



I-MAP: ANDROID BASED ONLINE AND OFFLINE LOCATION FINDER

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ABSTRACT

Android is becoming the fastest operating system to be used in the smart devices for which application are developing. This paper will justify the needs and types of map and also the ability to mark the location as the user needs for locating its home, office, car parking and it also provides placing markers to a specific area. The I-map contains feature of multiple marker which can specify multiple areas along with its Longitude and Latitude positions. The variations in the map type can give the user a detailed view about the regions and accordingly user can markup the region with the polygon feature. This technology also works in an offline mode, giving user less chance of Map Jaggies for any particular area. The application uses the Google API key and the encryption method SHA1 key

KEYWORDS: Encryption, Google API, Jaggies, SHA1 Key

INTRODUCTION

The mobile has become the valuable part in the recent years for the human beings. It has become necessary for humans to have a powerful device which will provide numerous facilities other than simple facility available in mobile phones. I-map is the Android Application facility, Google supported map that will Search, locate and navigate the location on the map.

Android devices have become the first preference for many users and the demand for social application is growing immensely [1]. So this application is made to satisfy the need of the user while travelling or searching to locate and markup the region. The user can also get directions in Latitudinal and Longitudinal markings on the Map of any region. I-map provides different view like hybrid view and terrain view to provide user an accurate region with names and markings on it. It can mark multiple regions through pinpoint and enclose various selected regions through Polygon selection. The navigational feature gives handler its recent location on the map according to the real time data [2]. The map works smoothly in the offline mode without representing any jaggies in any ‘zoom in’ or ‘zoom out’ condition. The swipe function on the map can help the user to swipe easily between different regions and the pinch in function will let the map to ‘zoom out’, similarly the pinch out function will ‘zoom in’ the map view. I-map also has the map of the detailed and marked up view of the Centurion Institute Campus as it represents each part of the campus. The smooth, precise and quality features and functions on the map give user a useful technology on their hand to move freely on earth.

Overview of Google API

Google has developed Google APIs using JavaScript APIs that allows interaction with Google Services and Assimilation of multimedia, feed-based Internet content into web applications [7]. Google user scripting language such as AJAX scripting and can be easily loaded using Google Loader. It provides many services to the developers to design various useful applications. Amongst numerous services Google API is a medium or platform for accessing various services provided by Google. Google offers variety of API for developers. The APIs can be used for Google Book Search, Google Analytics, Blogger, Google Code Search, Google Apps, Google Base, Google Spreadsheets, Google Calendar,

Google Notebook, Picasa Web Albums and Google Earth. Our application can enhance by using functionalities of Google API. The usages of Google APIs are abundant and increasing as the number of Android Developers increasing.

About Android

Android is the name of operating system (OS) developed by Open Handset Alliance (OHA). Android is known as the software stack for mobile devices that includes a middleware, operating system and key applications [3].

The Alliance is a union of more than 50 mobile technology corporations extending from handset manufacturer and service provider to software developers and semiconductor manufacturers including Acer, ARM, Google, LG Electronics, QUALCOMM and eBay, HTC, Intel, Sprint and T-Mobile. The intention of the OHA is to increase its innovation in mobile field and provide consumer a less expensive and better mobile experience. Open development platform offers Android developers the capability to build extremely rich and innovative applications. Developers around the world are welcome to take benefit of the hardware devices, background services, alarms, access location information, add notifications to the status bar and many other features.

REQUIREMENTS

Eclipse Indigo (IDE)

Eclipse indigo is an integrated development environment (IDE) consisting base workspace and an extensible plug-in system for customizing the environment. The IDE is created in java language. It can be used to develop applications in Java and by means of various plug-ins, other programming languages including C, C++, ADA, JavaScript, Haskell, Perl, Lasso, Python, PHP, FORTRAN, COBOL and Ruby. It can also be used to develop packages for the software. Development environments include the Eclipse Java development tools (JDT) for Java and Scale, Eclipse CDT for C/C++ and Eclipse PDT for PHP. For android based I-map project we required Eclipse indigo.

