

# **CHAAR: Location Based Product Offer Advertisement App**



**Inspiring Excellence**

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**Declaration**

I, hereby declare that this thesis is based on the results found by myself. Materials of work found by other researcher are mentioned by reference. This Thesis, neither in whole or in part, has been previously submitted for any degree.

Signature of Supervisor

Signature of Author

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**Amitabha Chakrabarty**

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**S. M. Mohi-Us Sunnat**

## **Acknowledgement**

This work was suggested by Amitabha Chakrabarty, SECS Dept., BRAC University, as a Graduation thesis. This is the work of S. M. Mohi-Us Sunnat, student of the SECS department of BRAC University, studying Computer

Science starting from the year 2011. The document has been prepared as an effort to compile the knowledge obtained by me during these years of education and produce a final thesis which innovatively addresses one of the issues of Android app on Location based on the most useful thing, Shopping.

I would like to express our gratitude to Almighty ALLAH (SWT) who gave me the opportunity, determination, strength and intelligence to complete my thesis.

I would also like to thank my supervisor, Amitabha Chakrabarty sincerely for his consistent supervision, guidance and unflinching encouragement in accomplishing my work who has consistently shown his interest in my work and assisted me in its completion.

## **Abstract**

Shopping is a major part of this modern era for both Men and Women. CHAAR App dynamically helps the users to find out their desire and favorite products. Besides it will give the notification about the shops which will have sale when users are around that shops or market. Moreover, this App will show the route between the user's location and the market by using Google Map. The Seller can

promote their products which is in sale or new in the market so that the buyers can easily track their favorite products. Sellers can track the popularity of their promoted products. In addition, it will help the users to save their time and energy for shopping.

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# Chapter 1

## Introduction

The booming growth of the mobile devices taught us the importance of staying connected anywhere any place. Now anyone can be reached around the globe if that individual is carrying a mobile device having voice and/or data connection enabled. The advancement of technology made all this possible. Today's mobile phones are equipped with functionalities that are much beyond voice and SMS. Recent mobile phones are much more powerful than some of the personal computers (PCs) may be 10/12 years back and enabled with the capabilities running much more calculation intensive applications (Apps). Along with the functionalities of data services (such as email, browsing etc.) there are another service that modern mobile phones can provide such as sense of device location. With built in receiver, mobile phones access global positioning system (GPS) satellites to detect its location accurately (around 10/50 meters' error). This feature opens up a new domain called Location Based Services (LBSs) [1] where a user can have information based on the location of the mobile phone. When initially introduced, LBS were limited to product advertisement, such as promotional offers in a marketplace or in airport lounge etc. New and emerging LSB enabled application applications are in huge demand from the user domain [2]. In emergency situation when the current location is very important to pinpoint the affected area, location based information or service comes to rescue. System such as

alerting the fire brigade in an event of a fire, location based service allows the fire fighters to locate the victims. Similarly, in the need of emergency blood, a blood bank can locate potential individuals of particular blood groups using location based service. In this paper, I am proposing use of LBS in the area of mobile advertisement. I proposed a framework for an android App that will enable user to sense the markets nearby him/her. And the app will also notify user of any promotional offer from the shops in the nearby markets. Promotional offers will be notified based on user interest. Our prototype currently supports Dhanmondi area and near by shopping malls. But is can be mapped to the entire Dhaka city or for all over Bangladesh by adding new store locations in the location database.

## **1.1 General Idea**

This development is based on two very popular things. One is Shopping and another is Geo-Location Based Sale Advertising [5]. I always like to have something extra. If I can get that for shopping that will be always welcomed. There are a lots of local and international brand for cloths which are very popular in our country. During discount period, their selling static increases but most of the buyers don't get the in time information of the discount so that many people miss the offer. Though some people informed by friends, TV ads, social media or local banners, posters etc. But now the customers acceptance for location-based ads is possible due to advancements in mobile technology as well as because companies will be understood that location is only one of targeting dimensions. If the ad will be supposed be effective, it will have

to be more relevant, more context oriented, more tailored. This ads targeting is looking at all factors that might influence each consumer's purchasing decisions, such as nearby venues, events and neighborhood demographics such as the ages and gender etc.

## **1.2 Objectives**

- Buyers can find their products by just a click
- They will be notified by this app where is his/her nearest market and what types of sale will be going on.
- Reduce the time and energy to find the sale products
- All kinds of Brands or Non-Brands products promotion in one field
- Sellers can promote their new products
- Sellers can promote their on-sale products
- Buyers can rate the seller's products so that sellers will know what should produce for next time or session.

### 1.3 Thesis Outline

- **Chapters 1** consists of the *Introduction* about the Local Based Services, GPS and other important keywords regarding this thesis and Motivation, why I did my thesis on such topic.
- **Chapters 2** deals with the *Background Researches*, includes market analysis and people's demand that I study for my work.
- **Chapters 3** is comprised of my *Contribution*. Here I have explained about the libraries which I have used and some algorithms with Java Code format.
- **Chapters 4** is the Challenges and Limitations
- **Chapters 5** is the Future Work.
- **Chapters 6** is Conclusion.
- **Chapters 7** is References.

