

Campus Assistance Navigation System

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Abstract- College campuses can be large, confusing, and complicated for new students and visitors. Finding the institute/campus can be easy using GPS or Google Maps directions, but this changes when you are actually on the campus. Google Maps and GPS systems have become indispensable in recent years, with vast amounts of users relying on them for directions, but their capabilities are not yet being fully applied to university campuses. Directions within campuses are not available using the Maps application. Taking for example the Sinhgad Campus, when the Polytechnic College, which is situated at the far other end of the campus, is entered as the Destination, no complete directions are provided. Thus this android application is a service that provides directional assistance within the campus itself. Integrated innovative parking system for the users visiting the campus will have easy assistance in finding and navigating through the huge parking lots.

Index Terms- Android platform, Campus map editor, Ubiquitous computing, Google Map maker, Google map.

1. INTRODUCTION

Technological advancements have gained a great growth in finding many applications in everyday activities. There are many applications and devices that focus on directing the user to desired locations. Today's drivers are well resourced for travel thanks to the GPS units many have in their cars. GPS allow users to enter a destination and based on their current location display the fastest way to the destination. Google Maps and GPS systems have become vital in recent years, with vast amounts of users relying on them for directions, but their capabilities have not yet been fully applied to university campuses. Directions within campuses are not available using the Maps application.

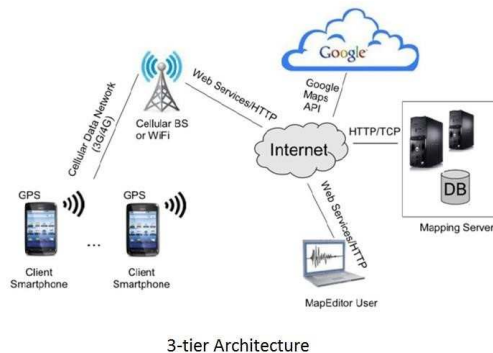
1.1 Motivation

Confused and unfamiliar or first time visitors coming to the campus have no idea about the locality. Local campus crowd too can't direct these visitors every time. So a simple way to navigate around campus is the key point behind this application. Food rating by the users helps feed hungry stomachs around the campus by giving a fair scenario of the available options rated by the users themselves.

Parking and remembering the parked spots through such huge campuses can be very tedious. So, a convenient way to navigate back to the vehicle is also an attractive feature.

2. PROPOSED METHOD

The application mainly has four folds. First, the main motive behind this concept is to develop the campus assistant application for a mobile device, specifically for the popular and widely used Android system. The application allows a user to select a source and destination locations and displays the shortest path between them. It is also a guiding tool for the nearest path for parked vehicle. Top suggestions for the available refreshment joints around the campus are also an added feature making the application relatively useful. Second, the application is not only to get distance between two places in the campus but it can also track your friends in the campus by sending them requests. Third, the application also provides the food ratings of various food places in the campus. Fourth, it has a unique feature of tracking your parking spot within the campus.



prompts the user to enter relevant information such as user type, campus map, and destination location. The app relies on a JSON/HTTP protocol to request an XML map file from the Mapping Server. This XML file is parsed and the map graph features are constructed. The smartphone GPS device is used to determine the user’s current location or the user can indicate a source location. If the user wants driving directions, the app will direct the user to the compatible parking lot nearest to the intended destination.

Fig. 1. Architecture Diagram

3. SYSTEM ARCHITECTURE

In the system the user has the android application installed on his smart phone. The user logs in with the valid registered credentials or registers for a new account. The user then uses the Google Maps services through the app which calls the Google APIs. The location of the user is calculated using the data through GPS of the smart phone and the location is pointed on the map. Using the searching functionality, the user can search the desired location in the campus and can enable the routing path to reach to the destination.

Figure 1 presents the architecture of our campus

assistant application. Since Google Maps does not show campus locations, we have to build the map data structures that describe campus locations, roads, alleys, everything needed for directions and navigation. We can use a MapEditor tool to edit and manage campus maps. These maps are stored on the server as XML files. The MapEditor tool are Adobe Map maker and Google Map maker which are used to build the map tiles and the various markers representing campus map concepts (buildings, etc.). The MapEditor tool allows fast and easy handling of

a map and its XML file. Since buildings, streets and other entities of the campus are not visible on Google Maps, this has to be done manually by the MapEditor User. The MapEditor lets the user edit a campus map superimposed on the Google Map and saves it as an XML file on the server. The main component of our architecture is the Campus Assistant smartphone app that runs on Android phones. The app user interface