Java Development Kit 6

The **Java Development Kit (JDK)** is an execution of the Java EE Java ME or Java SE platforms released by Oracle Corporation in the form of a binary product aimed at Java developers on Solaris, Linux, Windows or Mac OS X. Since the overview of the Java platform, it has become the most widely used Software Development Kit (SDK). For the Development of I-map project java development kit was installed on the system unit.

I-MAP IMPLEMENTATION

- Getting Started with I-Map on Eclipse

Install Google play service and update SDK version in Android SDK manager. In eclipse Go to Windows > Android SDK managerupdate all SDK version and update Google play service.

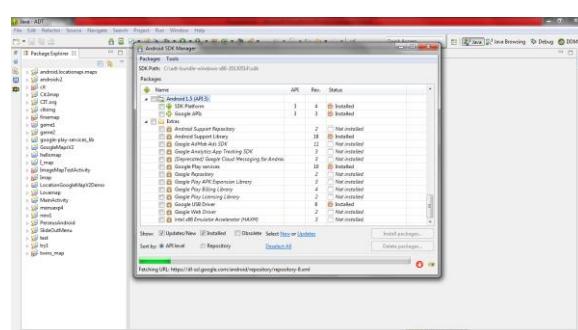


Figure 1

- Create New Android Project

Go to File > New > Android Application Project.

Select the Target SDK 4.2 & Min SDK 2.2, compile with Android 4.3



Figure 2

- Now Get an SHA1 Key

SHA1 key is required for we accesses API key from Google API console. How we get SHA1 key Go to Windows > Preference > Android> Build > Copy SHA1 key

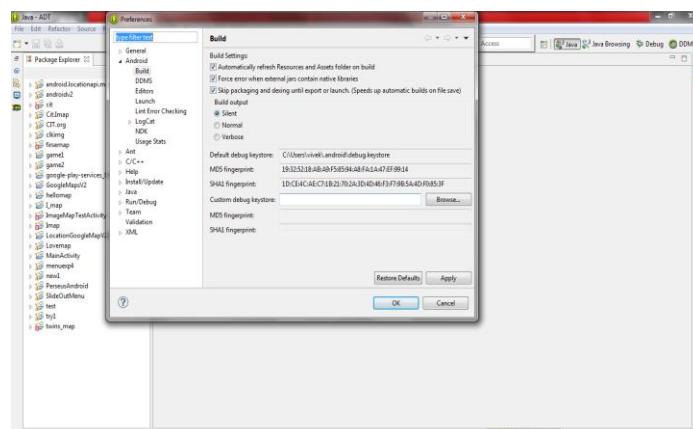


Figure 3

- Import the Google play Services on the workspace

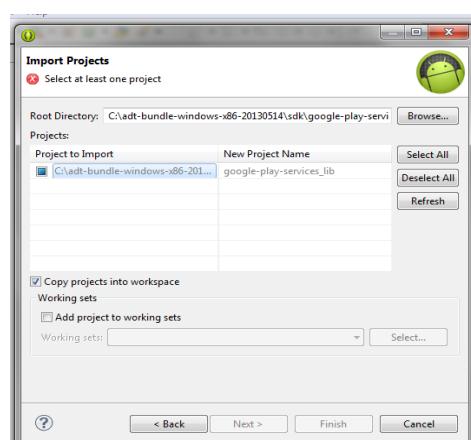


Figure 4

- After creating the new file for android project set the properties of android and imports the Google play service_lib into the project.

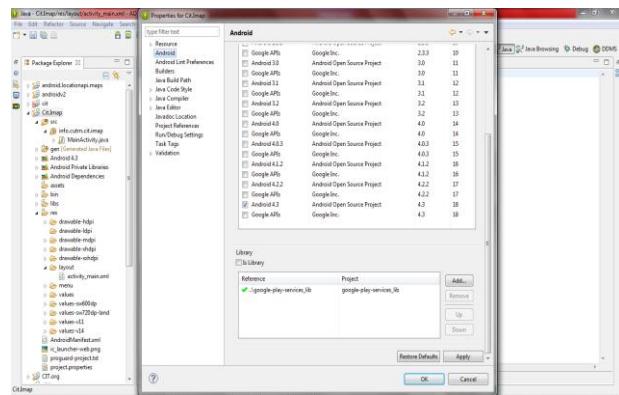


Figure 5

- Get the Android API key

Log in to Google API then name the project and go to Services to get the Android API key value for android map v2, get the SHA1 Key number along with the package name with a semicolon between them.