# Chapter 2

## Background Researches

### 2.1 Online Survey

Before Started my project first of all, I needed a statistics regarding one major thing and that is Shopping. In our country many people love this shopping even some people are really shopaholic. Male and Female both are really passionate about this in this modern era. Ages are not applicable in this time. So I made a google doc form regarding this shopping with some important questions and share this survey through Facebook. More that 500 people filled up this survey.

Here is the Questions of the Survey and Pie Chart of Result:

1. Gender? A) Male ; B) Female ; C) Other

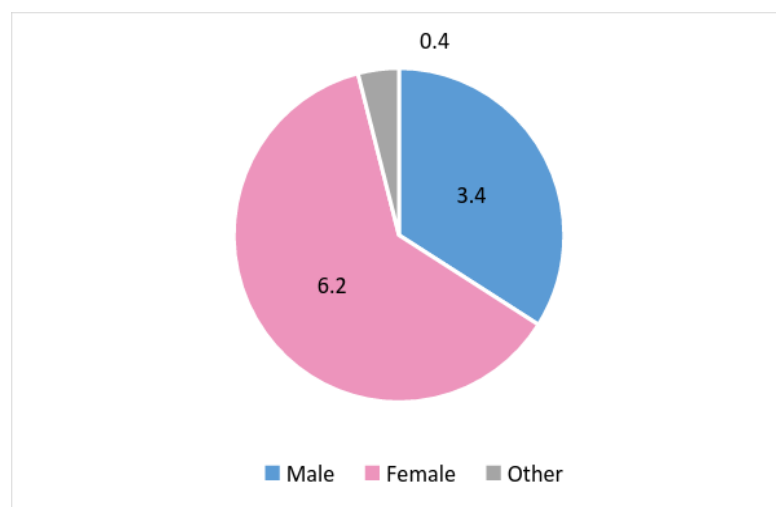


Fig 2.1.1 Pie chart of Gender

2. Ages? A) 15-20 ; B) 21-25 ; C) 26-35; D) 35+;

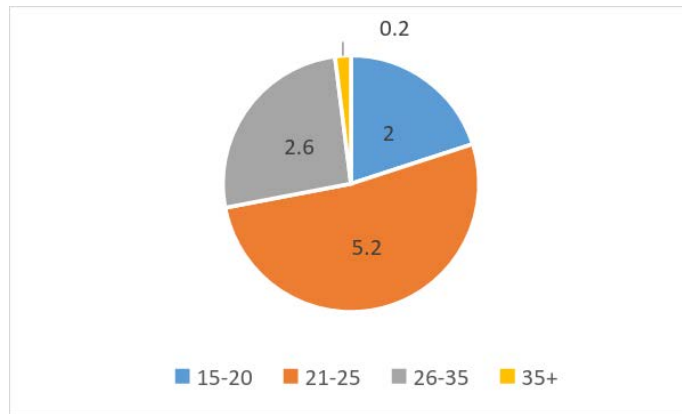


Fig 2.1.2 Pie chart of Ages

3. Do you Like Shopping? A) Yes ; B) No

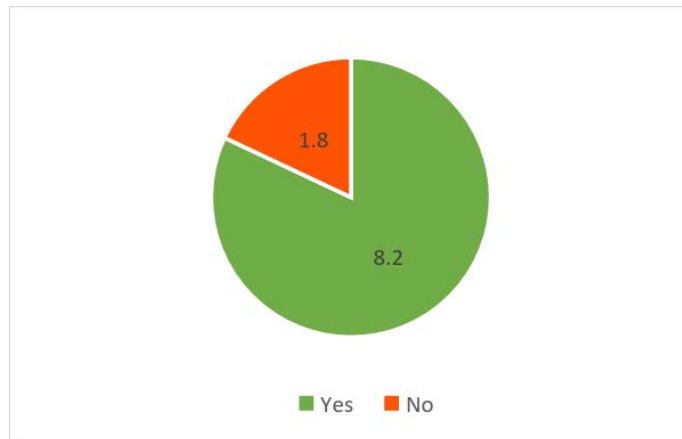


Fig 2.1.3 Pie chart of Who likes Shopping

