

# Campus Navigation on Android Platform

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**Abstract-** A University Campus maybe very large or it may have many campuses. Every year lots new student get admitted in the university. Many new buildings are built, new courses are started and some departments, library, canteen, etc.in the campus and how to find those places from current location. It creates problem to the new comer to reach easily and timely in the desired location. The new faculty number, staff and visitors also face same problem inside campus. Moreover ,these does not exist an efficient system to inform about any event which will happens just few minutes or a few hours later in in the university campus with its proper location and shortest path from current location. Now days, most of the student, faculty member members and staff use android phone for personal purpose. A Global positioning system based on map application will be most helpful to locate desired place and shortest path from current location and to get updaters of event on map with its location. Thus it will reduce frustration and confusion of anybody inside the campus. This paper represents the architecture and design of a google map based application on android platform. The application has been implemented using android SDK and has been tested for KJ campuses.

**Keywords-** GPS, Android SDK, ADT, Android Emulator, HTML, CSS, Java Script, JSP, Servlet, Apache Tomcat, LBS, Google Map

## I. INTRODUCTION

During the last few years, the development of mobile devices has gained significant progress with respect to memory capabilities, advanced processing power and higher transfer rates to name only a few performance parameters. Nowadays android mobile becomes the most popular in the smart phone market because android is an open source [4] mobile Operating System based on Linux with java support and it comes under free and open source software licenses. Location based services (LBS) provide personalized services to the mobile clients according to their current location [12]. Geographical Information System (GIS) is the core part of LBS to provide all the valuable features of LBS [9]. People can track own location and also navigate from one location to another location very easily. There are lots of technology to track location like Cell Identification, GPS, Various Radiolocation systems, Accelerometers and Electronic Compass etc [6]. GPS gives much higher accuracy of latitude and longitude compare to other techniques but it works only in

outdoor, not in indoor. The Location Tracking techniques can be worked with all today's market cell phones with networks such as GSM (Global system for Mobile Communication), GPRS (General Packet Radio Service) and CDMA (Code division multiple access). There are many applications and commercial devices that provide driving directions and navigation such as Waze [Waze Navigator], Google Navigation [Google Maps], in car navigation, Magellan navigation devices [Magellan Smart GPS], and Garmin navigation devices [Garmin Navigation] [3]. This navigation became easier with the help of Google Maps on GPS enabled android devices. GPS applications allow users to find a destination based on their current location. So, location searching becomes a new trend with the combination of Google Maps and GPS. It provides lots of additional features [1] like displaying congested route, smart driving decisions and improve driving safety and reduces time and energy while going to an unknown places. But its capabilities are not up to the mark inside the university campuses. All the route directions, buildings, grounds, parking lots, canteen etc. are not properly available in Google Maps application. For example, if we search for Food Tech. & Bio-Chemical Engg. Dept., Jadavpur University it will not locate the place. So, we can say, inside Jadavpur University campus, Google Maps application is not efficient. Timely information is very important in today's life. For example, traffic information, information about accident, road maintenance are known in advance. Similarly, for a "Digital Campus", timely information is very crucial like where and when football match will be played, place time and topic of a seminar or venue and agenda of some student meeting etc. These features are not available in Google Maps. If this feature is integrated with Google Maps, it will be very helpful both for existing and new comers of University campus.

## II. CONCEPTS AND PROBLEM ANALYSIS

Though Google map is very helpful to find a location and alternative route to the desired location from user own location. But it is not so much helpful for our university campus because there are many departments, schools, library, canteen, playground, gates, hostel, jhills, and parking lots etc. which are not properly shown on Google map. University campus is growing faster and as a result changes are happening inside campus. Google maps cannot keep track of it regularly. No system to track user own location and then

provide shortest path of desired location inside campus. Though the notice is sent to departmental notice board about any event but when event will happen just few minutes or few hours later or some emergency information which should be spread very quickly, it is not possible for university administration to make all students, teachers, staff are aware about event so fast through notice.

Dependability on Android Application is growing faster with the advancement of smart phone technology. There are lots of Google map based apps on market. There are some technologies to display custom map. This can be achieved through Storing location data on XML file and place this XML on a server Displaying map taking location information data from MySQL server Spread event information with the help of NFC technology. The aim of this research work is to develop a user friendly, Google map based application for university campus navigation and updates of event information on android mobile in some different way. This application will show user’s current location in the campus or outside campus with a marker. This will provide a categorized menu of places of both Jadavpur University campuses. Users can get the desired places with a marker and also shortest path from current location. Users can also get updates about event information. Users can view any new building, canteen, playground, etc. on map.

