



Travel Time Tracker

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Abstract -In today's world, transport services play vital role in human life e.g. taxi, buses, auto rickshaw, trains, flights, etc. For a common man, bus is the most comprehensive and affordable mode of transport. Our entire schedule is dependent on transport services. But many unpredictable factors delay the schedule of such services like harsh weather situations, traffic conditions etc. In such situations, we are eager to know when transport service will be available and by how much time it will be delayed and so on. In order to reduce such problems, we have proposed a system by considering bus as example of transport service, which is helpful to the bus traveler to predict bus timings. We have implemented this system using the android technology which is the open source and rapid growing technology in today's market [1]. The proposed system has used Global System for Mobile Communication (GSM) modem, Global Positioning System (GPS) and Google Map Services. It works in both GPS Active mode as well as GPS disable mode to provide more flexibility to the user. It has been developed on the Bus Information System in Navi Mumbai. Using Location Based Services, it tracks the current location of the bus and estimate remaining time for the tracked bus to reach its destination using the Google Map Services. This system is an Android-based application that gives information about buses, bus numbers as well as bus routes using Location Based Services with the help of Google Maps API.

Keywords— GPS, Android platform, Google Maps Services, Location Based Services, Transport.

I. INTRODUCTION

In today's world, time is money. Because of the unpredictable traffic conditions these days, the people using chartered bus services, waste precious time waiting for the bus at their respective stops. There are buses made available for passengers travelling distances, but not many passengers have complete information about these buses. Thus there is a need of an early warning system, for the approaching transportation vehicle. A passenger requires the complete information about the number of buses available to reach destination, along with some additional information like bus numbers, bus timings, time taken for the bus to reach required designation and route maps. The proposed system is an Android-based application that gives information about buses, bus numbers as well as bus routes using Location Based Services with the help of Google Maps API.

The proposed system is user friendly, which anyone can access for free of cost. The aim for this project was to develop a system that would guide bus traveler with the routes, all the possible stops, display maps and track the locations of bus and show the estimated remaining time required to reach. The proposed system gives information about all the routes from the source to the destination and gives maps for the same.

Below mentioned are the functionalities provided by the proposed system:

- Route Information
- Bus Information
- Map Generation
- Location Tracking
- Navigation

The main goal of the proposed work is to improve the Bus system by adding the necessary additional features into the application, like accurate bus timings, correct bus numbers and moreover adding a GPS tracker into it. This system can also work with GPS disabled. Section II gives basic concept, section III gives literature survey of existing system, section IV highlights proposed system, its working and V gives implementation details, section VI gives application and output of system and finally section VII gives conclusion and future scope of proposed system.

II. RELATED WORK

In last few years, there have been growth in interest in Android Application development.

- According to the article in DNA in 2008 60% of the people in Mumbai travelling by road using Bus as transport service [2].
- 12% of roads is occupied by Bus that carry 60% of travelling people in Mumbai [2].
- People in Mumbai who take the bus everyday to work spend an average of 19 minutes waiting.
- 19 minutes spent waiting for a one way trip, everyday, accumulates to 13870 minutes an year, which is a total of 230 hours. Add to this the average 71 minutes one way travel time by buses, which totals to 863 hours in an year for the average Mumbaikar.

M-Indicator is a widely used application in Mumbai for any information related to traveling with train, bus, express, metro, etc. But the information provided by the application about the Bus transportation isn't sufficient for the user. It displays matter which is the same as what is online. The user can select the bus either by selecting using the bus number or by choosing using the source and destination location in the menu. Once selected it shows the stops the will be taking along with the time the bus will be leaving from its initial bus stop[3].

A research paper presented by students of AISSMS's Institute of Information Technology proposed a project "A Mobile Application for Bus Information System and Location Tracking using Client-Server Technology" which give information of bus's location but was restricted by the need of internet service for its use[4].The application depicts the process of selection of routes from source to destination and presents the respective map. After selecting the initial stop the user need to select the stops till where the passenger wants to travel. By using client-server technology the location tracker can track the current location of bus and returns to the client.



Figure 1: Screenshot m-indicator

There are many applications on the google play store that provide information about the bus but there isn't an application that gives location based tracking of the bus. At the same time, these application do not show the current traffic condition and the approximate time required for the person to reach the destination. Some Application on the play store gives the information about the route of bus but it lacks the real time information about the user's current location and get the route and approximate time required to reach the destination. There is no such application that will help the user to know more information about the Bus, which stop it takes and give a approximated time required to get there.

