

Special Purpose Online Bus Tracking (SPOT)

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Abstract:

Special purpose online bus tracking system is developed to provide the real time information of buses to the passengers. It consists of two android applications. First application establishes communication between central server and bus system which is capable of providing real-time data (GPS coordinates) regarding the current location of buses. Second application is student side application which displays the current location of the bus on Google map along with the estimated time of arrival to the specified bus stop hence it saves the time of students. Both the side applications provide dynamically updated timetable. Another important feature of both the applications is emergency service through which call or alert messages can be simultaneously sent to college, police and ambulance in case of accidents. Thus this is a cost effective, efficient system and helps students to catch their buses at the proper time.

Keywords — **GPS coordinates, real time data, central server, emergency, alert system.**

I. INTRODUCTION

Among all public transportation services, bus service is the major transportation used by public. Especially in a busy town or city, bus is the most easy, convenient and cheaper transportation. Various reasons that people take bus instead of driving their own vehicle are traffic jam, heavy parking fee and lack of parking slot in destination. However, bus transportation service has very poor transportation information system nowadays. Bus users do not know the exact arrival time for a bus, but only know the scheduled arrival time. [1]

Compare to train or flight transportation system, bus transportation service does not have a proper system to track all bus positions and the actual arrival time in every bus stops.[6] These problems occur because current bus service systems did not apply real time tracking technology to track on each buses on the road and also lack of a platform to update latest bus

traffic information to bus users. In order to solve these problems and enhance current bus service system, real time bus tracking system has to be developed and implemented. With real time bus tracking system, bus position data is transmitted to a central server for processing and on the other side the coordinates are fetched to map them. The main technology used to develop this system is Global Positioning System (GPS). GPS technology is able to receive the position of an object from space-based satellite navigation system through a GPS receiver.

The developed bus tracking system will be able to provide bus users a real time platform to check on updated bus information, for examples bus arrival or departure time, current location of the bus.[4] Besides, this system will also be able to reduce workload for bus management team and provide an immediate platform to update latest and accurate information to bus users.

II. RELATED WORK

The last two decades have seen growing interest in the development of Android based platform. Our review of this area shows that there have been only few approaches that provide automated tools for the functioning of the application:

1. An application has been implemented in Pune, named “Pune Bus Guide”. This application gives the way to the destination correctly, but the number of drawbacks that it has is greater than the number of advantages.

- It does not show the passengers current location even if he/she is connected to the GPS.[8]
- Also, this application has been proven useless as it does not display the bus numbers, so the passengers find it very hard to know the number and time of arrival of the respective buses.

2. Another application that was implemented in Mumbai, named “M-Indicator – Mumbai” has drawbacks like:

- It does not display dynamic updates.
- Its latest updates have given issues on every Android mobile supporting even the most recent device version. The “A to B” module of buses has given problems. Whenever an option for the source to destination is selected, the field still remains blank, i.e. no bus routes are displayed.[2]

3. The application built in Delhi named “Delhi Bus Navigator” has drawbacks like:

- The application works smoothly when offline, but works very badly when connected to the Internet.
- The application gives information about direct routes only. It does not give information about the alternate routes.

4. The application developed in Bangalore named “Bangalore BMTC Info” has drawbacks like:

- The application is never in an updated condition.
- The application has fed in wrong routes on several buses and given no updates to fix them.[10]
- After the minimization and restoration of the application, it cannot search anything.
- This application crashes almost always.
- The application is not user friendly with a complicated User Interface (UI).

5. The application developed in Chennai named “Chennai Bus Route” has the following drawbacks:

- The application works fine, but the bus timings have not been mentioned.
- The application does not display maps.[4]

III. PROPOSED SYSTEM

To overcome the drawbacks of existing systems a Special purpose online bus tracking system (SPOT) is developed on the android platform. Figure 1 shows the overall structure of SPOT and it provides real time information of the bus to the passengers and its implementation details are explained in the following chapters.

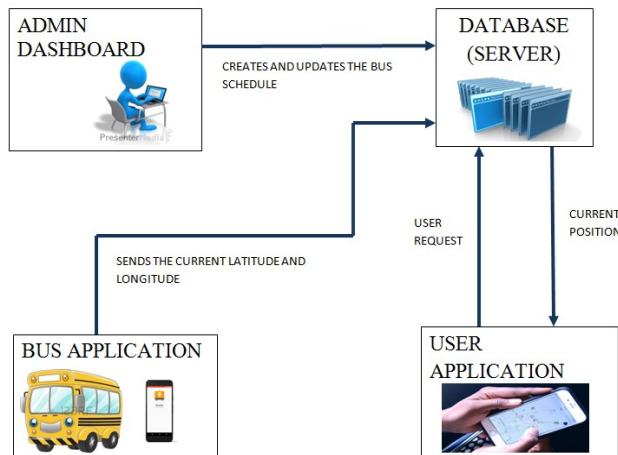


Fig. 1 Block diagram

IV. IMPLEMENTATION

SPOT implementation consists of three modules.