- In AndroidManifest.xml, the following element is added as a child of the `<application>` element.

```
<meta-data
    android:name="com.google.android.maps.v2.API_KEY"
    android:value="API_KEY"/>
```

This section sets the key `com.google.android.maps.v2.API_KEY` to the value `API_KEY` and makes the API key visible to any Map Fragment in the application.

- Specify Permissions

Specify the permissions your application needs, by adding `<uses-permission>` elements as children of the `<manifest>` element.

```
<uses-permission android:name="android.permission.INTERNET"/>
<uses-permission android:name="android.permission.ACCESS_NETWORK_STATE"/>
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
<uses-permission android:name="com.google.android.providers.gsf.permission.READ_GSERVICES"/>
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"/>
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
```

- Specify Requirement for OpenGL ES Version 2

The Google Maps Android API uses OpenGL ES version 2 to render the map. If OpenGL ES version 2 is not present on application map will not appear. Add the following `<uses-feature>` element as a child of the `<manifest>` element in `AndroidManifest.xml`

```
<uses-feature
    android:glEsVersion="0x00020000"
    android:required="true"/>
```

- Add a Fragment to support the layout

The XML file that defines the app's layout, and the main activity Java file is added with the fragment.

```
<?xml version="1.0" encoding="utf-8"?>
<fragment xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/map"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:name="com.google.android.gms.maps.MapFragment"/>
```

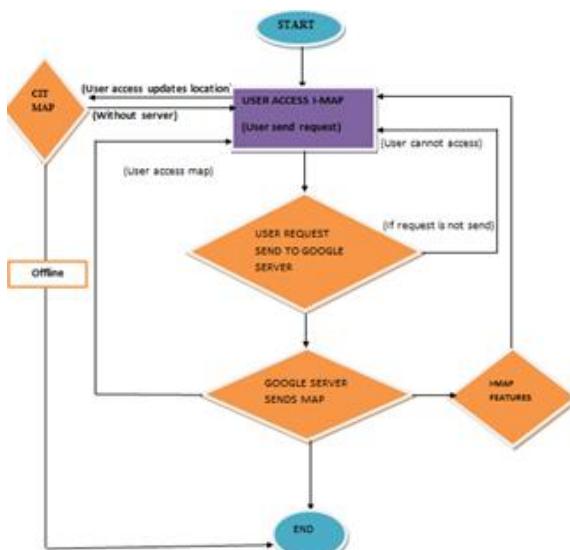
- For the Polygon Functionality

```
polygonOptions.add (marker.getPosition());
polygonOptions.strokeColor (Color.RED);
polygonOptions.fillColor (Color.BLUE);
polygon = myMap.addPolygon (polygonOptions);
```

- To setup the Navigational feature for the Map, the following codes is needed while coding
GoogleMap.OnMyLocationButtonClickListener.

Flowchart

The flowchart explains the detailed working of the application in online and offline mode with respect to its request for data retrieving from the Google server and response made by the server for the acceptance of data by the application.



Result and Simulation

- Output on AVD (Online Mode)

Parameters -

Name: nokia2

Target: Android 4.3(API Level 18)

- The output appears as the splash screen along with the Menus, representing different functions of the I-map after execution.



Figure 6

- The Main Activity in the Menu will show the output of the search field, through which user can easily locate their interest of areas. The search point will represent the area in the following format: City/State, Capital, Pin Number, and Country.