4. Stages of Addiction for Shopping? A) Shopaholic ; B) Regularly ; C) Occasionally ; D) Not Interested

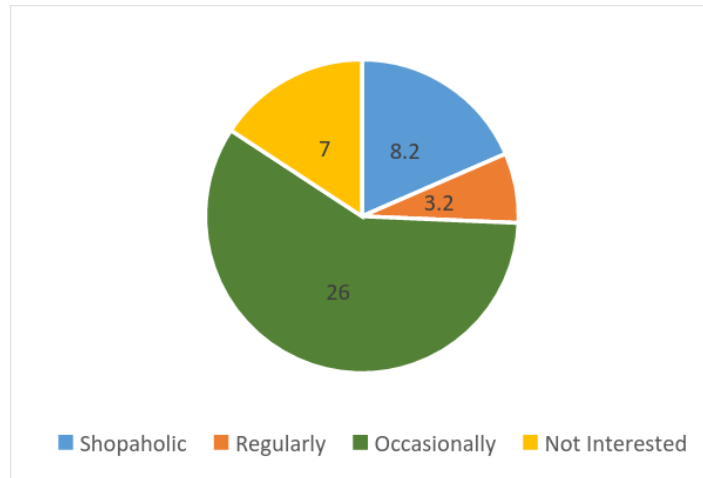


Fig 2.1.4 Pie chart of addiction level of Shopping

5. Do you like to shopping more during On-Sale? A) Yes ; B) No

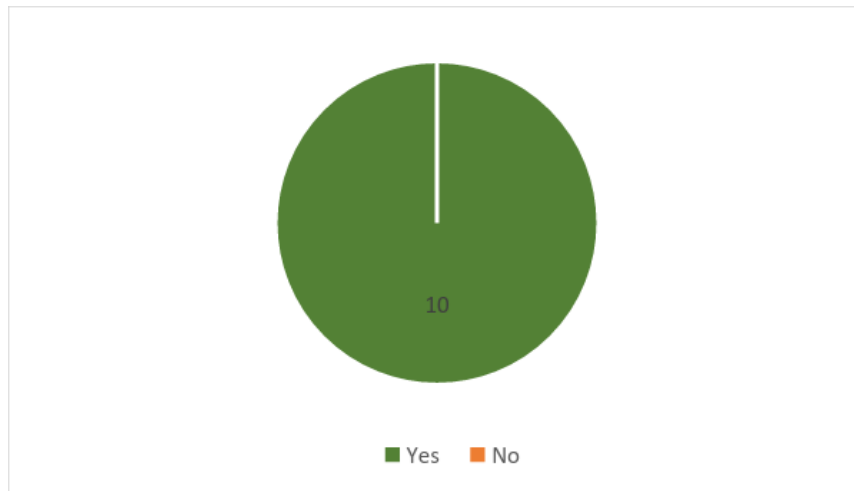


Fig 2.1.5 Pie chart of Who likes On-Sale

6. Do you get updates of any ongoing sale immediately or within ½ days and in which shop it is? A) Yes ; B) No

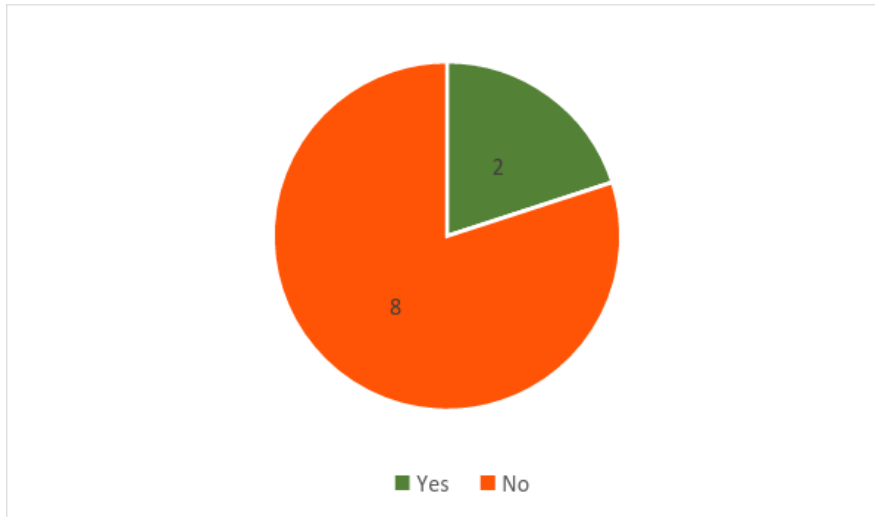


Fig 2.1.6 Pie chart of Who heard about the on-sale offer immediately

7. From what sources you know about any ongoing sales? A) Facebook ; B) Friends ; C) Newspapers ; D) Banners or Posters ; E) Other Online Social Networks

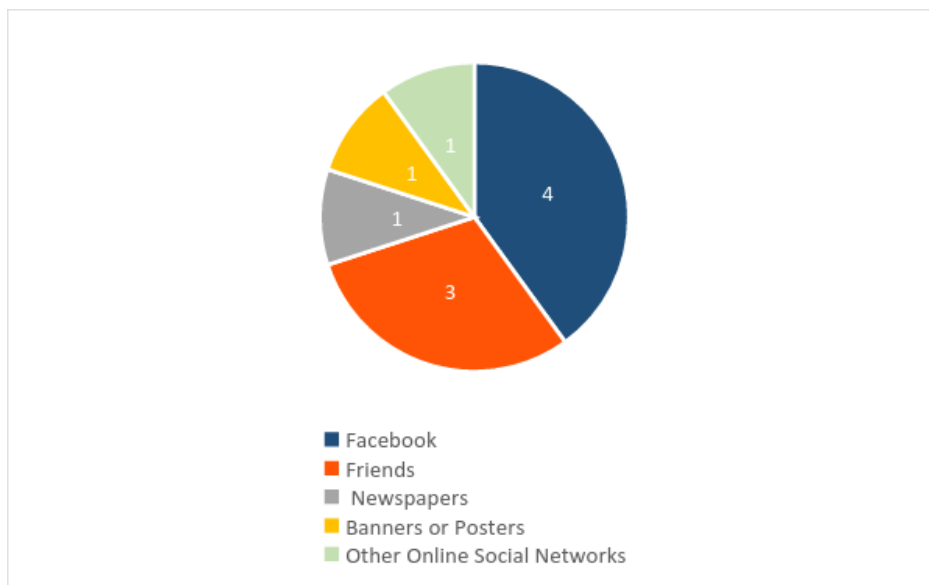


Fig 2.1.7 Pie chart of from where they heard about the on-sale offer  
 After this survey I became really happy to see that people are really passionate about the shopping and my project will keep a vital role in this country for these people.

