

Metro Rail Monitoring And Tracking System

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Abstract:

In day to day life everyone is in hurry to reach their destination and waiting for buses and metro, many of us unaware of where the vehicle is. To overcome this problem an easy system is propose in the paper to track the real time metro location. Vehicle tracking system is a well-established technology in today's era. It is very safe and reliable technology. The propose system has an advantage, now a days in mobile phone location services are easily available by using Global Positioning System (GPS). The system consists two android applications and one database server. One application is in android mobile which is locate in every metro and one is in client/ user mobile phone. The server database is mainly responsible to provide or update exact location of metro to client application. On the other hand in user application user can see the speed, arrival time and location of metro in real time. Also all the information is view on a map using Google API. The application is made only for android platforms.

Keywords: *GPS, metro, tracking system*

1. Introduction

GPS is a popular technology for tracking system. Different types of GPS devices are used to track different types of object's location. GPS device receive signals from satellite, so we can easily and accurately track the location of a vehicle movement. [10] In today's world everyone uses mobile phones for communication from anywhere. Mobile phones have GPS sensors, so it can receive signals from base station and satellite. [9] After receiving the signal, android phone stores the location based information to the web server database. Web server database updates the information to user application. User can monitor the vehicle location from anywhere using android application. Now GPS tracker's is used to track location, but this needs to buy extra GPS devices and have to pay periodically for this services. Here we use Mobile phones for providing tracking system without purchasing and using extra devices and no need to pay for the devices. Mobile phones are cheaper than other devices, GPS system are already embedded with android mobile phones without additional cost. Users can track immediate real time location of vehicle by using android application and GPS. Android mobile phones has an ability to connect android application with a Google maps using Google API, so user can view the vehicle location on Google map respectively[12].

The page is organized as, literature survey has covered in section II, section III has covered proposed methodology, experiment and result in section IV, and conclusion is included in section V.

2. Literature Survey

A number of studies in the past decade have collected evidence about the organizational impacts of applications. The role of information systems in monitoring and transporting people and goods increased during the 1990s. In-Vehicle Data Recorders evaluation first appeared in the track industry in the early 1980s, but were limited to routing and tracking [11] .

MTC bus route: Bus Metro Suburban allows the public to track the buses in Chennai. The application enables public to update the location of the metro in a click. The application will take the information from the passenger travelling in the metro by retrieving it through the GPS of the user's phone and update it as the current location of the metro. The other passengers can check the location updated by those who are travelling in the metro using the application. The real time tracking of metro is not possible in this application. If there is no updating made, it is not possible to know the location of the metro. Metropolitan Transport Corporation (MTC) had planned to implement vehicle tracking system by fitting On-Board Units into the buses but due to financial crunch the idea is yet stagnant [1] [2] .

Delhi Metro Rail : A metro rail-based system was prescribed by RITES, containing a network of surface, underground and raised corridors accumulating to 213 kms, to stay aware of the traffic demand up to the year 2021. The entire task expense was assessed at Rs. 15000 Crores according to 1996 value level. The system at present handles 2.4 million commuters daily. The first and second phases of Delhi metro have been finished. The DMRC site demonstrates various advantages of metro [3] [4].

Mumbai Metro: Mumbai Metro app shows all information about Metro stations, Timings, Fare, etc. Mumbai Metro app is a perfect guide for metro users. It shows all information about metro services like station wise timetable, all station information including first and last train timing, Contact number, etc. Its calculate fare from one station to another with other information like distance, time and all stations between them. Interactive map shows all metro stations[5] .

BMRCL Bangalore Metro: Namma Metro (Bengaluru Metro) is a metro system serving the Bengaluru, India. It is the third longest metro network in India after Delhi Metro and Hyderabad Metro as an October 2018. The metro network consist of two lines: An interchange station, station marker and terminal station marker is beautifully shown in the app with two lines.

