ISSN:0975-9646

Karan Punjabi et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (2) , 2014, 1603-1606

Bus Locator via SMS Using Android Application

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***Abstract*—Location based Services offer many advantages to the mobile users to retrieve the information about their current location and process that data to get more useful information near to their location. Now days in this fast life where everyone in is hurry to reach their destination. Waiting for bus is a hectic and even many of us are unaware of the bus timing, hence to overcome this problem we have come up with system "Bus Locator via SMS Using Android Application" which aims to build an Android application that automates all the aspects related to the college bus arrival. At specific pickup point the application sends current location of bus to the server, then server sends SMS to students who are supposed to board at the next pickup point. The complete scenario requires everything to be done manually, & there is no confusion such that bus can arrive early or late since when it leaves from one stop, student waiting at another stop can easily receive a message/SMS. Second module includes Displaying Graphical-Map of current bus location at server side. Third module includes blood bank at server side. Most of the applications developed so far use a handheld GPS receiver device for tracking the location, but we have reduced the cost of device by using mobile phone which has an inbuilt GPS receiver.**

Android and java platforms are used to develop the application using eclipse tool.

***Keywords*— GPS, Android SDK, GPRS, XML, Google API.**

I. INTRODUCTION

Android is becoming very popular in embedded market for two main reasons. First, it is open source software; moreover there are no royalty fees for Java VM (Virtual Machine). Second deriving from the first, Android is highly suitable for expansion as the developer sees fit.

Being students ourselves, we have been motivated to develop this project for the benefit of the student masses, by the idea of providing an easier means of accessing various web resources related to the college bus, thus providing them with a better, richer experience of travelling to college. Further, the recent advent and popularity of Android technology motivates us to create an Android application for the same.

Bus Locator system is an application for Smartphones that supports Android Operating system at client side. This application uses the GPS function, available in most of Smartphones today, to pin point current location fairly accurate. With this application installed on smart phone, all a student need to do is to start up with application when he/she needed. This application will send co-ordinates to server, and then server sends SMS Alerts to student who all is registered from their specific pickup point and also server provides additional services through SMS alerts like, Blood donation, E-notice, and University related news.

II. PROJECT DESCRIPTION AND GOALS

This is purely Android application which only runs on Android devices or Android phones. Basically, this application at client side fetches the co-ordinates by using Google Maps, sends the co-ordinates to server, then server send SMS Alerts to students who are registered for this service, also server provides Graphical Map of current Bus Location by having markers on to the Map. It also runs in the background so students are free to use their phones for other activities. The main focus of our research is to reduce the overall cost of tracking based on GPS system as it is a satellite based service which is available 24X7 everywhere in the world. GPS system can be used to get location which includes details like latitude, longitude values along with the timestamp details etc. It's a free of cost service available to every individual. In order to track the location of the Bus we have used Google Maps for mapping the location sent by the mobile phone. The mobile phone which fetches the GPS location communicates with server using General Packet Radio Service (GPRS). This is a low cost service provided by the service providers which is a wireless data communication system. Mobile phones equipped with GPS receiver are easily available in the market now days and is a booming technology. This cell phone technology has enabled us to communicate almost every part of the world across the boundaries. The GSM/GPRS is one of the best and cheapest modes of communication present these days and in future.

A. User Classes and Characteristics

- Users must have GPS in his/her Smartphone.
- The Application should not affect the performance of device.
- Application should fetch the co-ordinates from Google Map and sends these co-ordinates to server.
- Server sends SMS Alert to registered students.
- Server displays current location of the Bus in Graphical Maps.
- Server provides SMS Alert about required Blood group.

B. *Design and Implementation Constraints*

- Internet enabled mobile device working on Android platform.
- Phones having GPS facility.
- System with:
  i. Processor –Intel Pentium 4 or above.
  ii. RAM: 512 MB or above.
  iii. Internet connectivity.

III. SYSTEM ARCHITECTURE

The system is composed of client and server interface. At client side we have Android Application which runs on device attached in the bus or provided to driver. At server side we have website which is supposed to store all details related to these services like Student details, Bus details, and Bus stop details.