III. PROPOSED WORK

After analysing existing systems in transport services, we have proposed an application helps user to know more about the Bus and the route taken by the bus. The application is built using the latest Android Application Development library to maintain compatibility and make sure that the application support maximum number of user. The application supports Android 4.0(Ice-Cream Sandwich) and above platform. It follows Google's best practices for developing Android application so that it is made simple and user friendly also easier to update. The proposed system is made for the NMMT transportation service available in Navi Mumbai as an example.

It takes bus number, initial (source) location and destination from the user and the using the data it finds the latitude and longitude and with the use of location based services and Google map API to display the data on the map in the application. The user finds the information about the route and the next stop in his journey. Using navigation, the application shows the real time tracking and returns the estimated time required to get to destination along with traffic of the route. The information of the application can be updated as there is a change in the bus transport system.

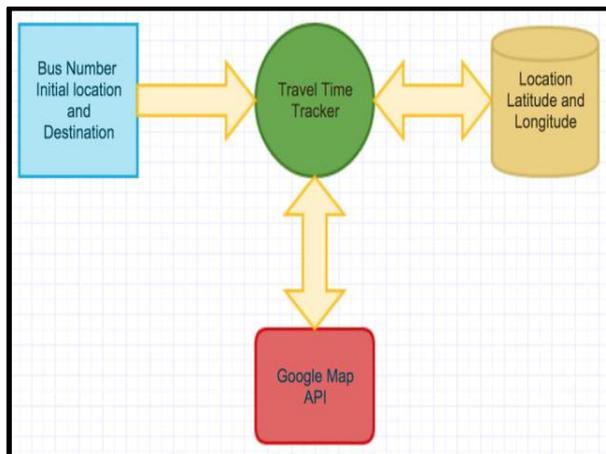


Figure 2: General Architecture of Travel Timer

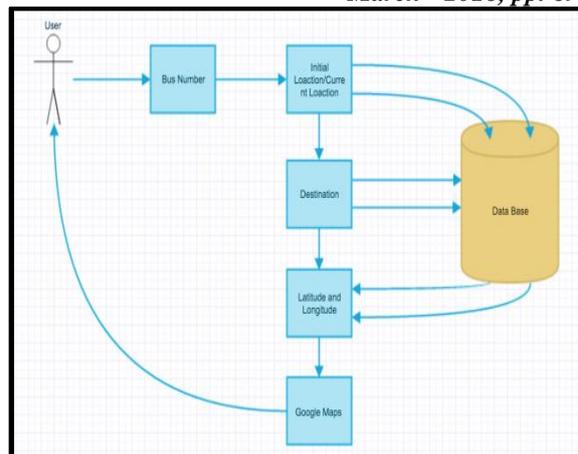


Figure 3: Data Flow Diagram of Travel Time Tracker

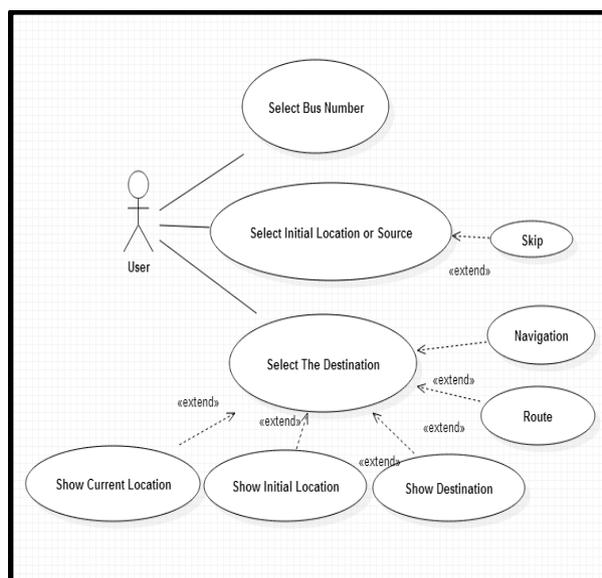


Figure 4: Use Case diagram of Travel Time Tracker

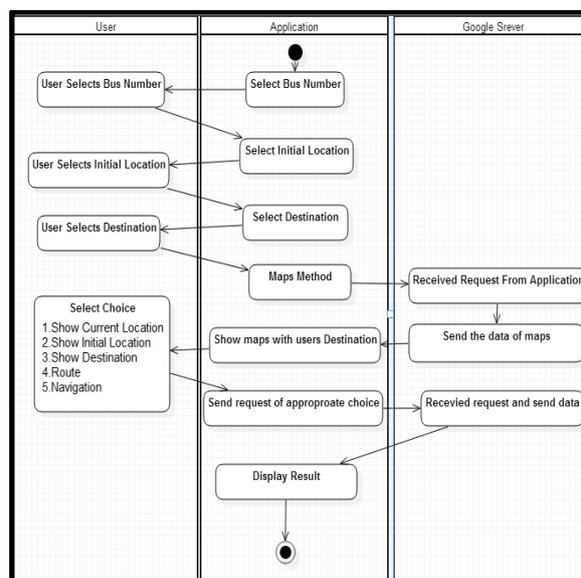


Figure 5: Activity Diagram of Travel Time Tracker

IV. EXPERIMENTAL RESULTS

Development Tools

A. Android Studio

Android Studio is the official IDE for Android application development, based on IntelliJ IDEA. On top of the capabilities you expect from IntelliJ, Android Studio offers:

- Flexible Gradle - based build system.
- Build variants and multiple APK file generation.
Code templates to help you build common app features.
- Rich layout editor with support for drag and drop theme editing.
- Lint tools to catch performance, usability, version compatibility, and other problems.
- ProGuard and app-signing capabilities.
- Built-in support for Google Cloud Platform, making it easy to integrate Google CloudMessaging and App Engine

B. Android SDK

Integrated Development Environment (IDE) is used in Android development is recommended to developers due to its multitasking platform and simplicity in working.

C. Android Emulator

Android emulator is a virtual mobile device which runs on the user's computer and used to test Android applications without any need of physical device.

D. Location Based Services

