Development of Android Based Real Location Tracking App

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Abstract – With the change in human living standards, a human needs to travel alone at new places. He is not aware of various places at new location. His family members might be worried about his well-being. We have developed an Android based real location tracking App which is able to track current location of a person. It will inform a person about his current location at regular interval of time. We have also developed a database in which a user can save information about his name and address and this information can be hand over to a person who is interested in travelling at same place. This App is able to register new people and it is able to provide Log In facility at any instance of time. This application makes use of real time Firebase database.

IndexTerms: **Android App, Location Tracking, Real Time Database**

I. INTRODUCTION

An Android App can be very useful in determining the location of the user. By identifying a user's location in an Android app can be really useful. Users take their mobiles all over the place and are frequently using them on the go, and as developers we can benefit from that by providing a more appropriate familiarity based on their current location. This paper presents some easy steps which will create an App that will identify the user location easily. It can also alert her about location regularly. This App occupies less space on the mobile device and it can be installed on any Android based mobile like Redmi and OPPO etc. While developing a location-aware application for Android, we can make use of GPS and Android's Network Location Provider to obtain the user location. Although GPS is most precise, but it only useful in outdoors, it quickly consumes battery power, and doesn't return the location as quickly as users necessity. Android's Network Location Provider verifies user location using cell tower and Wi-Fi signals, providing location information in a way that works indoors and outdoors, responds faster, and uses less battery power. To get the user location in an application, we can use both GPS and the Network Location Provider, or just one.

II. RELATED WORK

Linux based Android is an open and free operating system, which is mostly used for mobile stations, such as smart phones and tablets. It was developed by Open Handset Alliance composed of more than 30 technology companies and mobile phone companies. It tries to permit users experience the best service features, and allow developers to get a more open level for more suitable software developing. Thus mobile applications with more convenient functions can be developed via Android [1]. Authors in [2] has emphasized on the requirement of the location tracking app, its architecture and other possibilities. Authors in [3] have mentioned various types of Android based applications like weibo client, video player and audio player. Authors in [4] have provided joint tracking and simulation of human body movement through an android app. An android app can be useful in various areas like face recognition systems [5-6], network security [7-9], wireless body area networks [10-11] and in wireless sensor networks [12-20] to avoid energy holes problems [21-22]. The working of newly developed App should be tested by [23-24]. Labhade has provided offline location tracking of a person [25]. Authors in [26] have provided a 24 hours GPS tracking technology.

III. ADDING A MAP TO AN ANDROID APP

Step 1: Download Android Studio. We have installed and worked on Android Studio 3.1.

Step 2: Install the Google Play services SDK.

Step 3: Create a Google Maps project

Follow these steps to create a new app project including a map activity:

- ✓ Start Android Studio.
- ✓ Create a new project as follows:

If you see the Welcome to Android Studio dialog, choose Start a new Android Studio project, available under 'Quick Start' on the right of the dialog.

- ✓ Enter your app name, company domain, and project location, as prompted. Then click Next.
- ✓ Select the form factors you need for your app. If you're not sure what you need, just select Phone and Tablet. Then click Next.
- ✓ Select Google Maps Activity in the 'Add an activity to Mobile' dialog. Then click Next.
- ✓ Enter the activity name, layout name and title as prompted. The default values are fine. Then click Finish

✓ The Google Maps Android API is distributed as part of the Google Play Services SDK, so the first thing you should do is launch your SDK Manager and make sure you have the latest version of Google Play Services installed – if an update is available, then now's the time to install it.

✓ Next, create an Android Studio project with the settings of your choice, but when you reach the 'Add an Activity to mobile' screen, make sure you select 'Google Maps Activity as shown in **Fig. 1**.

Figure 1: Google Map Activity

IV. GET A GOOGLE MAPS API KEY

✓ The application needs an API key to access the Google Maps servers. The type of key you need is an API key with restriction for Android apps. The key is free. You can use it with any of your applications that call the Maps SDK for Android, and it supports an unlimited number of users.