1. Green line
2. Purple Line

BMRCL Metro Timing app is a beautifully designed mobile app to make the transportation easy. Enter source and destination station and find basic detail of the route like distance, fare, journey, duration, number of stations, and interchange if any. [6]

NMRC tickets: Noida metro app is designed only for ticketing application. Ticket can be purchased for Noida Metro Aqua line. Single journey, return journey tickets can be purchased using the mobile application. [7] [8]

3. Proposed Methodology

Basic concept and components

The Metro Rail Monitoring and Tracking System is an application used to determine the location of metro in real time using different methods like GPS and other navigation systems operating via satellite, GPRS.

The android application which we are creating for users to identify metro location in real time and to improve customer satisfied ratio for using metro by detecting metro speed and its arrival time. The user first check the location, speed and time of metro and after clicking on that information, user will get location over a map. By using the map user can be able to see the position of metro. Once the location and speed of the metro is tracked in real time it will be beneficial for user. This application built using webhost000 for database server, Java and the Google Map. The information is to be integrated with a Google Map through Google Maps Application Programing Interface (API) which displays the position into a map. Since the metro position is retrieved in every second, the map also updated at a same interval, thus a real time location tracking is achieved.

The required components and their specifications are given below:

A) GPS :

GPS stands for Global Positioning System. GPS has provided positioning, navigation, and timing services. GPS receiver can determine accurate time and location, in any weather, day or night, anywhere in the world. GPS based vehicle tracking system uses the GPS technology, GSM service and Android mobile. As per shown in this system has two main modules Metro module, User module. Metro module performs tracking functionality. It tracks the vehicle through GPS and transmits its current location to the server. The function of User Module is to see the speed, arrival time and location of metro in real time and also view the google map with vehicle locations. Server works as a central connector for Metro module and User module respectively. As both modules communicate with each other through Server only. As shown in mobile application communicates with server and access the remote database. Whereas Server database updates all the information to the user.

B) Metro module:

In metro application vehicle name is already set and the location information about that vehicle back to the server through GPRS and continuously update the database.

C) User module:

The Android Application through which user will get to know the actual position of proposed metro. This android provides the user interface through which user communicate with system. It provides location, speed and arrival time of metro. After click on the metro information user will get google map with exact location of metro.

E) Google Map

Google has developed a Google maps for the mapping service in application. By using Google map API key from the site it provides a map view where user can see the exact current position of metro. [13]

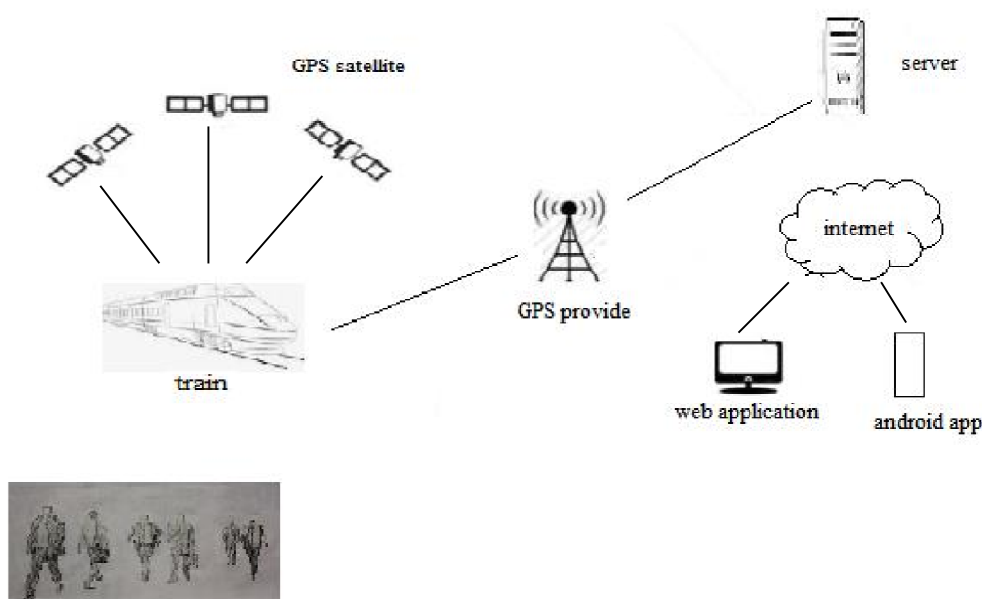


Fig 1 : System Architecture

4. Experiment and Result

Paper is designed in three parts where each part is responsible for different aspects. Essentially, main activity handles initiator methods and configuration processes for Location manager class such as previous updated information, current location, arrival time, distance speed and Google maps. Following are some steps to find the all information in a metro tracking application. And this steps is initiated or implemented with the outcome result are given below.