**III. DESIGN ARCHITECTURE**

**A. System Architecture**

The architecture of the entire system is shown in figure 1. At first the application in the user’s phone, requests for Google API from Google server.

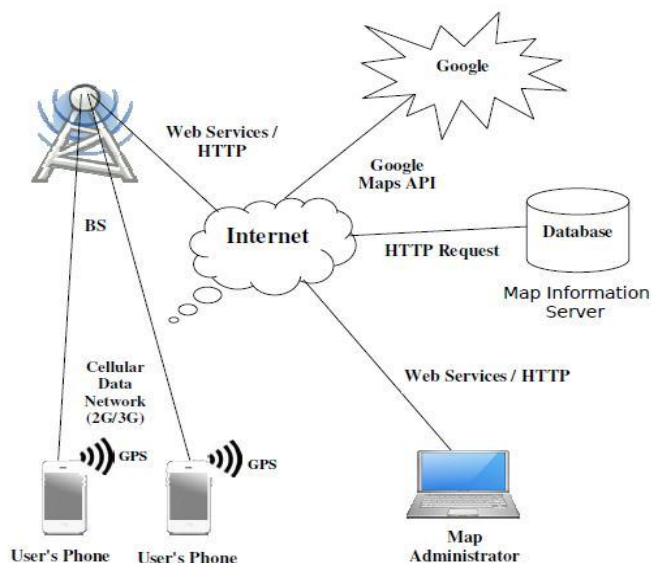


Figure 1

Then the map is loaded on user’s phone. By GPS of users mobile, current location of user is tracked and displayed on map. A HTTP GET request is sent through the cellular data network services and internet to the map information server dimensionally.

**B. Campus Map Design**

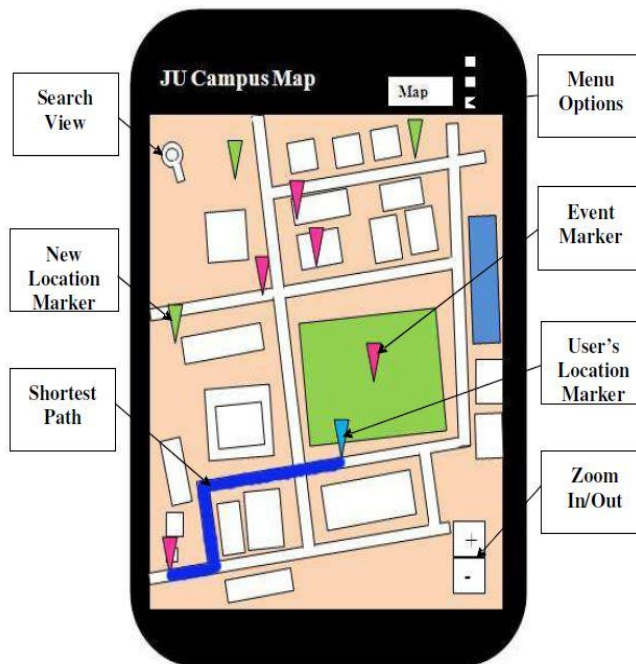


Figure 2

Figure 2 shows the design of campus map. Google Map API v2 has taken as a template to show campus map. There will be a categorized menu options on top right corner of the screen to view desired location. ‘Map’ option will be there to change map view. A search view will be on the top left corner of screen to search places by search text.

**IV. LITERATURE SUREVEY**

Trend of Location based navigation with the help of Google Map in android platform growing faster. Piyanuch Silapachote, Ananta Srisuphab, Rasita Satianrapapong, Warat Kaewpijit, and Nuttaporn Waragulsiwan developed an application named GuideMyTour[2]. This map indicates and tracks a user’s current location and heading direction. It can be zoomed in and out, or rotated in any direction. It combines a traditional paper map image of a locality with a satellite map image. A user provides a custom map of particular location and the corresponding satellite map is retrieved from Google Map. The geoinage mapping engine is responsible for relating and aligning the two maps; the result is passed to the map rendering engine which then displays the overlaid map to the screen. Every known point of interest marked clearly. While