✓ Use the link provided in the google_maps_api.xml file that Android Studio created for you:

✓ Copy the link provided in the google_maps_api.xml file and paste it into your browser. The link takes you to the Google Cloud Platform Console and supplies the required information to the Google Cloud Platform Console via URL parameters, thus reducing the manual input required from you.

✓ Follow the instructions to create a new project on the Google Cloud Platform Console or select an existing project.

✓ Create an Android-restricted API key for your project.

✓ Copy the resulting API key, go back to Android Studio, and paste the API key into the <string> element in the google_maps_api.xml file as shown in **Fig. 2**.
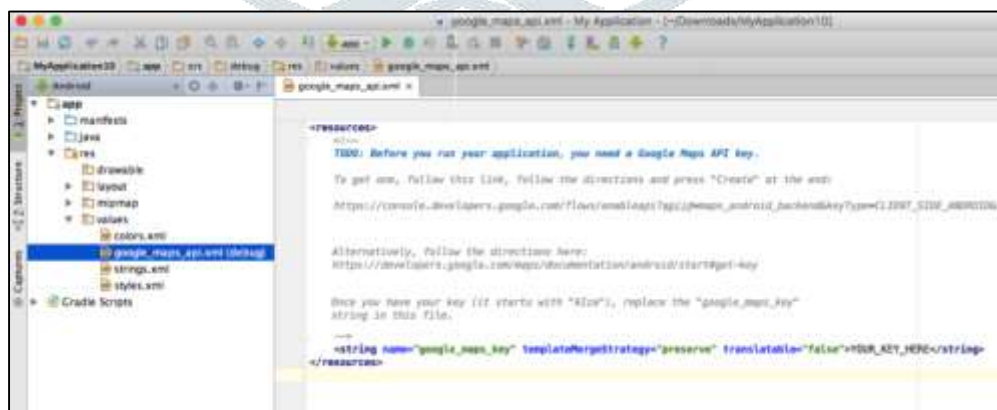

Figure 2: Google Map Activity

V. CONNECT AN ANDROID DEVICE

5.1 Select Developer options
On the device, open the Settings app, select Developer options, and then enable USB debugging as shown in **Fig 3** (a, b, c).
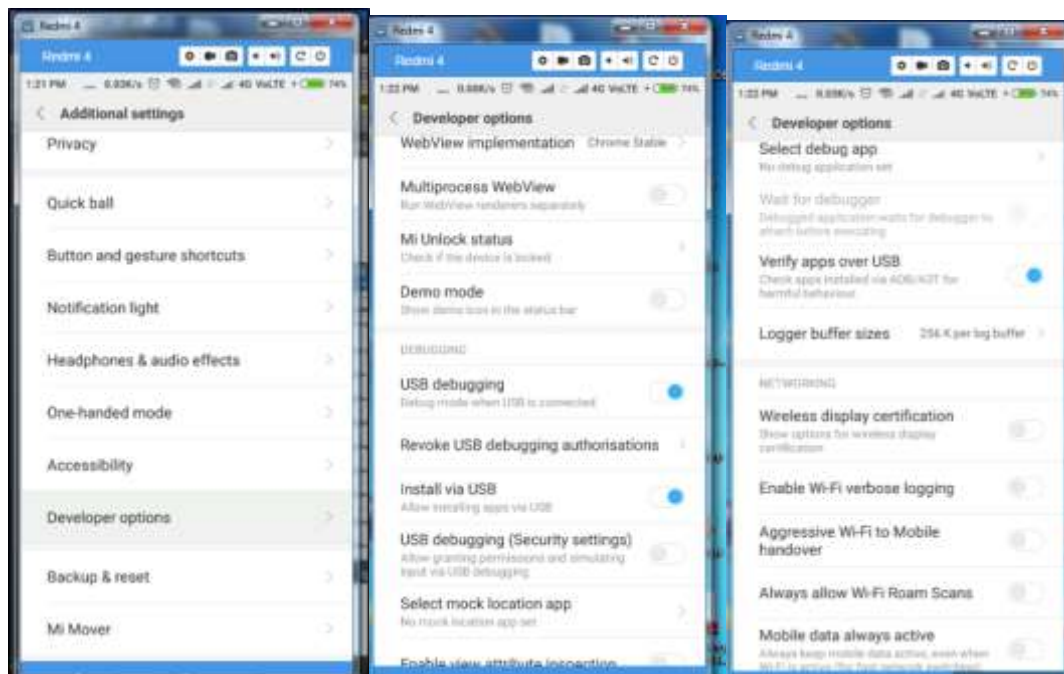
Figure 3: (a: Developer Options, b: USB Debugging, c: Verify app over USB)