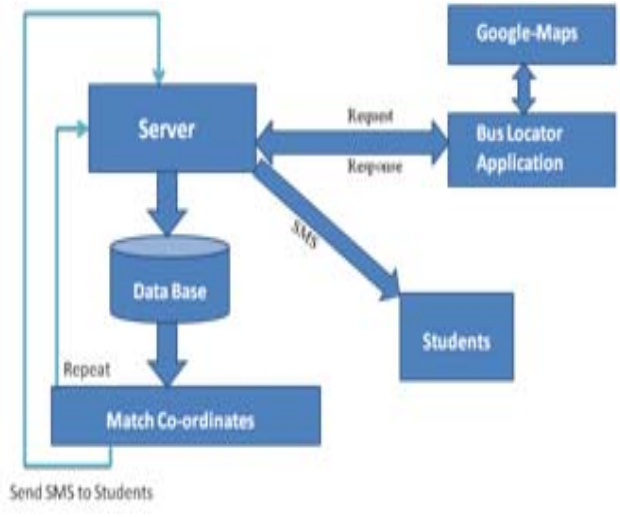

Fig 1 Overall Description of the system

In fig.1, first step is student should register for this service by proving his/her details to the respective Administrator. Next, when the device which is placed in Bus reaches at stop1 it should fetch its co-ordinates from Google Map, and sends these co-ordinates to the server. Server then performs the matching of co-ordinates operation with next stop2 registered co-ordinates. If these co-ordinates match, then server sends SMS Alert to students about current location of Bus. If these co-ordinates don't match, then it will repeat the process.

IV. IMPLEMENTATION

The proposed system highlights on the SMS Alerts for students about current position of bus even with additional services as mentioned above in this paper. Location-based service is another key functionality that is used in Smartphone applications. It is often combined with maps to give a good experience to the user about their location.

A. Modules at Client side

- Bus Locator.
- Fetching Bus Location.

1) *Bus Locator*: In this module, at front-end user enters the Bus details like Bus Id, Bus Name, and Bus Number. These details are stored at back-end in SQLite database. These details include the schedule of Bus, and route of Bus. Server fetches these details by having link between Application and Website.

Fig 2 Layout of application

2) *Fetching Bus Location*: In this module, Bus Locator Application will fetch the coordinates from Google Map at background so that it should not affect any other activities of device. By the time when device changes its location it will fetch the co-ordinates and sends these co-ordinates to the Server. These co-ordinates are in terms of longitude and latitude.

Fig 3 Layout of fetching Bus Location

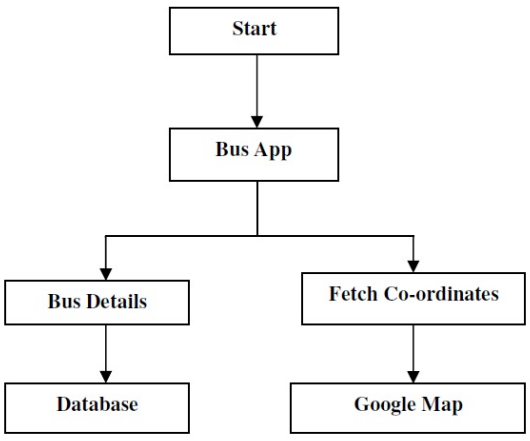

Fig 4 Flow of application at Client side

B. Modules at Server side

- Administrator Login.
- Graphical-Map.
- Blood Bank.
- E-Notice.

1) *Administrator Login:* This module consists of three sub modules, Add Bus Details, Add Bus Stop Details, and Add Student Details. In first sub module Add Bus Details, we are providing information of Bus by giving Bus Id, Bus Number, and Bus Name. This sub module is to have interaction between Client and Server.