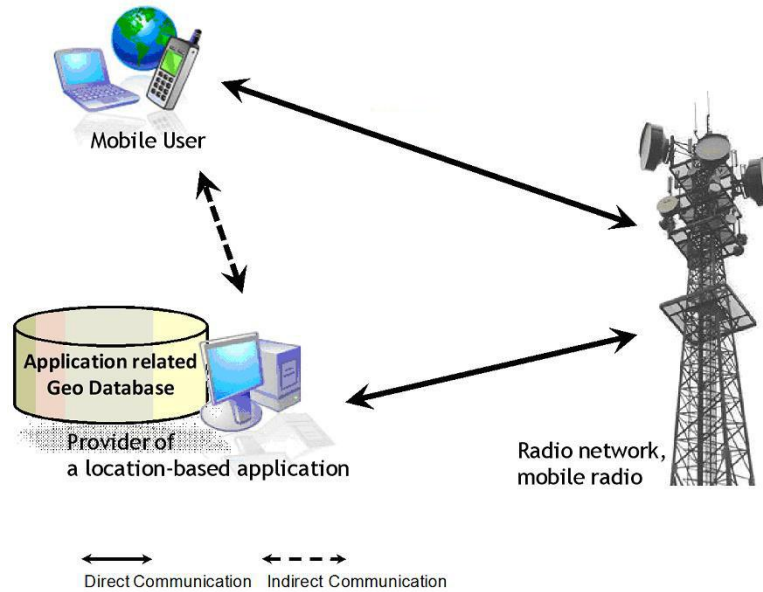


## **2.2 Theories**

### **2.2.1 Location Based Services (LBS) [15]**

A location-based service is a software application for a IP-capable mobile device that requires knowledge about where the mobile device is located. Location-based services can be query-based and provide the end user with useful information such as "Where is the nearest ATM?" or they can be push-based and deliver coupons or other marketing information to customers who are in a specific geographical area.

An LBS requires five basic components: the service provider's software application, a mobile network to transmit data and requests for service, a content provider to supply the end user with geo-specific information, a positioning component (see GPS) and the end user's mobile device. By law, location-based services must be permission-based. That means that the end user must opt-in to the service in order to use it. In most cases, this means installing the LBS application and accepting a request to allow the service to know the device's location.



**Fig 2.2.1.1 Location Based Services**

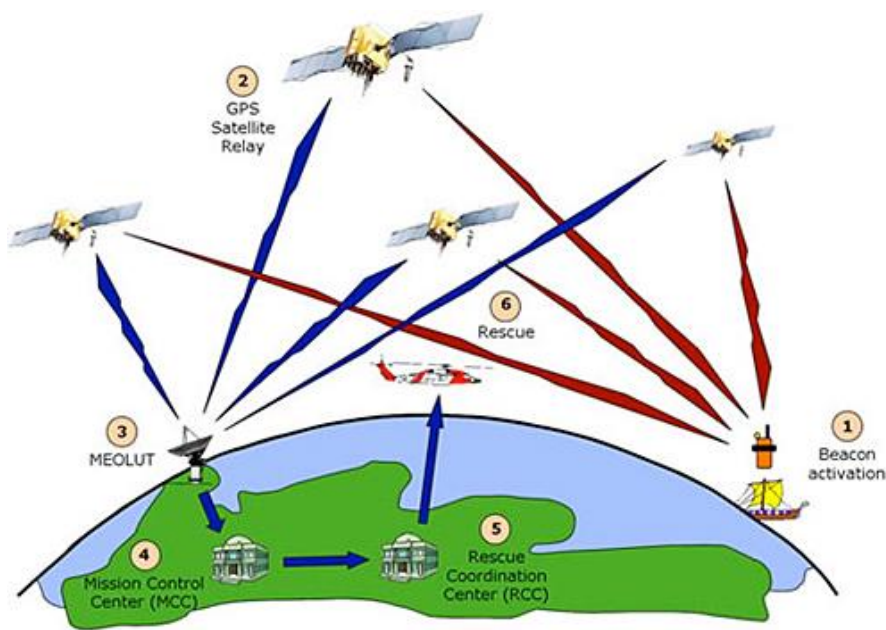
Although location-based services have been around since 2000, they have mostly been used in commerce with a subscription-based business model. The release of Apple's 3G iPhone and Google's LBS-enabled Android operating system, however, has allowed developers to introduce millions of consumers to LBS. According to the 2008 fourth-quarter report from Nielsen Mobile, a division of The Nielsen Company, location-based services account for 58 percent of the total downloaded application revenue for mobile phones in North America.

### **2.2.2 Global Positioning System (GPS) [16]**

GPS, which stands for Global Positioning System, is a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world. The capabilities of today's system render other well-known navigation and positioning technologies

namely the magnetic compass, the sextant, the chronometer, and radio-based devices impractical and obsolete. GPS is used to support a broad range of military, commercial, and consumer applications.