5.2 Set up your system to detect your device

When you are set up and plugged in over USB, you can click Run in Android Studio to build and run your app on the device as shown in **Fig. 4**.
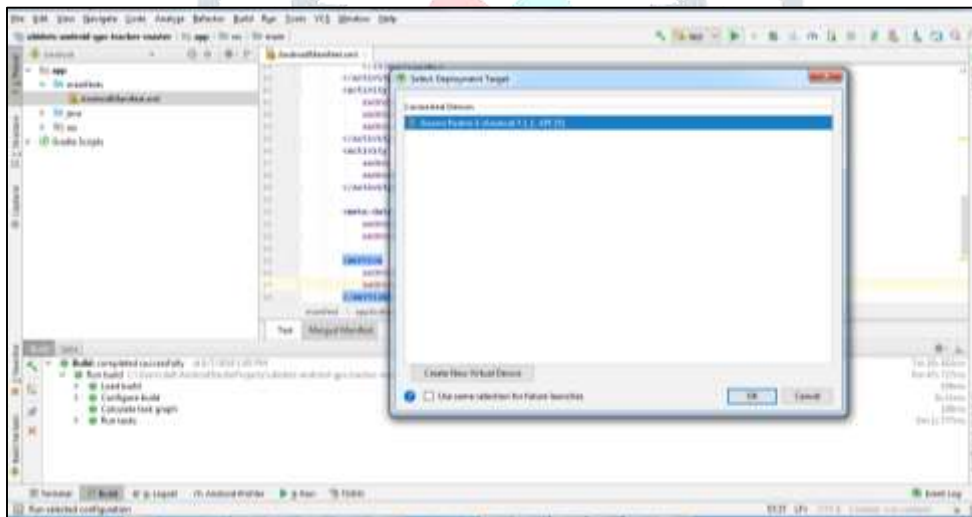

Figure 4: Connecting the App to your Android Device.

5.3 RSA security key

When you connect a device running Android 4.2.2 (API level 17) or higher to your computer, the system shows a dialog asking whether to accept an RSA key that allows debugging through this computer. This security mechanism protects user devices because it ensures that USB debugging and other adb commands cannot be executed unless you're able to unlock the device and acknowledge the dialog.

VI. ENABLE DEVELOPER OPTIONS ON XIAOMI MI 5/4/3

Step 1: Unlock your phone and go to main Settings on your Xiaomi devices.
Step 2: Scroll down to find About phone and tap on it.
Step 3: Locate Miui Version and tap seven times on it.
After that, you will get a message "You have enabled developer option" on your device screen.

VII. CREATION OF API FOR GOOGLE MAP

First of all create a project and select Maps SDK for Android as shown in **Fig 5**. We have created a project LocAPP and

