Android – Geo Finder - A Real Time Tracking of Moveable Assets

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ABSTRACT

Real time information of public transports like buses, trains and cargo vehicles, that are in transit is unavailable. This information will be very helpful for managers, supervisors,   users and customers of the service. The project seeks to locate and plot location of any moveable assets in Google maps, which can be viewed through a mobile application. Moveable Assets can range from public transport like trains, buses to cargo transports like courier, vans, ships etc. This is achieved through a informer application, a tracker application and a plotter application, which runs on Android, PHP, GPRS / GPS and My SQL.

KEYWORDS

 Android, Geo-Coding, My SQL, PHP, GPS, GPRS

1. INTRODUCTION

The evolution of mobile communication has made long distance communication a simple task. Advancement in the field of mobile technology has led to development of applications for the mobile users; news, entertainment, games, information sharing, and everyday tasks can be done in a comfortable manner. With these developments, the mobile looks more like a computer and less like a phone.

The project is a GPRS (General Packet Radio Service) based informer, tracker and plotter system used for identifying the current location, and displays its location in mobile handsets via web server.

The GPS (Global Positioning System) is used to mark its current geographic location (geo-location). GPRS transmits voice and data to the mobile device. In this project, we consider movable assets of the following categories
1. Public Transport (Buses, Trains, etc)
2. Cargo Transports (Trucks, ships, vans, etc)

GPS or GPRS can also be used to track the moveable assets such as buses, trains etc. A large organization owing a large fleet of transport vehicles can keep track of their movements and current locations.

1.1. OVERVIEW

A simple mobile program is created and installed as an embedded module in the moveable asset. This periodically transmits its location through its GPS/GPRS module to a server, by calling the PHP page at regular intervals of time. These locations are expressed as coordinates; which is used to mark it on a map. These coordinates are stored in the SQL database. The stored data can be retrieved by a web page, to plot on a map.

1.2. EXISITING METHODLOGY

In the existing methodology, the current location of the moveable assets cannot be determined. However the current location of the mobile device can be ascertained, but its movement cannot be tracked remotely

1.3. GEOCODING

Geo-coding is the process of determining associated geographic coordinates (often expressed as latitude and longitude) from other geographic data, such as street addresses, or zip codes (postal codes). With geographic coordinates the features can be mapped and entered into Geographic Information Systems; or the coordinates can be embedded into media such as digital photographs via geo tagging. With mobile devices now having liberal access to GPS, geo-coding has become common place.

1.4. GEOCODER

A Geo-coder is a piece of software or a (web) service that helps in this process

1.5. PROCESS OF REVERSE GEO-CODING

Reverse geo-coding is done similar to the geo coding process. When a GPS coordinate is entered, the street address is interpolated from a range assigned to the road segment, from a reference dataset that is nearest to it. If the user provides a coordinate near the midpoint of a segment ranging from 1 to 100, the returned street address will be somewhere near 50. This approach to reverse geo-coding does not return actual addresses, but estimates probable addresses based on the predetermined range. Alternatively, coordinates for reverse geo-coding can also be selected from an interactive map; or extracted from static maps by geo-referencing them in a GIS, with predefined spatial layers to determine the coordinates of a displayed point. Many limitations of geo-coding are similar to reverse geo-coding. The accuracy and timeliness of the reference layer used to reverse geo-code a coordinate will have a significant impact on the accuracy of the results

1.6 LIMITATIONS AND CURRENT USAGE

Reverse geo-coding services are not popular because of the need for extensive computing resources and large and updated databases.
However, public reverse geo-coding services are increasingly available through APIs, other web services, and mobile phone applications. These services require manual input of a coordinate, captured from a GPS, or selection of a point on an interactive map, to look up a street address or neighbouring places. Examples of these services include the Geo-Names, reverse geo-coding web service, which has tools to identify nearest street address, place names, Wikipedia articles, country, county subdivisions, neighbourhoods, and

