the server every moment in the form of

latitude and longitude. The location of the bus is visible in Google Maps when asked for.

The following figure shows the flow of this module.

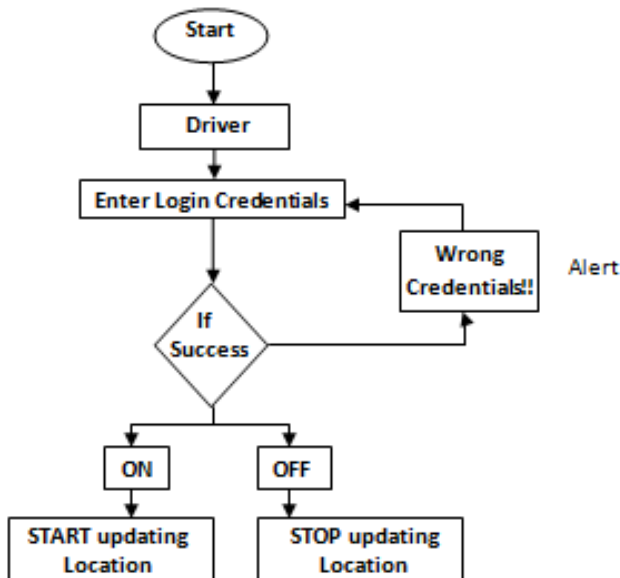


Figure 4: Flow Diagram for Driver Module

When Driver enters into the Driver module, following screen will be provided for him to enter login credentials.



Figure 5: Driver Login Page

### 3) Bus Information:

This is the most important module and is the whole and soul of the system. The users of this module need to log in with their unique ID provided by the college management. They can get access to the details of all the buses of college through their phones. Here they will get all bus and driver related information offline too. Students can track the location of their bus from any location. Student and staff must make sure that their location service is active. They can also get the estimated time of arrival of bus at their respective stops. This will help

them to manage their time and arrive at their stop at the proper time, neither too early nor late.

The following figure shows the flow of this module.

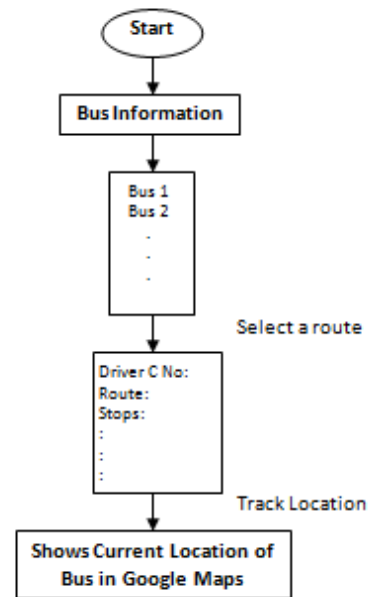


Figure 6: Flow Diagram for Bus Information Module

When Student or Staff enters into this module, they need to enter their credentials and after successful log in they will get the following screen to view bus details.

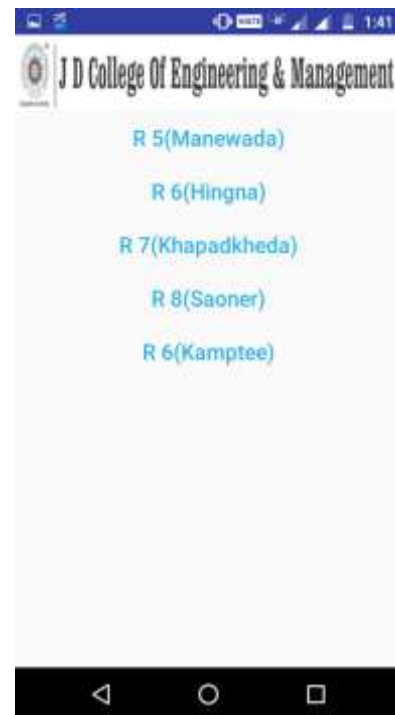


Figure 7: List of available bus routes

## 6. Future Enhancement

The following features can be added up as future enhancements:

- A feature can be added for parents, where they could be given a privilege of receiving a text message that their ward had boarded the bus safely as soon as they get into the bus.

- Managing of public transports likes auto-rickshaws and trains

## 7. Conclusion

We developed an Android Application to track the college buses and provide relevant information to their users. This paper has described the design and architecture of our college bus tracking system. Our system is composed of smart phones and a server. The system is able to demonstrate its performance to track college bus from any area. Furthermore, our system is low-cost as it doesn't require any external hardware for location tracking.

## Acknowledgement

We would like to express our intense honor and deep regard to our project guide Prof. Shrikant V. Sonekar for his guidance and constant encouragement for carrying out the project. Working under him was a great experience for us. He kept us going, and this would not have been possible without him.

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