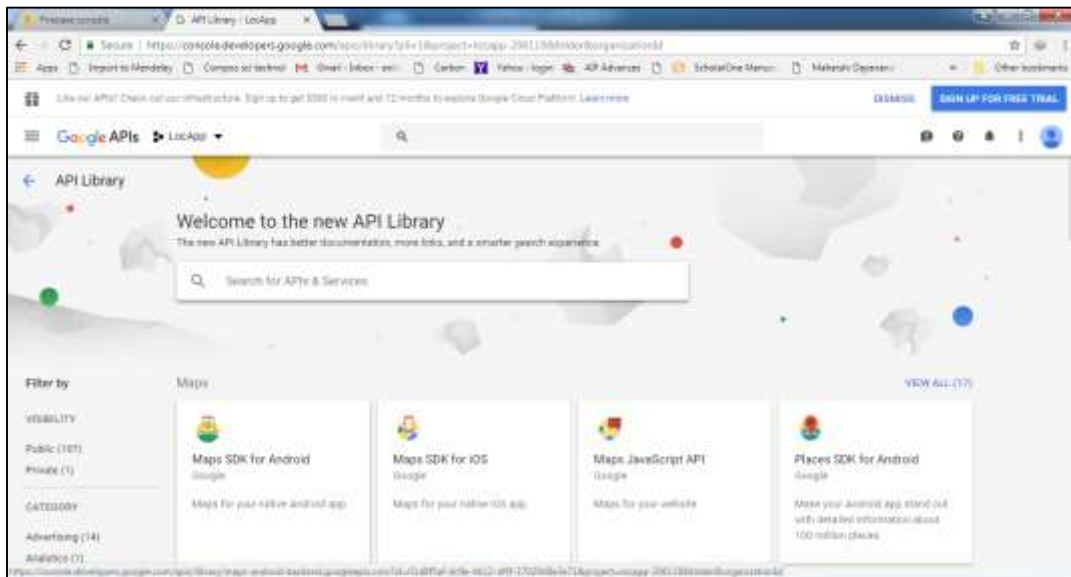Create API by enabling credentials as shown in **Fig 6**.
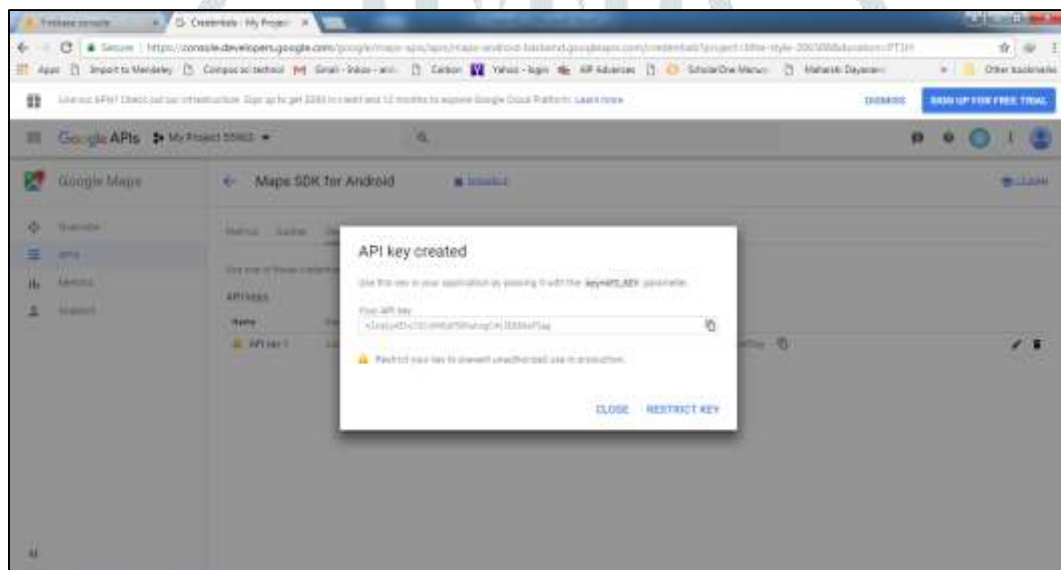
Figure 5: Maps SDK for Android