other location data, from a coordinate. Geo-Names use the United States Census Bureau's tiger line data set as the reference layer for reverse geo-coding. Google has also published a reverse geo-coding API, which can be adapted for online reverse geo-coding tools, which use the same street reference layer as Google maps.
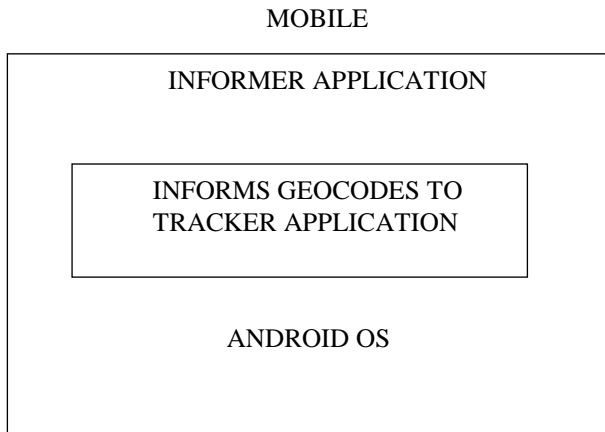
2. APPLICATION OF GEO-FINDER

2.1. INFORMER APPLICATION

MOBILE

INFORMER APPLICATION

INFORMS GEOCODES TO TRACKER APPLICATION

ANDROID OS

Fig 1. Informer Application

The project uses two main underlying concepts. The main application of this system is tracking, to which the GPRS/GPS enabled Android mobile is connected, giving the information about its position. The user can view the position in the mobile handset. This information is sent to the SQL Database, and then hosted on a web server through PHP.
From the SQL Database the co-ordinates are retrieved and plotted on the maps. The mobile transmits and receives, enabling the stations to triangulate the location of the target, with their computers. Mobile Application is developed to view the information from the web server on the mobile handset. The project "Android Geo - Finder" is an application for Android devices, based on the principle of reverse geo-coding.

2.2. TRACKER APPLICATION

WEB SERVER

TRACKER APPLICATION

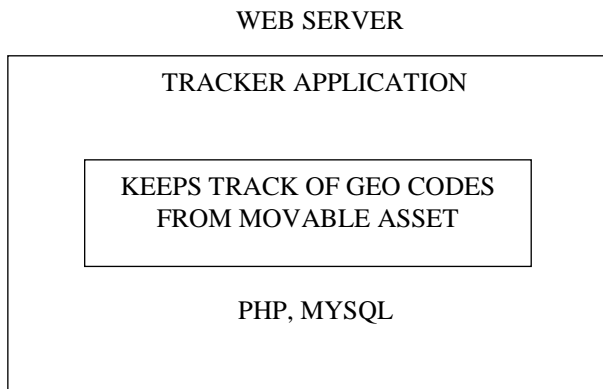KEEPS TRACK OF GEO CODES FROM MOVABLE ASSET

PHP, MYSQL

Fig 2.Tracker Application

In the tracker part, geo-coordinates received from the informer application, are updated in the MYSQL database. This tracks the geo-codes from the movable assets simultaneously with their unique identifiers that are configurable in the database. The technologies used in the tracker application are explained below.

2.3. PLOTTER APPLICATION

MOBILE

PLOTTER APPLICATION

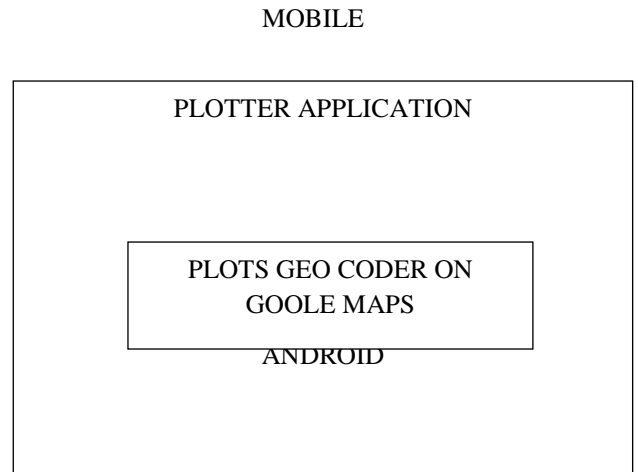PLOTS GEO CODER ON GOOLE MAPS

ANDROID

Fig 3.Plotter Application

In the plotter part the obtained geo-coordinates from the MY SQL database are plotted in the Google maps. The process of plotter is done by reverse geo-coding. The technologies used in the plotter application are explained below.