1. Metro application creation:

Metro monitoring application has been developed to analyze the position/ location of metro and store it to the server side. As shown in figure 3 it is develop on mobile phone with GPS receiver capability to acquire the information of metro location, calculate delay and request to server.

1.1 Location Time:

The android application takes the location tie of metro from $t_1, t_2, \dots, t_n$ and store it into the database server.

1.2 Destination Calculate:

The android application calculates the distance and gives the location of metro as per user requirement.

1.3 Speed of metro:

Speed of metro is calculated in meter/ second and stored in a database server.

1.4 Server Upload:

Server upload all the information related to the android application.

2. Database Server:

In this we use the webhost000 server it automatically recover and update background from a dynamically changing mero position. Changes is seen such as moved vehicle location in longitude form. The server side database holds the updated location and information for all metro provides response to user/ client application.

3. User application creation:

User application shows in figure 4 enable the users to access the metro information from server such as location of metro in real time, they should be able to quickly and conveniently find out there local metro arrivals, delays, etc,

3.1 Metro test:

It test the location of metro in real time. It takes the updated information of metro through the server.

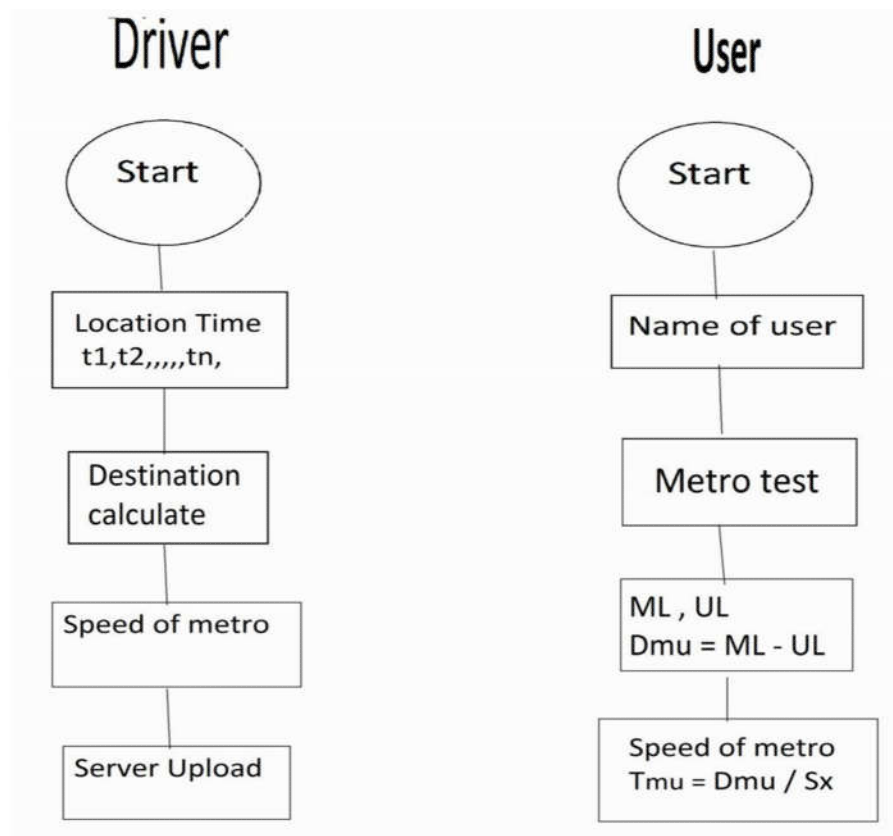
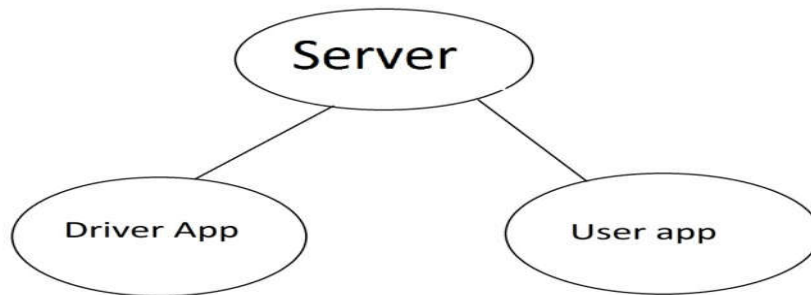
3.2 Metro Location, User Location:

Destination metro unit = metro location – user location

3.3 Speed of metro:

Speed of metro is calculate in meter/ second by using formula $TMU = DMU / SX$ and update it to the user.

Time = Distance / Speed



Result Analysis

After successful implementation of Metro Tracking System we obtained following results :

The application must be required Metro name, Metro speed and Metro location as shown in figure 8.1.

Metro name is already set in metro application which is located in each and every metro.

The core aim of our paper is to design an application for the user, so that the user can plan his/her travels more effectively and efficiently.

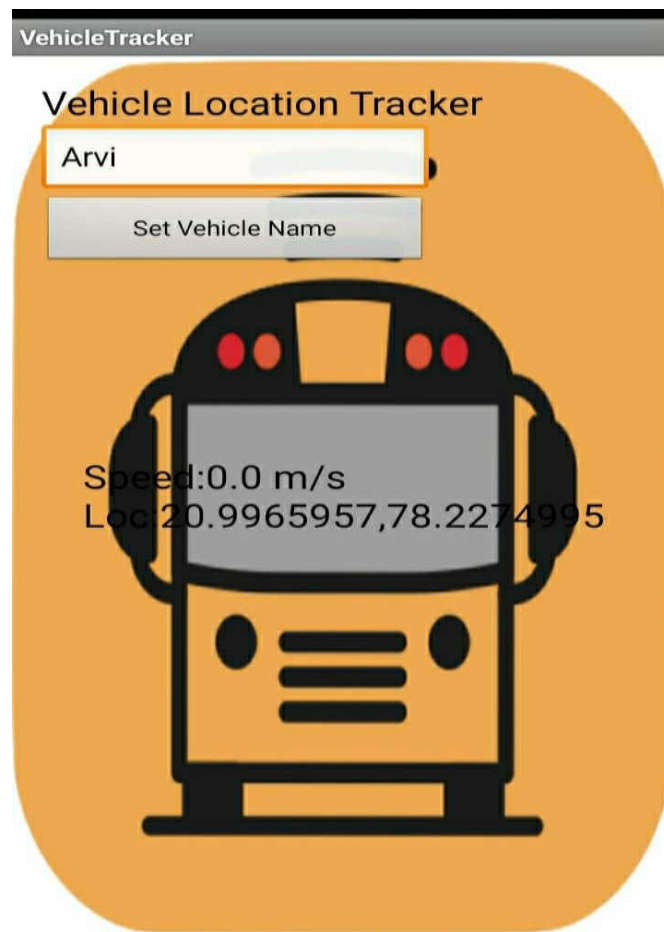


Fig. 3: Metro Module

The image shows the Metro Application.

In the application Vehicle Name is set. After click the button it shows the speed and location of metro and update on the web server database. So whenever the user want to see the organizational metro information server will provide the information to user application.