Figure 6: API created

VIII. ADD FIREBASE TO THE APP

- To open the Firebase Assistant in Android Studio:
- Click Tools > Firebase to open the Assistant window.
- Click to expand one of the listed features (for example, Analytics), then click the provided tutorial link (for example, Log an Analytics event).
- Click the Connect to Firebase button to connect to Firebase and add the necessary code to your app. Add users to your database, as shown in **Fig 7**.
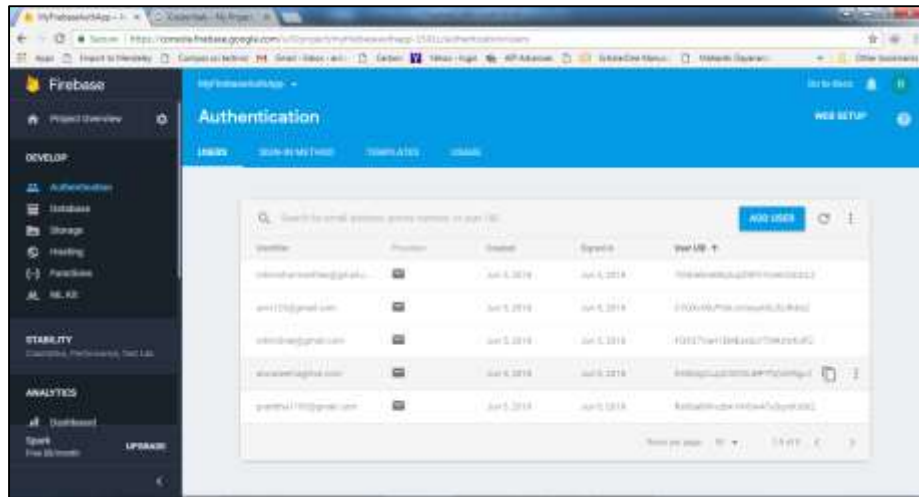
Figure 7: Registered Users of MyfirebaseAuthApp

IX. LOGIN AND REGISTRATION MODULE OF LOCATION TRACKING APP

Figure 8 shows the structure of the module of Log in and Registration. It has four java files.

- LogIn Activity
- Main Activity
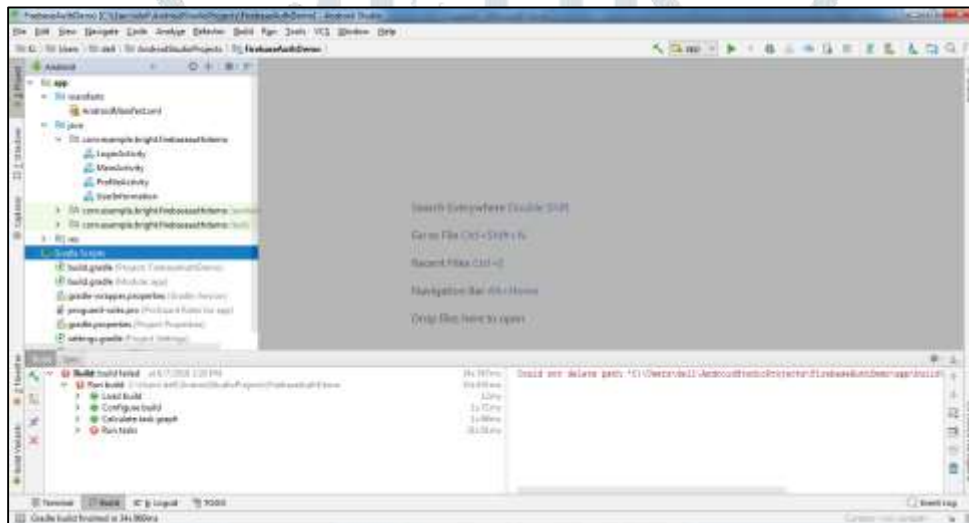- Profile Activity
- UserInformation