24 GPS satellites (21 active, 3 spare) are in orbit at 10,600 miles above the earth. The satellites are spaced so that from any point on earth, four satellites will be above the horizon. Each satellite contains a computer, an atomic clock, and a radio. With an understanding of its own orbit and the clock, the satellite continuously broadcasts its changing position and time. (Once a day, each satellite checks its own sense of time and position with a ground station and makes any minor correction.)



**Fig 2.2.2.1 Global Positioning System**

On the ground, any GPS receiver contains a computer that "triangulates" its own position by getting bearings from three of the four satellites. The result is provided in

the form of a geographic position - longitude and latitude - to, for most receivers, within a few meters.

If the receiver is also equipped with a display screen that shows a map, the position can be shown on the map. If a fourth satellite can be received, the receiver/computer can figure out the altitude as well as the geographic position. If you are moving, your receiver may also be able to calculate your speed and direction of travel and give you estimated times of arrival to specified destinations. Some specialized GPS receivers can also store data for use in Geographic Information Systems (GIS) and map making.

### **2.2.3 Shared Preferences**

Android provides many ways of storing data of an application. One of this way is called Shared Preferences. Shared Preferences allow you to save and retrieve data in the form of *key, value* pair.

In order to use shared preferences, you have to call a method *getSharedPreferences()* that returns a `SharedPreferences` instance pointing to the file that contains the values of preferences.

Here is a model code and it shows how can we call this *Shared Preferences* method

```
SharedPreferences sharedPreferences = getSharedPreferences(MyPREFERENCES,Context.MODE_PRIVATE);
```

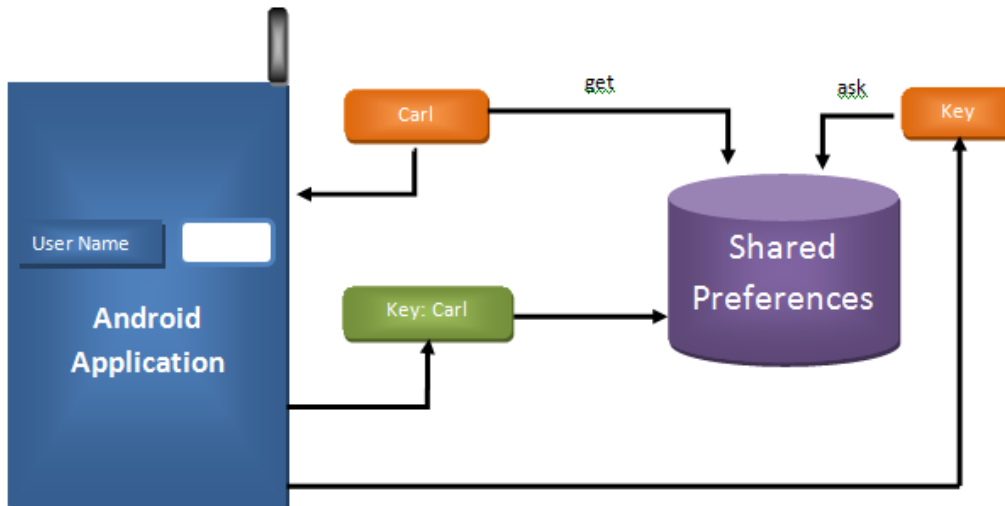


Fig 2.2.3.1 SharedPreferencesSystem

## 2.3 Why Android

In Bangladesh, Android, Apple and Windows Phone is the main Operating System for mobile phones. But Android is the main OS [3] in our country. More than 70% mobile users use Android. Fig 1 show the pie chart of the Android user statistics. So this platform is the best way to reach the users. Besides, this platforms devices are so available and start from very cheap budget. As user experiences, android is very user friendly.

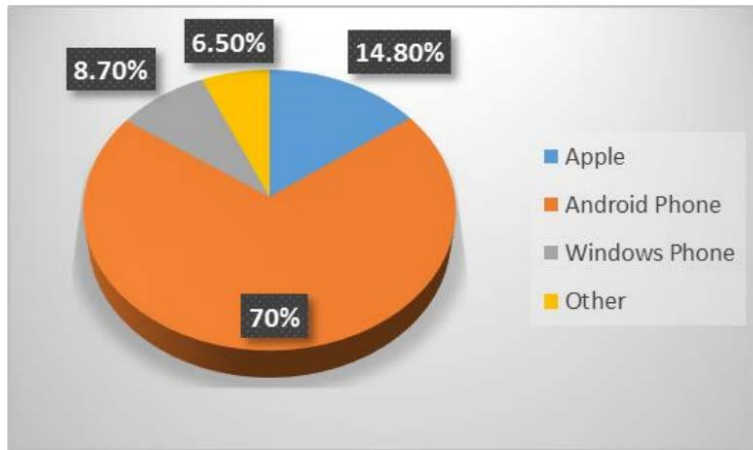


Fig. 9 Operating System used by respondents.

