

Device Tracking Using GSM/Satellite Network Coverage

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Abstract-

When people are out of station or family member are out of home there is need for real time tracking system for their safety. Now a day's mobile phones have capability to give geographical position in real time, by using global positioning system (GPS) service. GPS based device tracking has been proven to have wide range of application. To achieve device tracking in presence of Global System for Mobile communication (GSM) network coverage, several methods are implemented such as GPS and International Mobile Equipment Identity (IMEI) number. The GPS based device tracking fails to give location of device in absence of GSM network coverage. We propose an idea to obtain location of a device in absence of GSM network coverage, by implementing Globalstar satellite tracking services for Android mobile application. This proposed mobile application suggest user to use satellite network for fetching latitude and longitude location co-ordinates. Satellite network uses its own integrated GPS to transmit location co-ordinates to requested user.

Keywords— GPS; GSM; IMEI;LEOs;

I. INTRODUCTION

In today's era more than 1.75 billion people worldwide to use Android phones [1]. Android phones have wide range of features which can be utilized for safety purpose amongst which location service facility. When people are out of station or family member are out of home at that time issue of their safety arises. To achieve device tracking in presence of GSM network coverage several methods are implemented such as GPS and through IMEI number. In absence of GSM network coverage the location can be obtained by satellite tracking service [2].

Android phone tracking using GPS/satellite uses either GSM network or satellite network to get real time geographical position of the device. It will help people to locate their Dear once in real time.

In presence of GSM network coverage proposed mobile application will use GPS service of device to get location co-ordinates. In absence of GSM network coverage proposed mobile application will use low earth orbit (LEO) network. GPS receiver operates at 9600 baud rate and is used to receive the data from space segment at the time of processing. GPS receives various location parameters, from these parameters values of only latitude and longitude are taken into consideration excluding time, altitude and name of satellite.

II. LITERATURE SUREVEY

In reference [2], Satellite tracking devices works via staellite Network. It uses satellite network to transmit information from its integrated GPS to data processing center and does not require GSM network coverage for transmission. It is recommended to use satellite network when person moving out of GSM coverage or travelling abroad.

In reference [3], the author attempted to put forth mobile application that worked as client server system which helped user to locate their family by receiving alert when family members where nearby. They have also proposed concept to fetch location from service provider. In this study however, they have not assumed case of absence of network coverage and location accuracy when application works in crowded area.

In reference [4], the author proposed development implications for urban and rural environment transportation system which seems to be scare. They proposed one hardware device which contains GSM modem and GPS unit within it. Same hardware devices where installed in vehicles and by using those hardware devices vehicles where tracked. Hardware device communicates via SMS with server and server was connected with GSM phones. The proposed system work considered to obtain only location coordinates but required excess overhead of installing

hardware device on every vehicles together with continuous server operating.

In reference [5], the author proposed Java enabled client

server system that helped to locate family members. Here application size was small because all users' related data was

stored on server. This proposed application locates family members in presence of GPS coverage, but does not work when GPS coverage is poor.

In reference [6], The author proposed java enabled client server system which works on GPS/GPRS module to fetch location Acquisition and to transmit location information, it uses Google Cloud Message(GCM) and third party sever was used for temporary storage of location information.

In reference [7], the author proposed communication satellites of 21st century and working of Low Earth Orbit satellites. Big low earth orbit satellite (LEOs) was proposed which is beneficial in cellular system. There are three main kinds of LEOs networks which are Inmarsat, Globalstar and Iridium. LEOs provides low delay and global coverage which can be used in absence of GSM network coverage.

In reference [8], the author proposed an application entitled "Sat-Fi". Sat-Fi is an android application which turns Android phone or wireless device into satellite device. This application enables device beyond cellular service. By using Sat-Fi application we can take our Android phone beyond cellular with reliable satellite hotspot. Globalstar Inc has offered Sat-Fi application on Google playstore and this application is freely available for installation. But for using this application initially user has to undergo through registration process on site www.globalstar.com.

III. PROPOSED IDEA

To fetch location of device, we propose idea of Android application which uses either GSM network coverage or Globalstar satellite network coverage, to get location co-ordinates in the form of latitude and longitude.

Proposed application facilitates omni-directional tracking of device. Initially users have to undergo through registration with application. After registration user can create his/her own friend list which gives location access rights to mutual friends. When any mutual friend wants to get location information of another mutual friend, then user send request for location through application. If requested user has GSM network coverage, then it checks GPS status and get location coordinate through GPS [3], but in absence of GSM network coverage application will suggest user to use Globalstar satellite network

on same Android phone by using Sat-Fi application [8]. The generic Architecture of proposed application is shown in figure 1 and figure 2 shows Activity flow of proposed application.