Figure 8: Log In and Registration

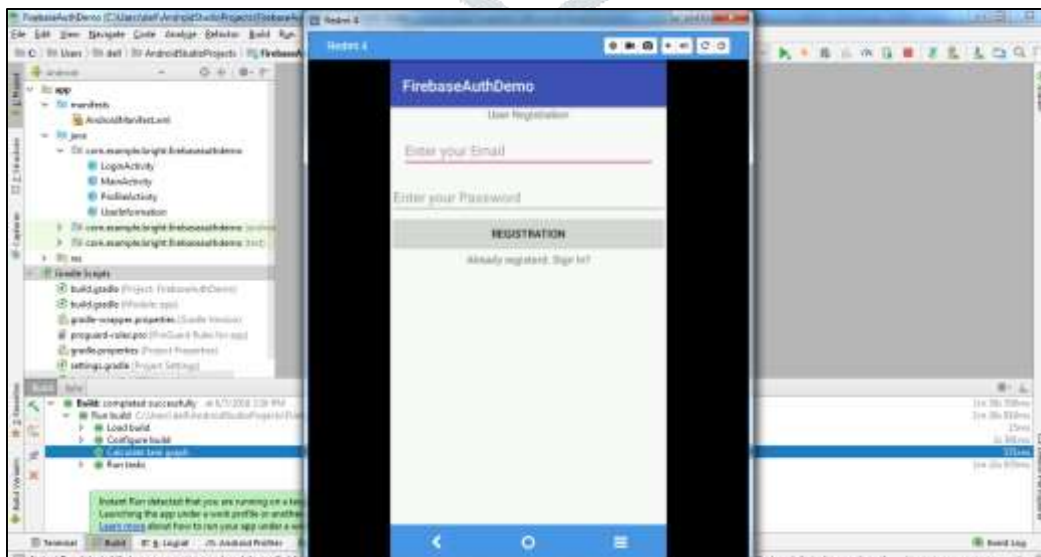**Figure 9** shows the new registration window for App.

Figure 9: New registration window for App.

Figure 10 shows the registration process of a new member. **Figure 11** shows that user has registered and it can be checked in the Firebase Database as shown in **Fig. 12**.
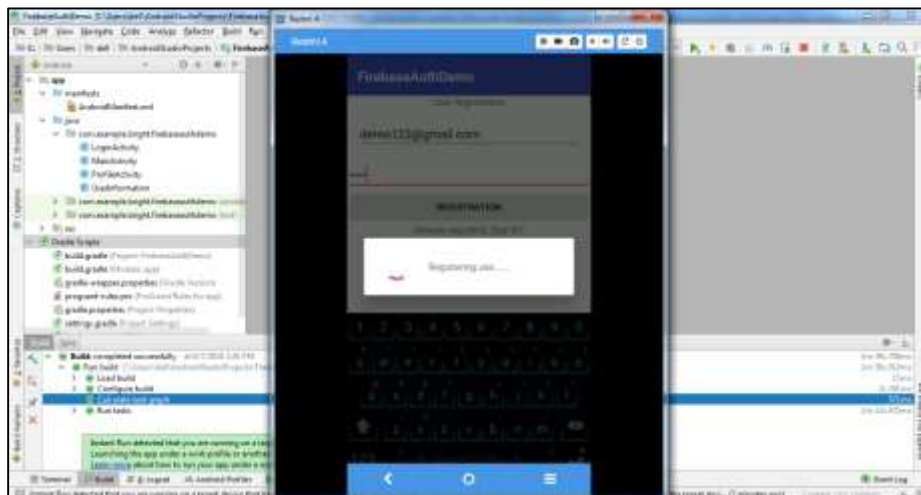