- A) Bus side application
- B) Student side Application
- C) Admin panel

A) Bus side Application:

Bus side application is developed on the android platform. The GPS feature inbuilt in the driver's phone will start sending the coordinates of current location if the permissions such as ACCESS_FINE_LOCATION, ACCESS_COARSE_LOCATION, INTERNET are specified in the manifest.xml file. Once the bus starts, driver has to manually start the bus side application by selecting the bus number and the driver name as shown in figure 2. Based on the bus number selected the corresponding PHP code will be invoked to store the data into database. When the location of bus changes coordinates of the bus will start being uploaded onto the server database as shown in figure 3. For the insertion of data into the database 'SendPostReqAsyncTask' class is used. This process of uploading will be continued

without any involvement of driver (such as refreshing the page) until he clicks onto the exit button. The exit button is associated with the functionality of kill process thread. This application is also associated with the features like Timetable and Emergency service. The timetable given is dynamically updated by the system admin. Emergency service can be used to call or alert messages can be simultaneously sent to college, police and ambulance in case of accidents.

B) Student side Application:

Student side application is also developed on the android platform. In this application student has to select the bus number (as shown in figure 3) in which he/she wishes to travel by referring to the given timetable. Timetable provided in this application is dynamically updated by the admin. Based on the bus number selected by student, respective table from the database will be referred and the current location of that bus will be displayed onto the Google map as shown in figure 5. To display the current location of bus, last entry of the table is fetched into the JASON object. This JASON object includes latitude and longitude of that particular entry. And these coordinates are passed as parameters to the 'addMarker' function which will add marker onto the Google map. As the location of bus changes previous marker is deleted and the new marker (for new location) is added. Along with the current location this application also displays the ETA (Estimated time of arrival) as shown in figure 6 for bus from its current location to the bus stop which is selected by the student from given options. Emergency service incorporated in the application can be used to call or alert messages simultaneously sent to college, police and ambulance in case of accidents

C) Admin panel:

Admin can login to the admin account after authentication and authorization. He can enter new route details and can manage the scheduling of all the buses. If there are any

notifications regarding buses admin is responsible to give the notification on both (user and bus side) applications.

V. RESULT AND DISCUSSION

Working of the project is depicted through snapshots as follows.

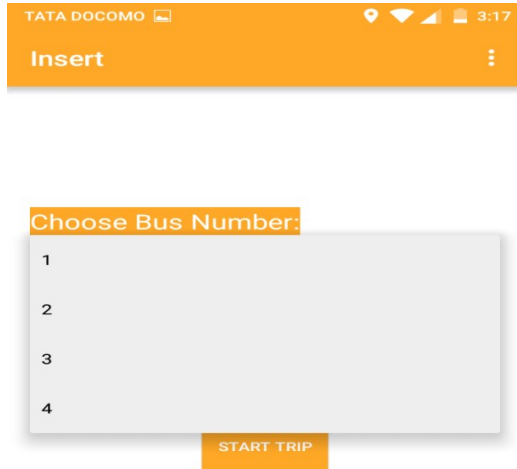


fig. 2 Example of choosing a bus no.