Fig. 2.3.1: Android phone use in Dhaka City [3]

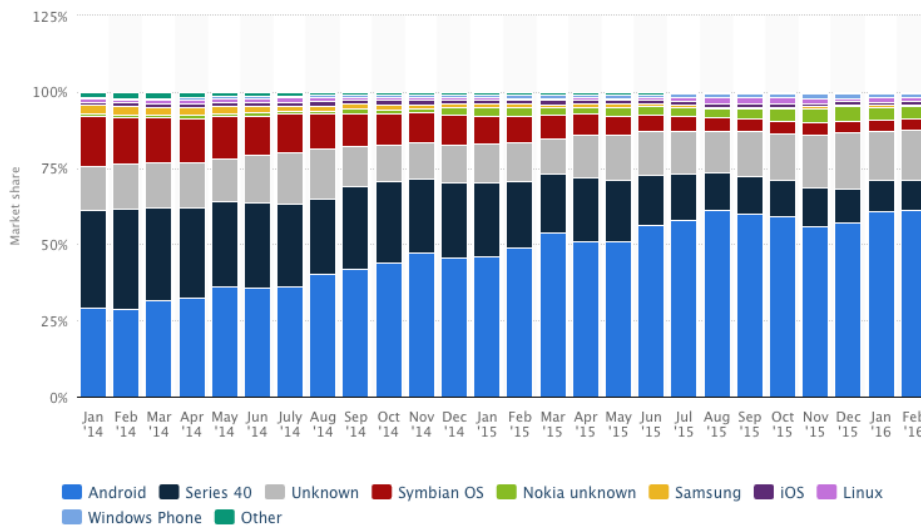


Fig. 2.3.2: Android phone use in Bangladesh from Jan' 14 to Feb' 16 [4]

According to Fig. 2.3.2, in Bangladesh, maximum mobile users use the Android and the statistic shows us that the number of android user is increasing. The android UI, UX is really attractive and easy to handle all types of users. Even we can buy this with a very cheap price which is start from 3000 BDT and it's really very available even

we can buy this from the nearest Phone-Fax Shop. So in every sector android is better than other platform in Bangladesh and that's why I choose this platform.

## **Chapter 3**

### **System Design**

In this work an android application is designed keeping in view both the consumer as well as the retailer. For advertising any promotional offer, retailers have to use retailer interface for put product's) advertisement server database. The App would fetch the updated record from the database and displays that to the consumer side. Each of the two parts have been discuss in detail in the following sections. Before explain the process here are some important information regarding this.

## **3.1 Quick View of the Project**

### **3.1.1 Languages**

- Java (Android version)
- PHP
- MySQL

### **3.1.2 Tools & Servers**

- Android Studio
- PhpStorm
- MySQL Workbench
- XAMPP for local server
- Online Linux Server

### **3.1.3 Libraries**



This section will highlight the libraries used to develop this App. Only brief description of the libraries are provided here:

```
dependencies {
    compile fileTree(include: ['*.jar'], dir: 'libs')
    testCompile 'junit:junit:4.12'
    compile files('libs/okhttp-3.0.1.jar')
    compile 'com.android.support:appcompat-v7:23.2.0'
    compile 'com.google.android.gms:play-services:8.4.0'
    compile 'com.google.android.gms:play-services-ads:8.4.0'
    compile 'com.google.android.gms:play-services-auth:8.4.0'
    compile 'com.google.android.gms:play-services-gcm:8.4.0'
    compile 'org.apache.httpcomponents:httpmime:4.5.1'
    compile 'org.jbundle.util.osgi.wrapped:org.jbundle.util.osgi.wrapped.org.apache.http.client:4.1.2'
    compile 'com.android.support:design:23.1.1'
    compile 'com.loopj.android:android-async-http:1.4.9'
    compile 'com.android.support:cardview-v7:23.1.1'
    compile 'com.android.support:recyclerview-v7:23.1.1'
    compile 'com.android.support:multidex:1.0.0'
}
```

Fig 3.1.3.1 Imported Libraries in Gradle File

- **com.google.android.gms:play-services:8.4.0:** This is the most important for this project because this is using for the Google Play services APIs and because of this I can use google map and customize this.
- **org.apache.httpcomponents:httpmime:4.5.1:** This is using to connect with the online remote server.
- **org.jbundle.util.osgi.wrapped:org.jbundle.util.osgi.wrapped.org.apache.http.client:4.1.2:** To connect with the online remote server *but it has been removed since Android SDK Level 23*
- **com.android.support:design:23.1.1:** This is Android Design Support Library. Above SDK version 23 there are some new built-in design library for android app development. This is call Material Design.
- **com.loopj.android:android-async-http:1.4.9 [8]:** This is a third party library. It uses for upstream HttpClient of version 4.3.6 instead of Android provided

DefaultHttpClient and it's compatible with Android API 23 and higher. This is also using for connect with the remote server to retrieve data from the database

- **com.android.support:cardview-v7:23.1.1:** This is using for Material Design. This is use for make attractive the Grid or List view.
- **com.android.support:recyclerview-v7:23.1.1:** This is for using Material Design and this is use to implement the cardview.
- **com.android.support:multidex:1.0.0:**As the Android platform has continued to grow, so has the size of Android Apps. When the application and the libraries it references reach a certain size, I need encounter build errors that indicate our App has reached a limit of the Android App build architecture. That time, it is needed to call to increase the size limit.
- To Reshape the images, this is using a class from the github known as *CircleImageView*[5]. This will help to make an image in a particular shape like circle, star, eclipse, heart etc.
- To Track the user location using GPS provider, I am using this a class from the github known as *GpsTracker*[14]. This project is a research of a MIT team. They make this to find out the GPS location using your portable devices and save on the server. To retrieve the GPS location, user need to turn on the WiFi or GSM Internet connection and must enable the GPS option. This is almost 80%-90% accuracy and the current radius of user's location is almost 10-20 meters.