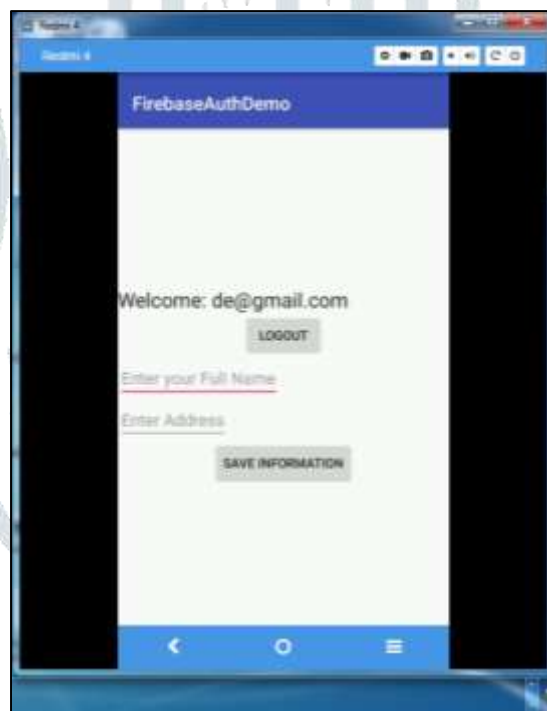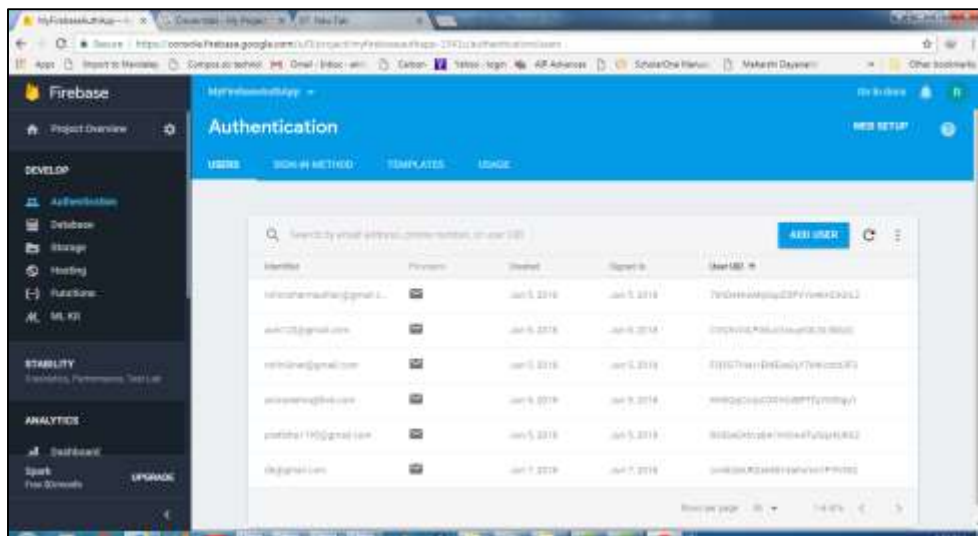Figure 10: Registration process of a new member.

Figure 11: New user.

Figure 12: User de@gmail saved in database.

Now save some information for the new user as shown in **Fig. 13** and it can be checked in the firebase database as shown in **Fig. 14**.

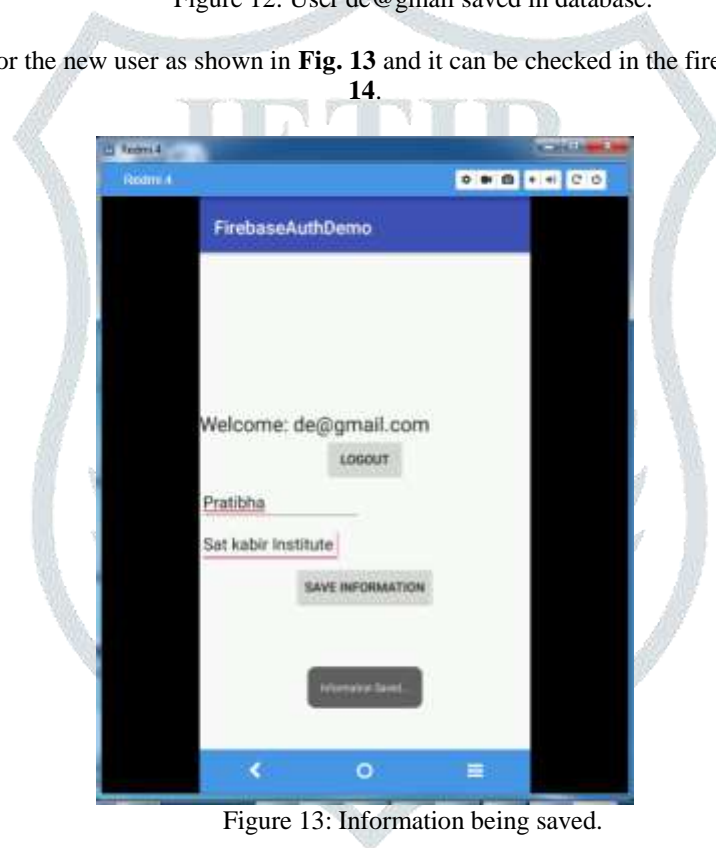

Figure 13: Information being saved.