2.4. HARDWARE TOOL

* Android Mobile

2.5. SOFTWARE TOOLS

* Ubuntu 9.10(jaunty)
* Eclipse (HELIOS)
* Android SDK and AVD Manager
* LAMP Server
* XML.

3. FUNCTIONAL BLOCK DIAGRAM

This has three main parts: informer, tracker and plotter. In the informer, a mobile application gets the current location (latitude and longitude) of the mobile device, using GPRS; the mobile transmits the geo-coordinates to the server at regular intervals of time.
The coordinates are transmitted from the informer, and stored in the My SQL database, at particular intervals, using proper authentication.
In the plotter, we retrieve the Geo-Coordinates from the My SQL Database using simple web program, to plot those co-ordinates in the Google Maps.
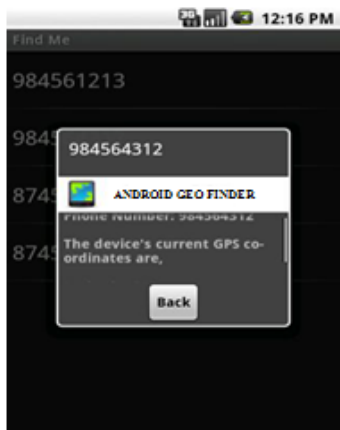
Fig 5. Screenshot of Informer Application

3.   RESULTS AND C

ONCLUSIONS

4.1 APPLICATIONS FEATURES

The main features of Android Geo Finder are:

• The application has two different set ups. One for the Android   devices. Another for the services to keep a check on web-hosting and Android to web-server communication.

• The application uses the device's core GPS service to extract the latitude and longitude data. This feature does not need an internet connection while using the GPS service.

• The application uploads the user's current location to a web-server. This enables the user to share their location so that it can be viewed by others, as well as view shared locations of other users.

• The web services act as a bridge between the Android devices and the server. It is used to capture user data, and send server data to the devices, when requested by the user..
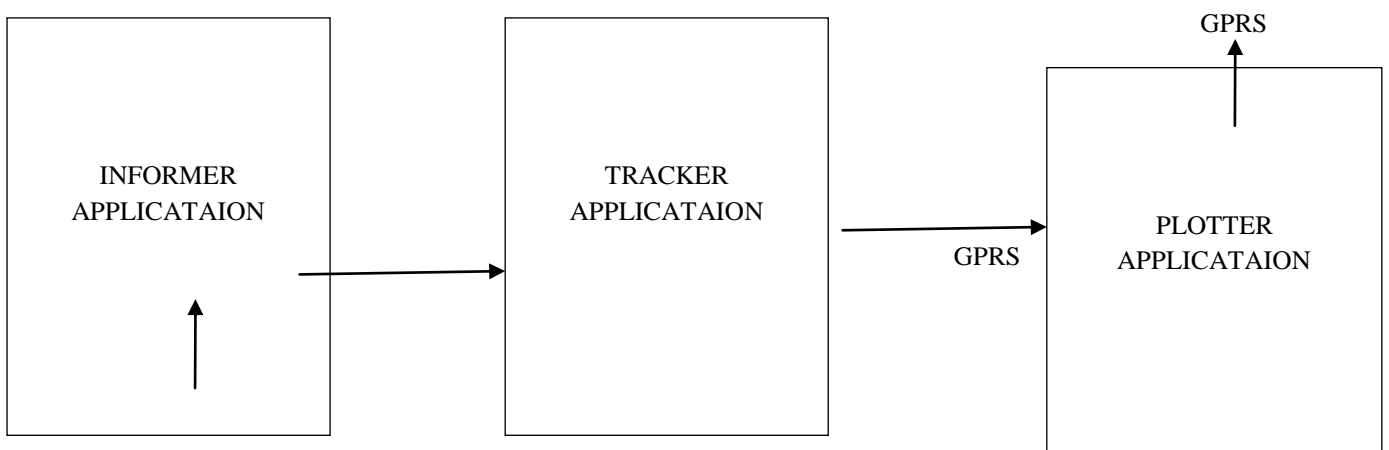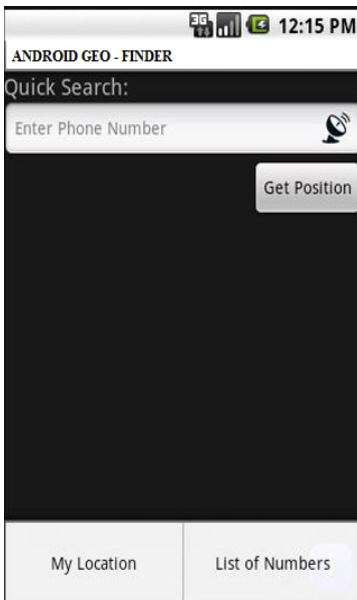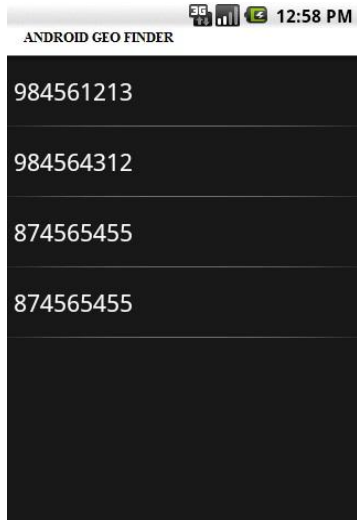
4.2. SCREENSHOTS – INFORMER APPLICATION