Proposed idea consists of following components such as Android device, Application server, Cellular network, Globalstar satellite network and Google Map service which is shown in figure 1.

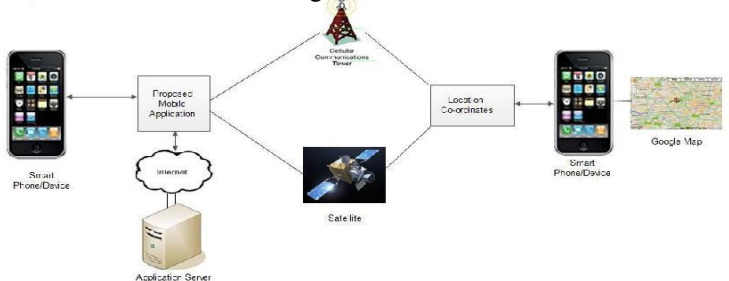


Figure 1. Generic Architecture of proposed application

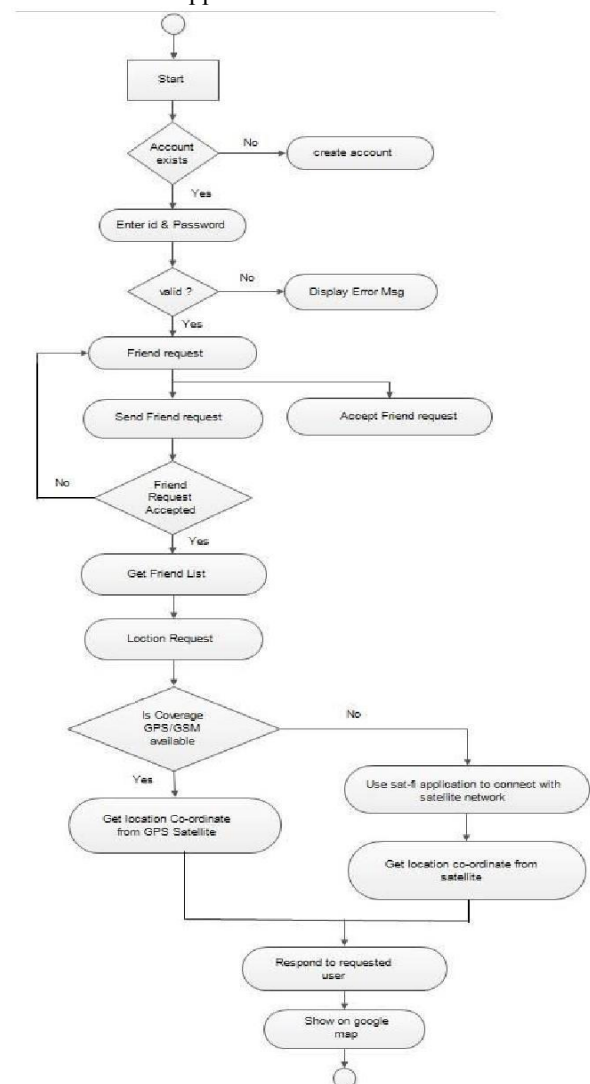


Figure 2. Activity Flow of proposed application

Initially user registers through android device, registration details will be maintained by application server. Application server will validate user and will provide list of mutual friends. If valid user will request for location of mutual friend then application will check GSM/GPS network coverage status. When GSM/GPS network coverage is available proposed application will use GSM network service to connect **with requested user then by using requested device's GPS**

service location co-ordinates are fetched [3]. These fetched co-ordinates are transmitted to requested user by proposed application. When GSM/GPS network coverage is not available proposed application will suggest user to use Globalstar satellite network service to get location co-ordinates from satellite network. Android phones can be turn into satellite enable wireless device by using service of sat-fi application. If user accepts suggestion of application to use satellite network then by using Globalstar satellite network services location co-ordinates of the requested device can be obtained. After receiving location co-ordinates from either GSM service or satellite network service, proposed application will display location of requested device on Google Map.

Sat-Fi is Android application which turns any Android phone into satellite enabled device which can easily send data **beyond cellular service with the world's most reliable satellite**

hotspot [8]. Globalstar satellite network has ability to track Mobile device.

Globalstar satellite network consist of 48 satellites in 8 orbit planes with 6 satellites per plane [7]. So this satellite network is beneficial for providing reliable and quality of service.

IV. CONCLUSION

This paper proposes an idea to make use of Globalstar satellite network to get location of device in absence of GSM network coverage. Though the result of the proposed idea were not tested we rely on previous work done where satellite network have been used to track location of devices and does not require GSM network coverage.

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