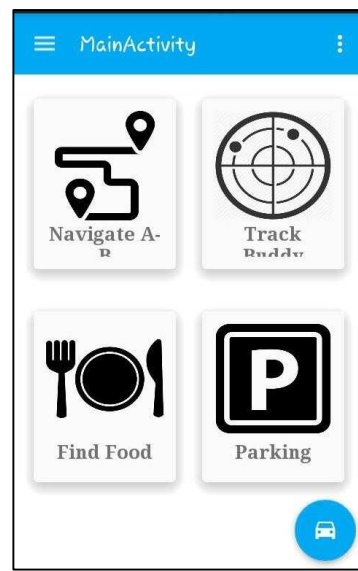
Fig.2. Screenshot of Main Activity Page

4. SYSTEM FEATURES

As we have mentioned that the application has 4 features or main application as shown in Figure 2. The four features are Navigation from point A to B, Buddy Tracking, Various food spots and Parking facilities.

4.1 Navigation Feature

The smartphone GPS device is used to determine the user's current location or the user can indicate a source location. The application will direct the user to the compatible parking lot nearest to the intended destination. It let user enter the desired destination location and then computes the shortest path between source and destination, and displays it on the user's screen on top of Google maps. Icons identify the user's



4.3 Finding Food Spots

This part of the application basically lists out all the local restaurants and other food places which can fill the hungry stomachs within the campus. With the list

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current location and the destination.

4.2 Buddy Tracking

This application allows you to see your buddies live on the map as they move. You can keep track of where everyone is at, and meet up or follow them. Your friends move in real time on the map and in comparison to your position. The app can run in the background unobtrusively so you can use your phone without any interruption. But this may lead to a question of privacy. This question can easily be solved by introducing request-response protocol between the buddies. A buddy can send request to his friend for the permission to track him. If he accepts his request the desirable track will be available to user else the request would be declined.

of these places it shows ratings, other basic information of each food place with its location in the campus. Figure 3 shows a basic demonstration of it.

4.4 Parking Facilities

Campuses can be complicated. It may be difficult to track same roads or go to the previous location we were before. Therefore, to solve this problem parking facility is a unique feature in the application in which initially the user can save the current parking spot and later after exploring the campus can track the initial

saved parked position.

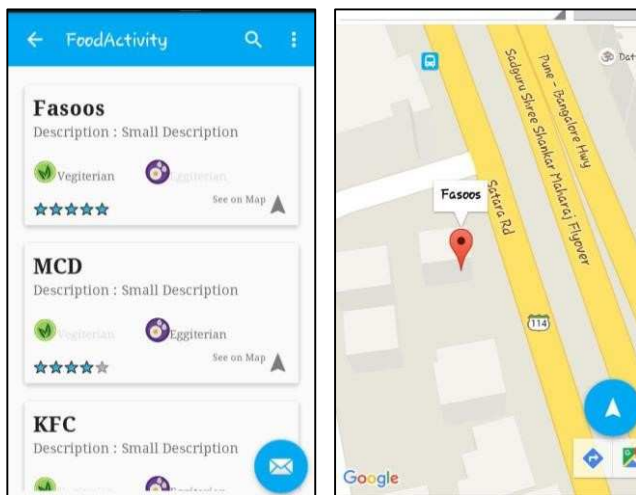


Fig. 3. List of various food places and its location

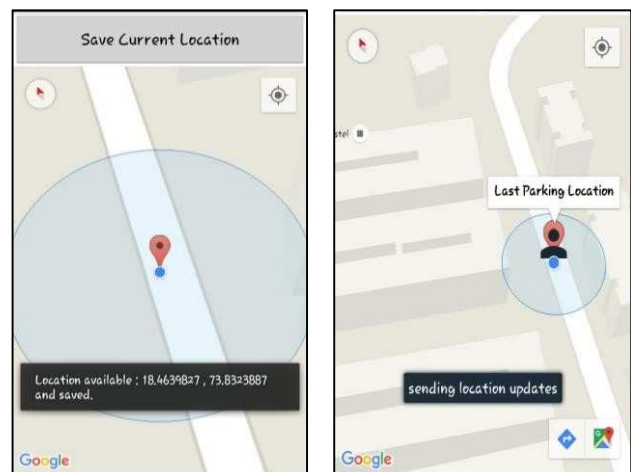


Fig. 4. Screenshot of Parking Facility

5. USE-CASE DIAGRAM FOR SYSTEM

The use-case diagram shows the functionalities of the actors participating directly or indirectly into the system.

There are basically two types of actors participating in the system. One, the navigator who will navigate and explore different sites of application using android application. The navigator is again divided into two kinds of user, i.e. Visitors and Non-Visitors. Second is the admin who will record various places like buildings, restaurants, etc. using a web admin portal. Using this portal admin can add, update and delete various sites within the campus. Admin can even add many alias names to same building as the building may be known from more than one name.