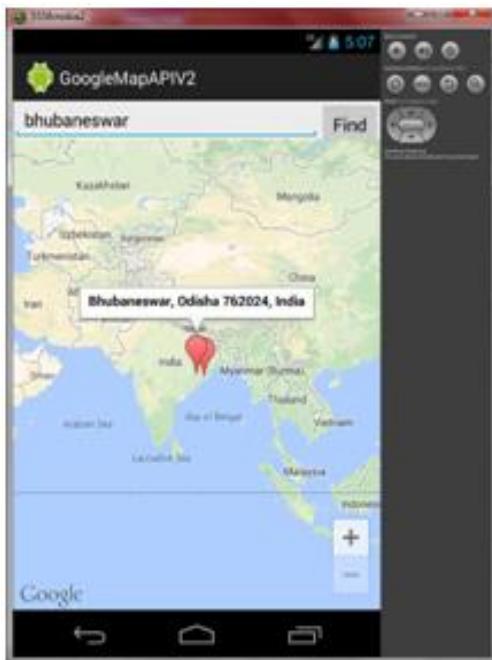


Figure 7

- The Second selection on the map naming Map1, will give the output on the emulator consisting of Latitude and Longitude, in the Hybrid map type, along with the Compass. The Pin point view has a multiple markup feature on the map. The Selected region can together show a polygon view to enclose the region of focus.

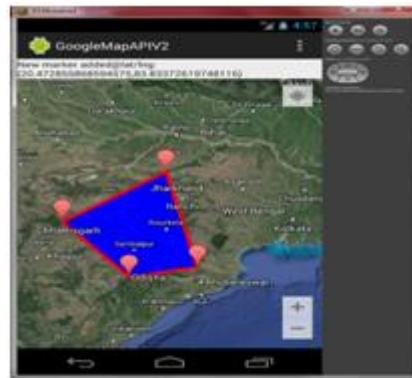


Figure 8

- The below image represents the Third option on the menu which will give the output of the Centurion Institute Campus, Bhubaneswar, Odisha with its detailed marking, representing each location of the campus

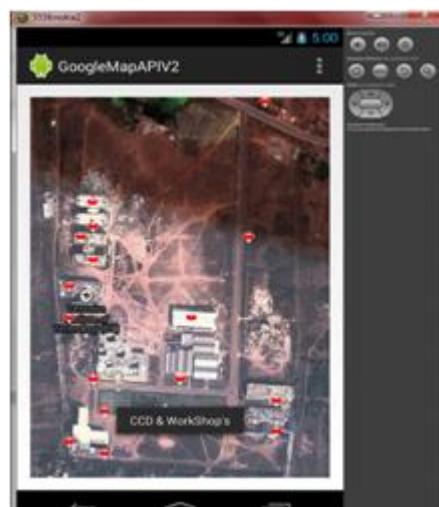


Figure 9

- The Fourth Menu will display the Developers Detail and about the application.
 - Output on AVD (Offline Mode)

In offline mode of the AVD the application will only show the Map of Centurion Campus with all its details as it works on the offline mode and rest of the parts of the application will not be displayed because the rest parts need Online Connection to view the Map on the AVD emulator.

- Output on the Android Device (Online Mode)

Parameters-

Name: Micromax Canvas a76

Target: Android 4.2.2

Kernel Version: 3.4.5

- Executing the Application on the Device, the Splash screen of the application results like in Figure 10.

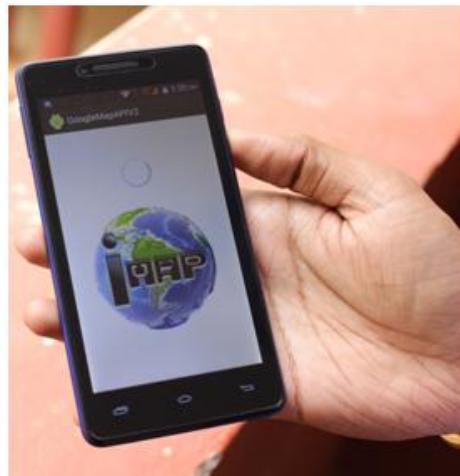


Figure 10

- The Menu layout of the Application in the device appears to be as in Figure 11.

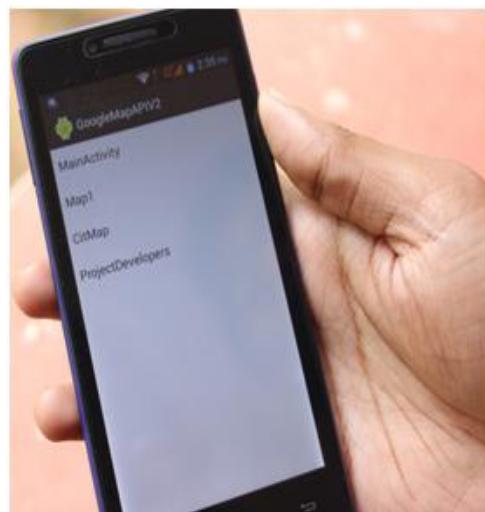


Figure 11

- The first option of the Menu naming Main Activity is represented below (Figure 12) in the online mode, which is showing the Terrain map type along with the location which is searched and the location is searched according to City/State, Capital, and Country.