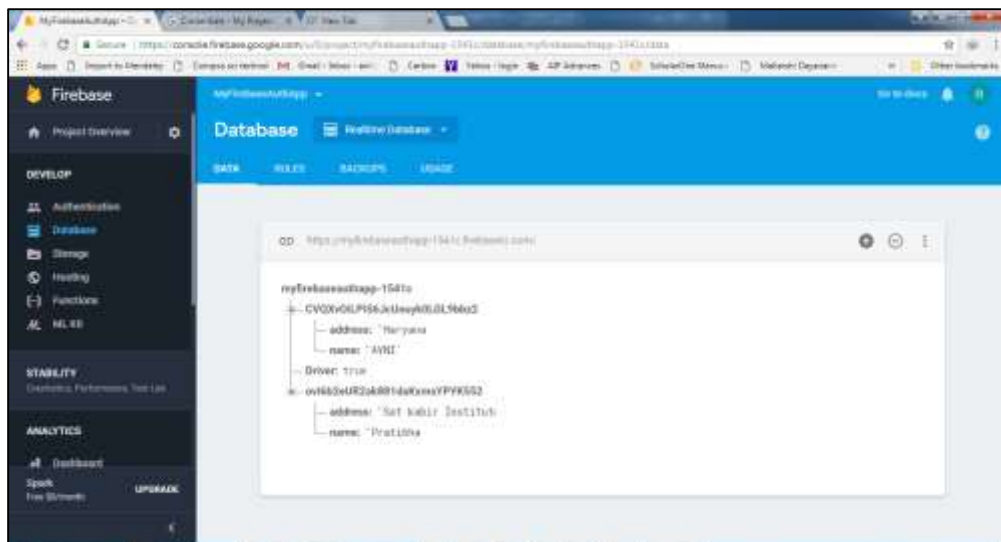Figure 14: Information Update in the Database.

X. LOCATION MODULE

It gives current location of the user. After the App is launched, initially a world Map is open as shown in **Fig 15**. After few seconds, it shows the current location of the user, as shown in **Fig 16**, the current location of the user Pratibha is Bahadurgarh, Haryana, indicated by the red color symbol.
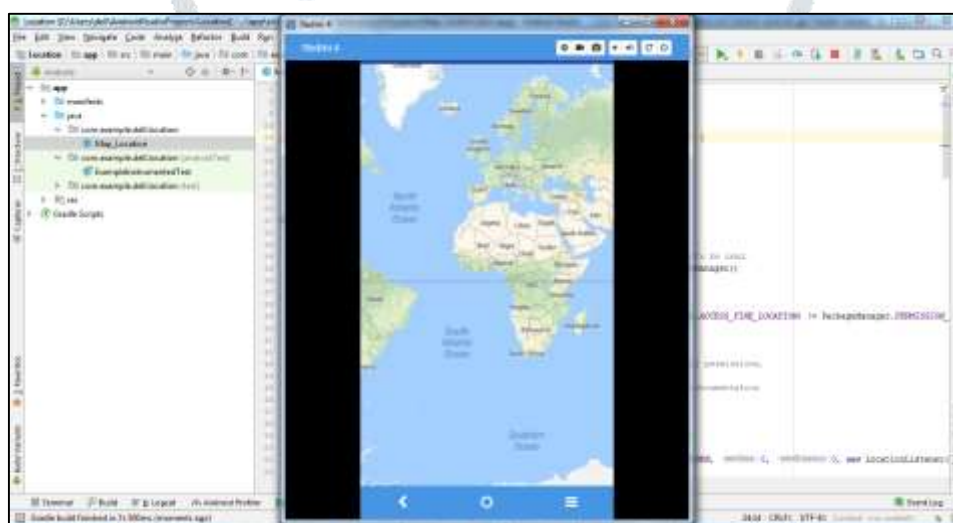

Figure 15: World Map.

Figure 16: Current Location of the user.

XI. CONCLUSION

This research article registered a new user and save its information in the real time firebase database. An old user can also track his location through this App. This App saves user's travelling locations which can be provided to his relatives immediately. This is a free of cost App and can be used by anyone. It can be installed on any Android based device. It is very useful for user if he is moving in an unknown place.

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