### 3.1.4 Permissions

Here is the Permissions what I need to run this app.

```
<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" />

<permission
    android:name="com.dreamogrammers.sunnat.thesis2.permission.MAPS_RECEIVE"
    android:protectionLevel="signature" />

<uses-permission android:name="com.dreamogrammers.sunnat.thesis2.permission.MAPS_RECEIVE" />
```

Fig 3.1.4.1 Permissions of this app in Manifest File

**android.permission.INTERNET:** This will give the permission to use the Internet.

**android.permission.ACCESS\_NETWORK\_STATE:** This will give the permission to use the GSM network besides the internet feature.

**android.permission.WRITE\_EXTERNAL\_STORAGE:** This will give the permission to use the internal or external storage of the devices to keep the cache data of this app.

**com.google.android.providers.gsf.permission.READ\_GSERVICES:** This will use for the GPS though this is not mandatory for any kind of app of the latest devices or API v.21 and above.

**android.permission.ACCESS\_COARSE\_LOCATION:** This will use for testing the GPS in emulator. (This is not for real world app)

**android.permission.ACCESS\_FINE\_LOCATION:** This will use to find out the current location of the user using GPS.

```
<permission  
android:name="com.dreamographers.sunnat.thesis2.permission.MAPS_RECEIVE"  
android:protectionLevel="signature" />
```

```
<uses-permission android:name="com.dreamographers.sunnat.thesis2.permission.MAPS_RECEIVE" />
```

These are using for the Google Map API v.2 Android

## 3.2 Online Server

### 3.2.1 MySQL

On the server, I am using MYSQL and PHP. There are 3 tables for the retailer. First one is retailer's information, then market information and promotional offer for products. I have created a PHP script which will make a JSON format [6] output of a specific table.