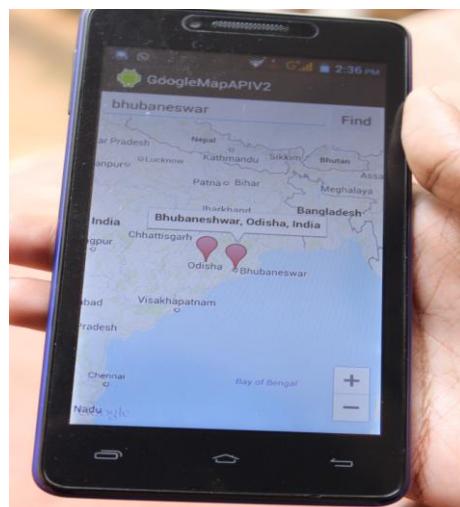


Figure 12

- In the Second option of the menu of the I-map, the application will show the map in the Hybrid Map type along with the Navigation, Multiple Pinpoint, Latitude and Longitude and the Polygon Functionality.



The above images of the Second Menu, represents
 (1) Navigation, (2) Latitude and Longitude with single
 pinpoint (3) Polygon view with multiple Pinpoint

Figure 13

- The image of Figure 14 represents the Third option of the menu which will give the output of the Centurion University Campus, Bhubaneswar with its detailed marking, representing each location on the campus.

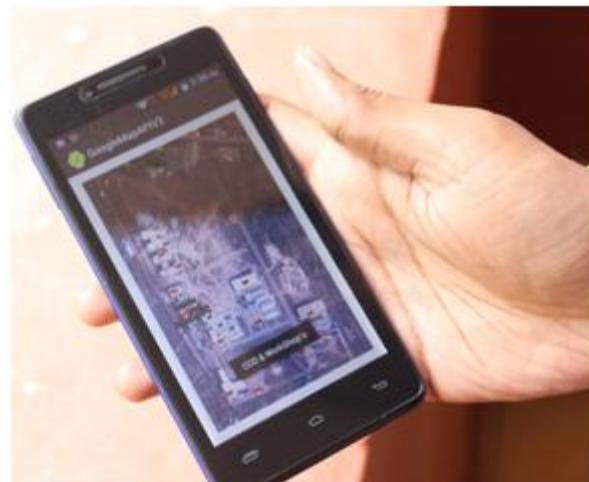
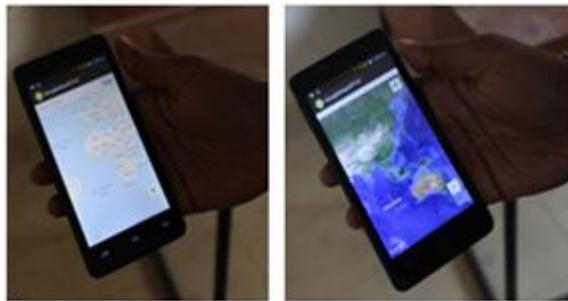


Figure 14

- The Fourth Menu will just show the information about the Developers.

Output on the Android Device (Offline Mode)

- In offline mode the application displays the map by retrieving it from the buffer memory.



The (1) displays the Terrain view of the map, without searching the location in the offline mode.
The (2) displays the Hybrid View of the map, representing the Latitude and Longitude and location of the map in detailed structure.

Figure 15

CONCLUSIONS

We used the Google API key to construct the map and its various forms and its types to help the public using android devices. Android applications are becoming a great scope for the future purpose in the field of smart devices to Google database connectivity. Similarly, I-map retrieves data from Google database in Online mode and also works offline using the buffer memory of the device. As it consumes less data on the device, it works more swiftly. Moreover the Polygon Feature and the Campus Specification Map extends the application existence and differentiate it from others.

The challenges for the future work of this application may include the feature to track the objects and navigate accordingly, and should work more effectively in the offline mode and at any presence of time.

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