user walking information updated regularly following the user movement. It not only uses a GPS but also an onboard compass as well as an accelerometer for higher accuracy of current location of user. The application also accessible in off line mode means without internet connection. The live view mode requires an onboard rear camera typically found in most today's mobile devices. Mihaela Cardei, Iana Zankina, Ionut Cardei, and Daniel Raviv, Department of Computer and Electrical Engineering and Computer Science Florida Atlantic University, Boca Raton campus designed a system of campus assistant application[1]. The application provides facility to choose starting and destination location and it gives shortest driving and walk able path and it also provides suitable parking lots for the user. It also shows user's current location with the help of GPS. The application provides rerouting when the user discontinues from the projected path. They have designed a Map Editor tool to edit and manage campus maps. These maps are stored on the server as XML files. The Map Editor tool uses HTML 5, JavaScript, and jQuery. They have used Google Maps API V3 for displaying maps and plotting markers. The Map Editor tool provides facility to faster manipulation of map and its XML file. Building, streets, parking lots are not available in Google Maps, this can be included, deleted, updated in the map with the help of Map Editor Tool. From the android mobile, user accesses the most recent version of map. It uses JSON/HTTP protocol to request an XML map file from the Mapping Server. Mihaela Cardei, Brandon Jones and Daniel Raviv, Florida Atlantic University added contextual information for mobile user navigation applications [3]. It adds contextual information in the path of destination from user's current location. They uses Dijkstra's algorithm to calculate shortest path. Sagnik Bhattacharya and M. B. Panbu designed and developed an application named "Mobile Campus" on android based mobile platform for SRM University campus [4]. University campus tour guide application will work on NFC (Near field communication) enabled smart phones on Android platform. It can be used by visitors/ students/ parents. This application includes basic functionality such as showing map of university campus, showing route from source to different location, can locate user current location. Map can be zoom in/out. User can also view important landmarks and information about upcoming event like seminar, sports etc. NFC enabled devices connect automatically with other NFC devices when other smart phones/devices come into close range and provides current event information. Near field Communication devices are operating at 13.56 MHz and can transfer data at up to 424 Kbits/second. HsienTang Lin provides a Comprehensive Guiding and Navigation Services on Smart Phone for 2013 Taiwan Lantern Festival. This application provide guidance and navigation service with a custom map, not simple Google map. This application gives content information of 3D

animation which is digitizing version of a water painting in size of 80 meters long and 0.9 meter height. It converts public map onto custom map in graphic format. The custom map may be in Kmz format. A kmz is a zipped file contains KML files which specify a set of features (place marks, images, polygons, 3D models, textual descriptions, etc.) for display in Maps. This kmz files loaded onto the application to show navigation on custom maps. When the visitor is interested in the POI (Point of Interest), then he/she may activate the guiding service. Anupriya and Mansi Saxena implemented a map navigation system for travelling salesman problem on android using Google map and Google Geo-Coder API [7]. A campus spatial information service system [8] was developed by author using Google map. The System is mainly the combination of Google Maps and MySQL database. The system provides such facility of interactive information such as the picture, description, link and the useful measurement tool. The system also provides zoom out, zoom in, pan, eagle eye and the browser of the spatial 11 .information, inter query between figure and text, complex path measurement etc. User can add his POI and Information about POI to database and it provides option of taking feedback from user. Following tools are used by them to implement the system these are Web

2.0 technologies: DHTML, CSS, Ajax

Population web programming language: PHP

Web server: Apache

Open source database: MySQL

Map presentation platform: Google Maps API

A useful model for the future digital campus [10] of Wuhan University of Technology was made by the author. This is a kind of GIS based campus navigation system. GIS (Geographic Information System) is a technology that integrates computer graphics and databases, which stores and processes spatial information. The system is mainly developed for school teachers and students, integrated schools teaching resources, infrastructure, service place and other data information, using GIS technology to provide teachers and students for digital and intelligent information services. This system includes several modules like Education management, Query management, Campus navigation etc. Based on Map Objects and Visual Basic, authors developed this system. A location based nearest ATM search is developed by Gugapriya A, Vaitheki J and Kaviyarasi S [9]. It's a pure application of GPS based location tracking service. The application combines banking service with location based service. Shaveta Bhatia and Saba Hilal compare various approach of location tracking and also proposed and implement a new algorithm [6] on Android 4.0.

## V. CONCLUSION

In recent years with the help Google maps, location searching becomes a new trend when people are not functionalities like showing any location, alternatives path from any location to other location and estimates time to reach the location. But it is not well developed or so much helpful for university campuses.

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