Fig 4. Functional Block diagram

4.4. PLOTTER APPLICATION
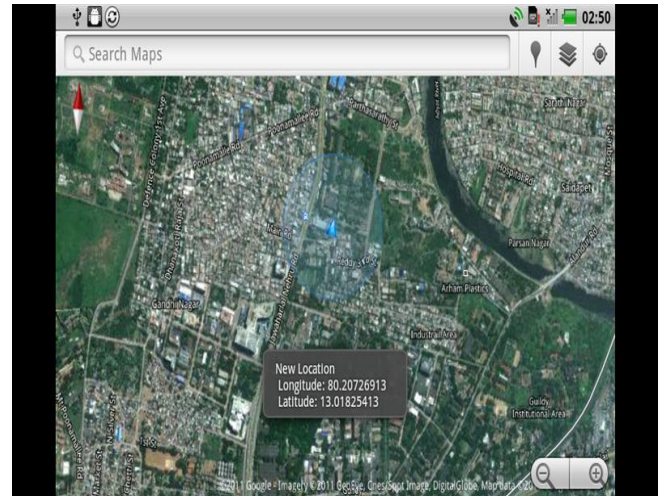
A SCREENSHOT OF THE GPS CODE IN ACTION

Fig 7.ScreenShot of Plotter Application

4.5. CONCLUSION

As already mentioned earlier "Android Geo-Finder" is an android mobile application with functionalities of reverse geo-coding. It can be developed further, and has enough potential to be converted into an enterprise application.

5. FUTURE ENHANCEMENTS

A few enhancements that can be added to the existing application are

• The application can be linked with external APIs like Yahoo/Google GPS API, which allows the user to send their GPS co-ordinates via Internet. This will provide the exact street address.

• The application can be linked to Google Maps for real time location update on the map. This feature is currently available on high-end Android Devices only like (Dell Streak). If we run the application in the background and switch on the maps, it gives the real time location of the device. This feature can be obtained without the use of the assisted GPS (that used GPS and Internet connection) as it requires only core GPS functionalities.

• It will be used for locating MTC Buses, and availability of the buses in that particular time, by giving the basic information, and know bus location.

• By using this method we can locate a transiting vehicle/object or the human anywhere in the world.

• An android OS based mobile is sufficient to find the location of a moving vehicle.

To conclude, the features used in this application are the latest technology trend. With some minor improvements "Android Geo-Finder" has the potential of becoming a very successful enterprise application.

4.3. TRACKER APPLICATION

Fig 6.ScreenShot of Tracker Application

6. REFERENCES

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