The user having the location-aware mobile phones can find out his current location and location of other GPS devices using LBS [7].

E. Google Map API

To access the Google Maps servers with the Maps API, a Maps API key should be added to the application. The key is free, you can use it with any of applications that call the Maps API, and it supports an unlimited number of users. Maps API key can be obtained from the Google APIs Console by providing your application’s signing certificate and its package name [8].

V. APPLICATION

Travel Time Tracker

1. In this app we get the time required to reach destination from the source and also get distance and time to reach destination.
2. The source location is taken by using the GPS sensor in the mobile phone.
3. In this app we get all bus stops according to the bus number.
4. In this app we get all the traffic condition while traveling.
5. One of the important function of the app its update according to the traffic condition time to time. Because it’s connected to the Google maps server.

Additional information

- Size: 2.4M
- Current Version: 1.0 Beta
- Requires Android: 4.0 and up
- Permission
- Location
- Photos/Media/Files
- Wi-Fi connection information
- Device ID & call information
- Other

The main function of the application is to show the route by which the user is going to travel along with the traffic information at the given moment of time. The traffic information updates on the fly according to the traffic at that moment of times. The application provides the Bus number and the Bus stop at which the bus is going to stop to give the user an idea where the bus is going to stop. This provides the user a way to track their route and get the time required to get to the destination. Google Maps services are used to display map in the application. GPS is used to get the current location of the user to get the time and route information of the bus using source and destination location that is provided by the user. A GPS is used along with Google Maps Service to track the current location of the user and get the map in the application. The Source and Destination Location provided by the user is used to track the route and get the traffic information and show the navigation to the destination. The application can also be used to Navigate to the destination location from source location or current location and the time required to get to the destination along with distance. The route is displayed along with the traffic information at a given moment of time. The application can also be used for any transportation service and can be used by police and military for security purpose and tracking.



Figure 6: Location Based Services [7]

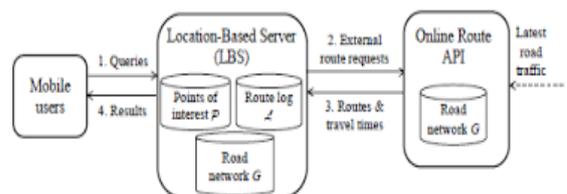


Figure 7: Block Diagram of Location Based Services [7]