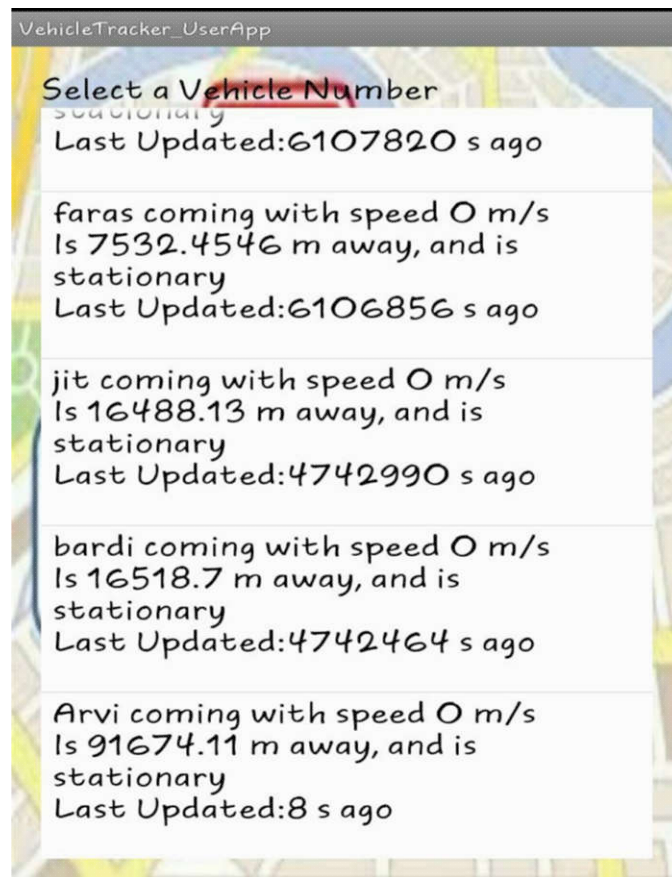


Fig. 4 : User Module

The image shows the User Application

User application shows the metro list menu, it shows the speed of metro in meter per second with respect to metro name. User can see all registered metro information, like last updated information, arrival time and at how much distance metro is from user location.

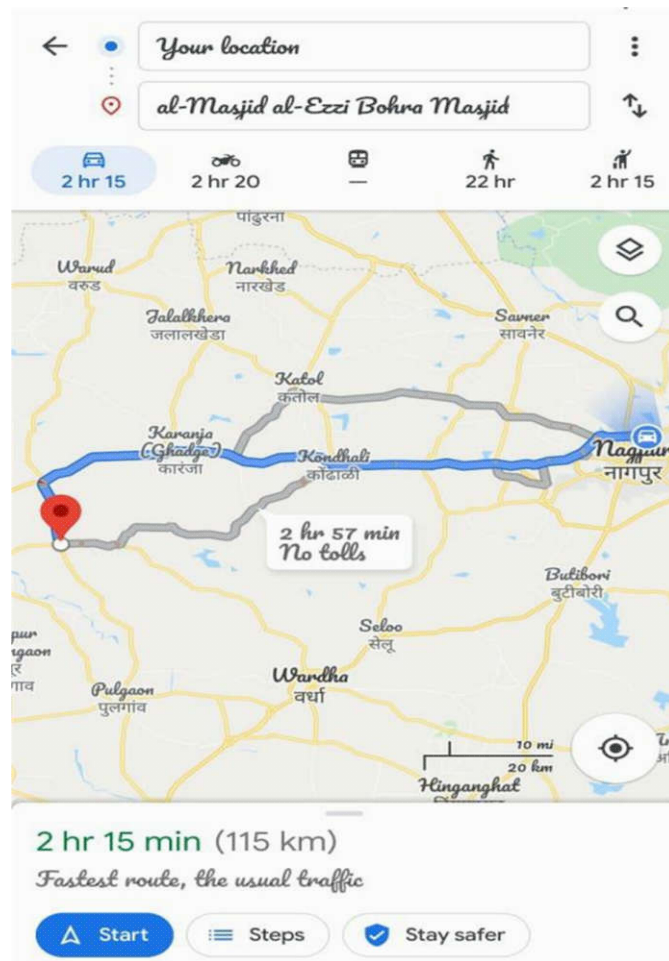


Fig. 5 : Google Map

The image shows the Google Map

When user click on the particular Metro information which they want the Google Map is to be display. By viewing the Google Map user can view the Metro location and routes.

5. Conclusion

Metro monitoring using tracking system mobile application as a means of service management. With real time tracking feature in mobile application user can able to track the metro's current position and monitoring is simplified and notify updates information in the application.

The android application can avoid possible delays. Having a mobile application is an interactive, fast and easy to use way to enable tracking. Upgrading this setup is very easy which makes it open to future a requirement which also makes it more efficient.

The application will also provide position on Google Map by using Google Map API, whenever GPS receives a new updated information we are able to see the location on Google Map.

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