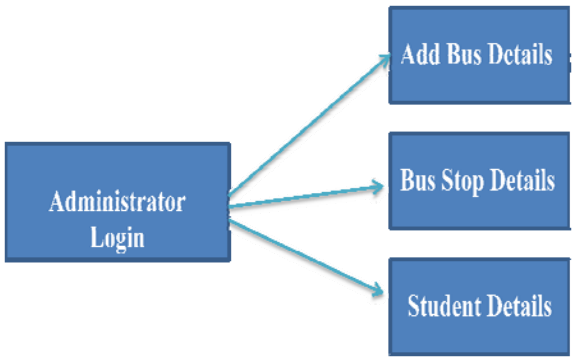

Fig 5 Administrator Module

2*) Graphical-Map:* This module displays Graphical Map of Current location of bus. When the application is running at client side it will fetch co-ordinates of device; further client will send these co-ordinates to Server. Server then locates these co-ordinates in Graphical Map by having markers on it.

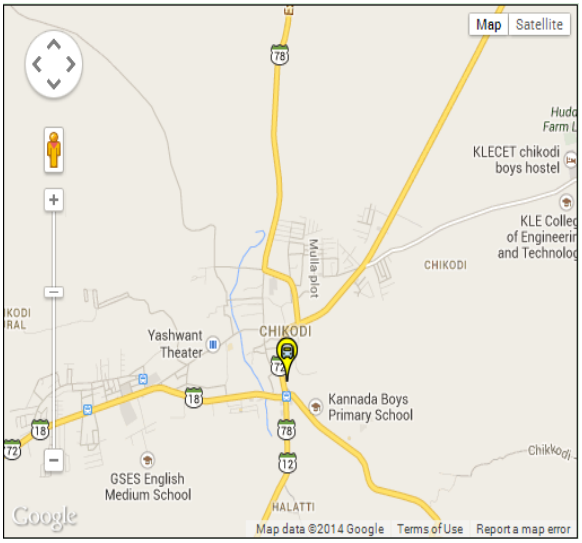

Fig 6 Graphical Map of Current Bus location

3) *Blood Bank:* This module is at Server side, providing SMS Alerts service for emergency in case blood requirement. Administrator inputs the required blood group to perform matching blood group operation. This Matching operation compares the required blood group with Students Database, if the match is found, it will display the list of students with their specific details, and Server then sends SMS Alert to these Students.

4) E-Notice: This module is at Server side, which provides SMS Alerts about college related information like University News, Results, Attendance, Campus drive, and any other Activities.

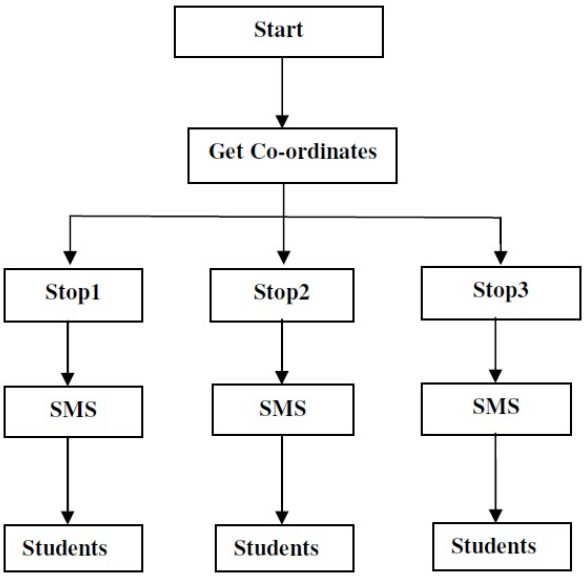

Fig 7 Flow of application at Server side

CONCLUSION

By fixing GPS enabled Android device in every bus we can track each and every bus from central location. Thus reduces the traffic problems and leads to the better work. This project reduces the risk of losing signals by the time of bad weather as compared with GPS receiver hardware device. The SMS service will helps to take the guesswork out of bus arrival at the stop. This project allows us to get acquainted with the work culture, people and environment. Project was great opportunity for us to learn and work in the environment.

Considering the features of project such as Bus Locator, Graphical Map, Blood Bank, and E-Notice we hope that our application will play an important role.

ACKNOWLEGDEMENTS

We are thankful to **"Prof .Sunil Hebbale"** who gave unending support right from the stage. We would like to take this opportunity to thank **"Prof. Chetan Bulla"** who has played an unimportant role in the development of the project.

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