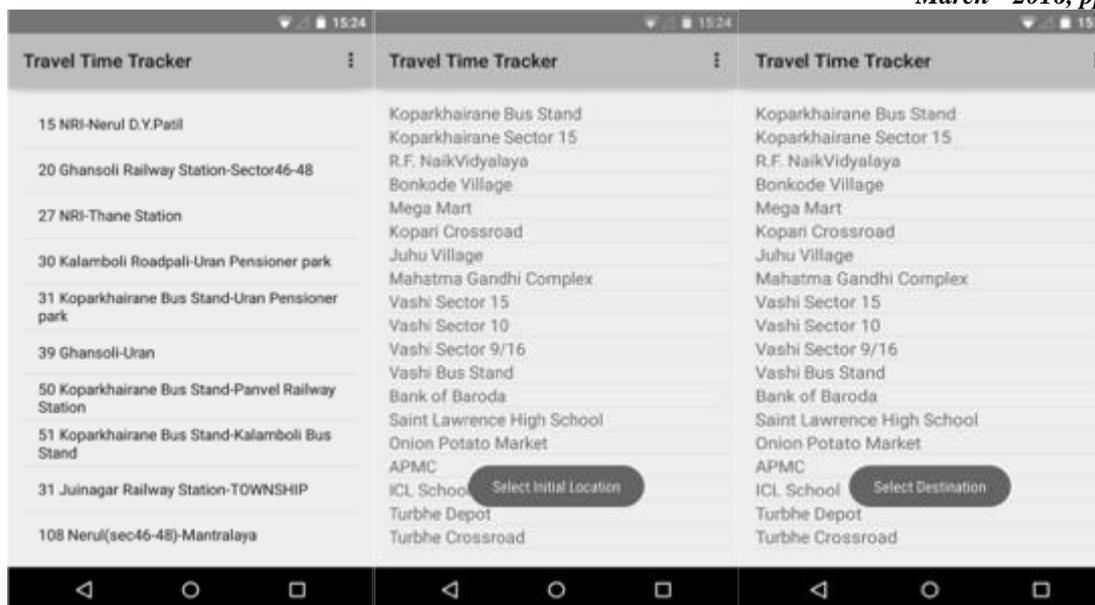


Figure 8: Selection of Bus Number
Selection of bus.

Figure 9: Selection of Initial Location
Selecting Initial Location

Figure 10: Selection of Destination
Selecting Destination Location

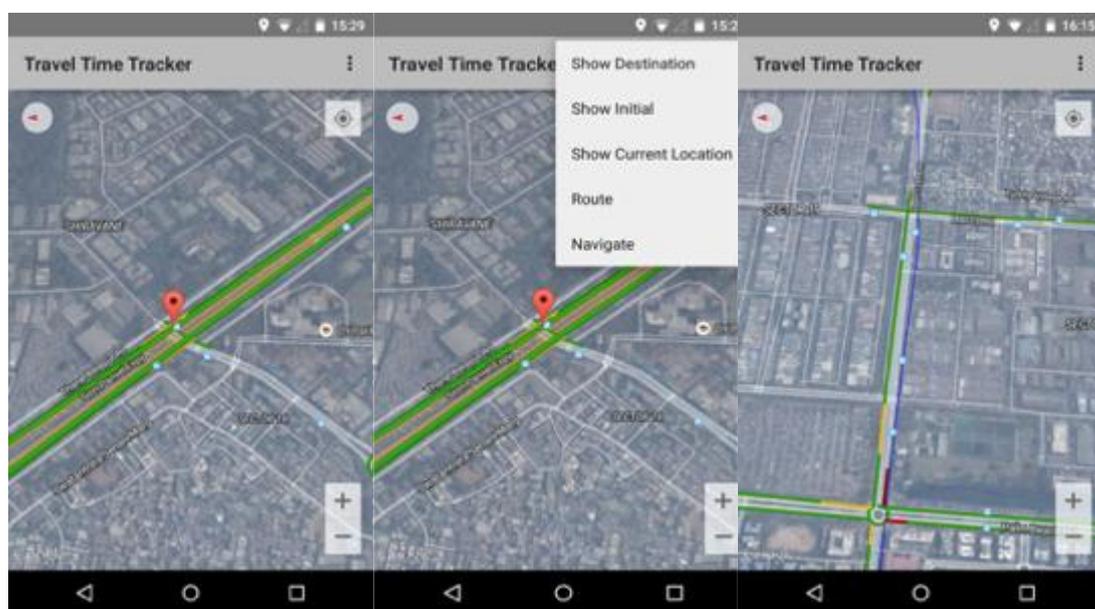


Figure 11: Location Pin
Bus Stops Shown using Marker

Figure 12: Overflow Menu
Menu with Option

Figure 13: Route of Bus
The Blue line showing Route of Bus

VI. CONCLUSIONS AND FUTURE SCOPE

As our day-to-day life dependent on schedule of transport services, we have implemented a system which helps to get information of transport service like bus in delayed situations. It is a simple user friendly android-based application which helps user to find out bus timings, by how much time bus will be delayed, etc. It has implemented Location Based Services through which we get current location of bus. It has also used Google Map Services to show route of a bus.

The scope proposed system can be extended to cloud platform which enables it to be accessed by every Android user. Also, addition of more types of transport services will help all types of travellers and tourists too.

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