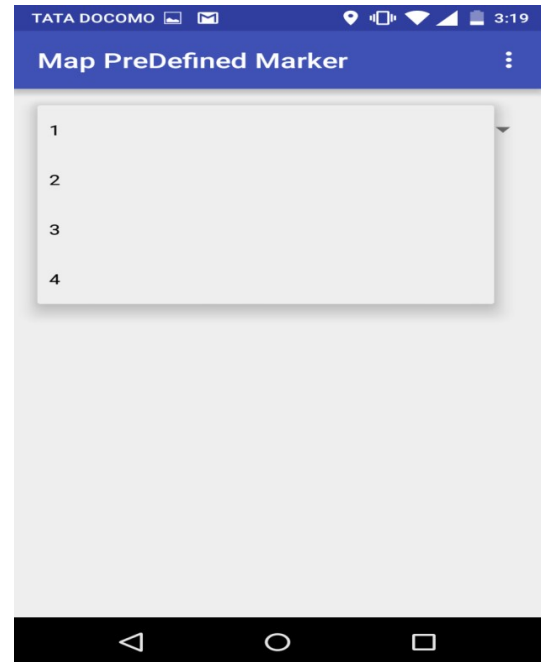
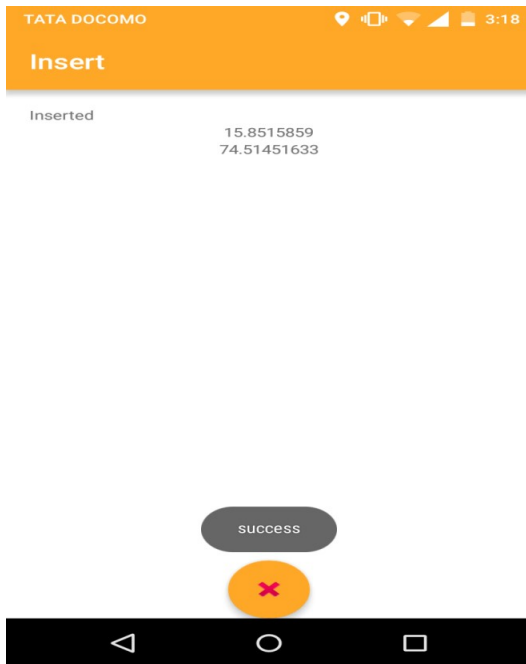


fig. 4 Example of bus selection by user

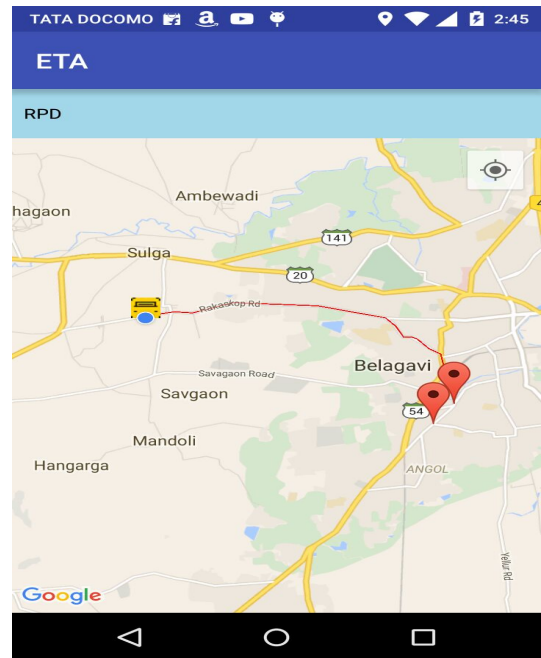


fig. 5 Example of current location of bus on Google map

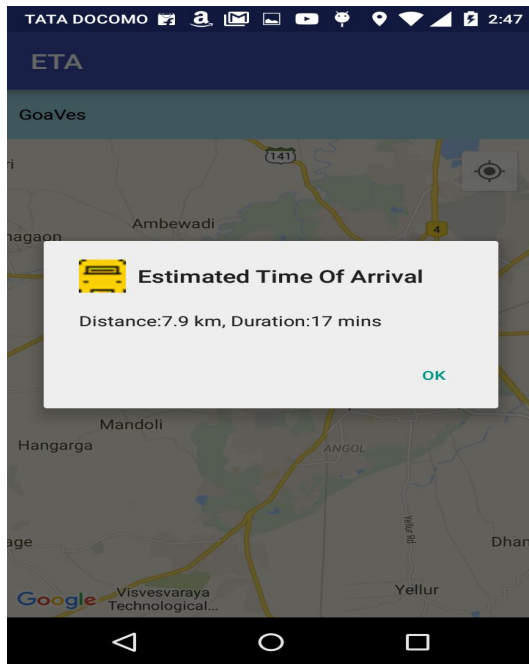


fig. 5 ETA Calculation

VI. CONCLUSION

While waiting for a bus, students may feel impatient and anxious if he or she does not know when the bus will arrive. [3] For the bus management side, it is very difficult to provide an accurate schedule for bus user due to some uncertainties may happen on the road such as traffic jam or bus break down. When a bus is delayed, bus management side should inform bus user immediately. [11] However, they do not have a platform to inform bus user in real time about the latest bus traffic status. In order to enhance bus system and increase the performance of bus service provider, the special purpose bus tracking system is developed including two android applications. Bus tracking system provides a real time platform for bus user (students) to check on bus traffic status in anytime and anywhere. It also provides a platform

for bus service provider to monitor bus status and update latest information to user.

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