Now moving on the various functionality navigators can perform, there are mainly four main features as discussed earlier. Here a step by step functionality of each feature is described.

5.1 Find Location in Campus

By clicking on the Navigate A to B Button shown on the Main Activity Window it will show a basic Google map API with your current location inside the campus. Using the search bar above the API we can search any building listed below in the drop down panel. It also allows you to set current and destination location to see distance and route between them. This feature basically helps to perform live tracking between two

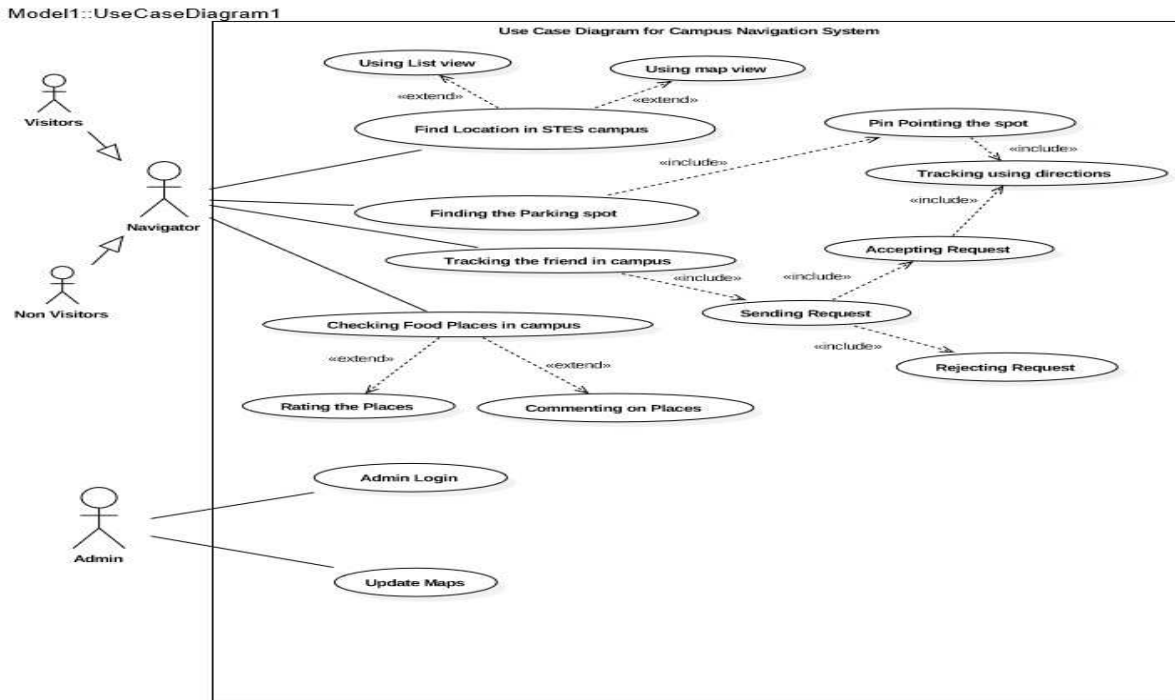


Fig. 5. Use Case Diagram for Campus Navigation

5.2 Finding the Parking Spot

By clicking on the Parking Button shown on the Main Activity Window, the application will allow you to save the current location by pin pointing it. Later when the user wants to return to the saved location after exploring the campus he can click on the small car button present at corner of the application which will show the directions to the earlier saved location.

5.3 Tracking the friends in the campus

By clicking on the Track Buddy Button shown on the Main Activity Window, the application will allow you to send request to the friends who have already registered in the application. After sending the request, the friend will get a prompt message about the request from other user to track his/her location. If the person accepts the request, the other user can successfully see the directions to his friend else he can see that his request has been declined.

5.4 Checking Food Places in campus The various food places present inside the campus. It shows the rating of each food place with a little description about it. It even shows on the map where that particular food place is situated. The list can be sorted according to the rating or alphabetically.

GPS.gov Roads and Highways,
<http://www.gps.gov/applications/roads/>
 Florida Atlantic University app for Android
 [4] Google Map Maker,
<http://www.google.co.in/maker/>

6. CONCLUSION

In this paper we presented a campus assistant application developed on an Android platform. The application provides various navigation services to users at Sinhgad campus. We also designed an admin web panel that allows authorized users to add new campus maps or update existent ones. Currently we are working on adding new features to our application, such as making this application available on various mobile phones which have operating system other than android. Expanding the application to different college campuses. We can add more features and updates according to the physical changes around the campus.

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