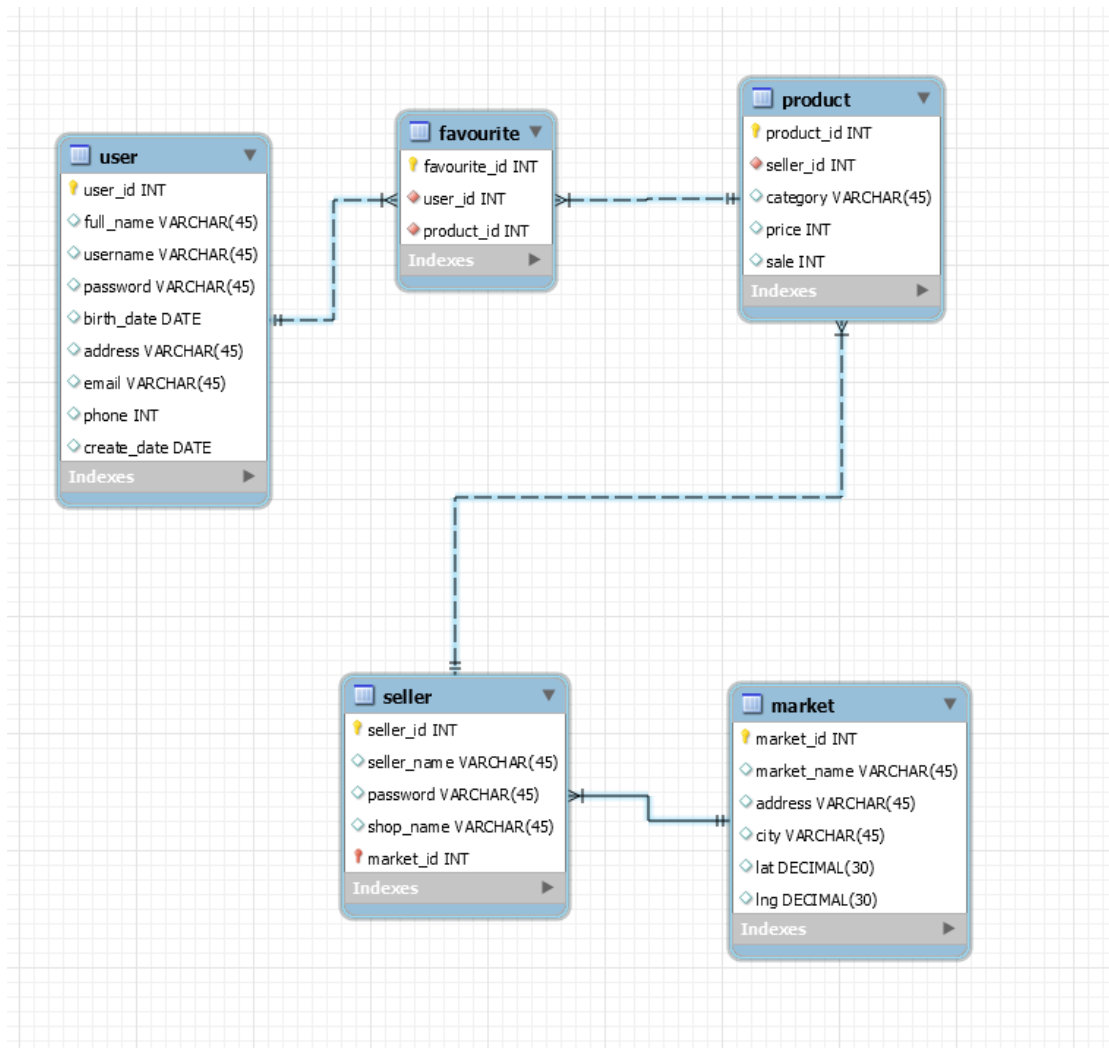


Fig. 3.2.1.1: Table Structure

I am using PHP and MySQL in the server-side. There are Five tables in the database.

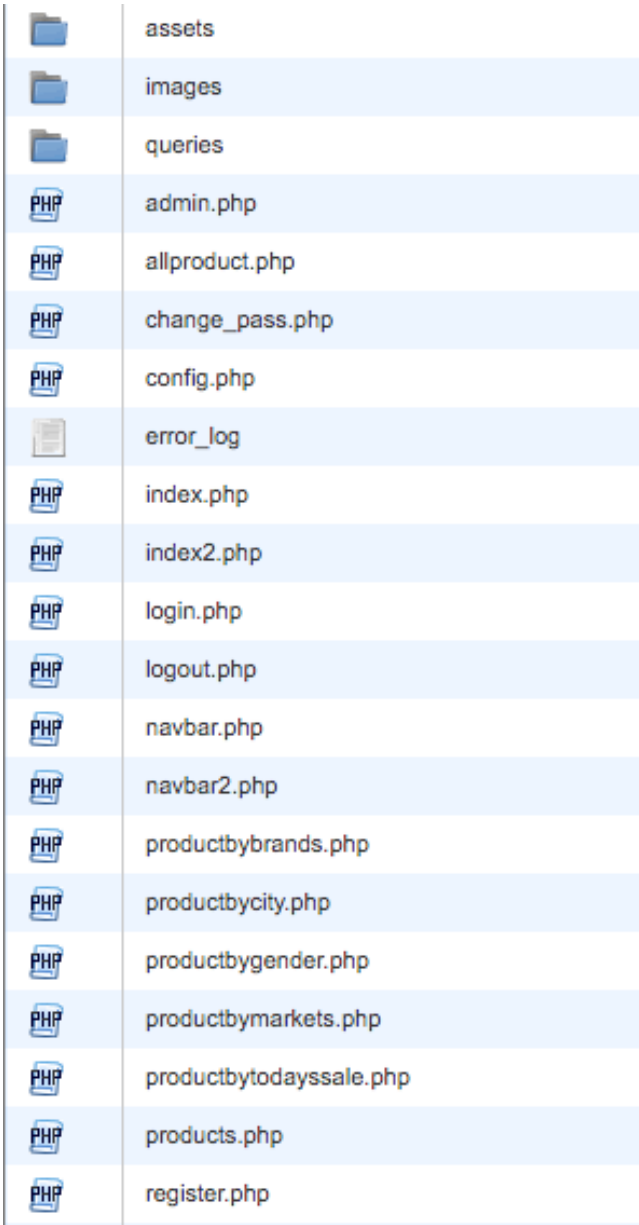
Brief description of the tables are given below. Fig 4 shows table structure.

1. **User:** This is the users table where App user's information will be stored. Here *username* is unique id for a user which is user name or id for login and the password is encrypted so this is much secured for the users and hard to hack

the account. There is one foreign key *user\_id* which is connected with the Favorite's *user\_id*.

2. **Favorite:** This table will store consumers list of favorite items. Bookmarked product will be displayed to the consumer based on the entry in this table. Here a user can keep the favorite product as wish list that farther he or she can see this. There are two foreign keys and they are *user\_id* and *product\_id*.
3. **Products:** List of products which will be uploaded by the retailer will be stored in this table. Here seller can store the promoted post and see the list of his post. There are two foreign keys and they are *seller\_id* which is connected with *seller* table and *product\_id* which is connected with *favourite* table.
4. **Sellers:** Here the retailer's information will be stored. Here they have another type of *user id* and *password* which is different from the *user* table. There are two foreign keys and they are *seller\_id* which is connected with *product* table and *market\_id* which is connected with *market* table.
5. **Market:** All markets with the geo-location and addresses will be stored in this table. Here when a seller will sign up for this, then he/she will have to mention the address and geolocation of his shop and the market. There is one foreign key *market\_id* which is connected with the *market* table.

### 3.2.2 PHP & HTML-CSS
























	assets
	images
	queries
	admin.php
	allproduct.php
	change_pass.php
	config.php
	error_log
	index.php
	index2.php
	login.php
	logout.php
	navbar.php
	navbar2.php
	productbybrands.php
	productbycity.php
	productbygender.php
	productbymarkets.php
	productbytodayssale.php
	products.php
	register.php

Fig 3.2.2.1 All the Files of PHP, HTML and CSS files

### 3.2.3 Java

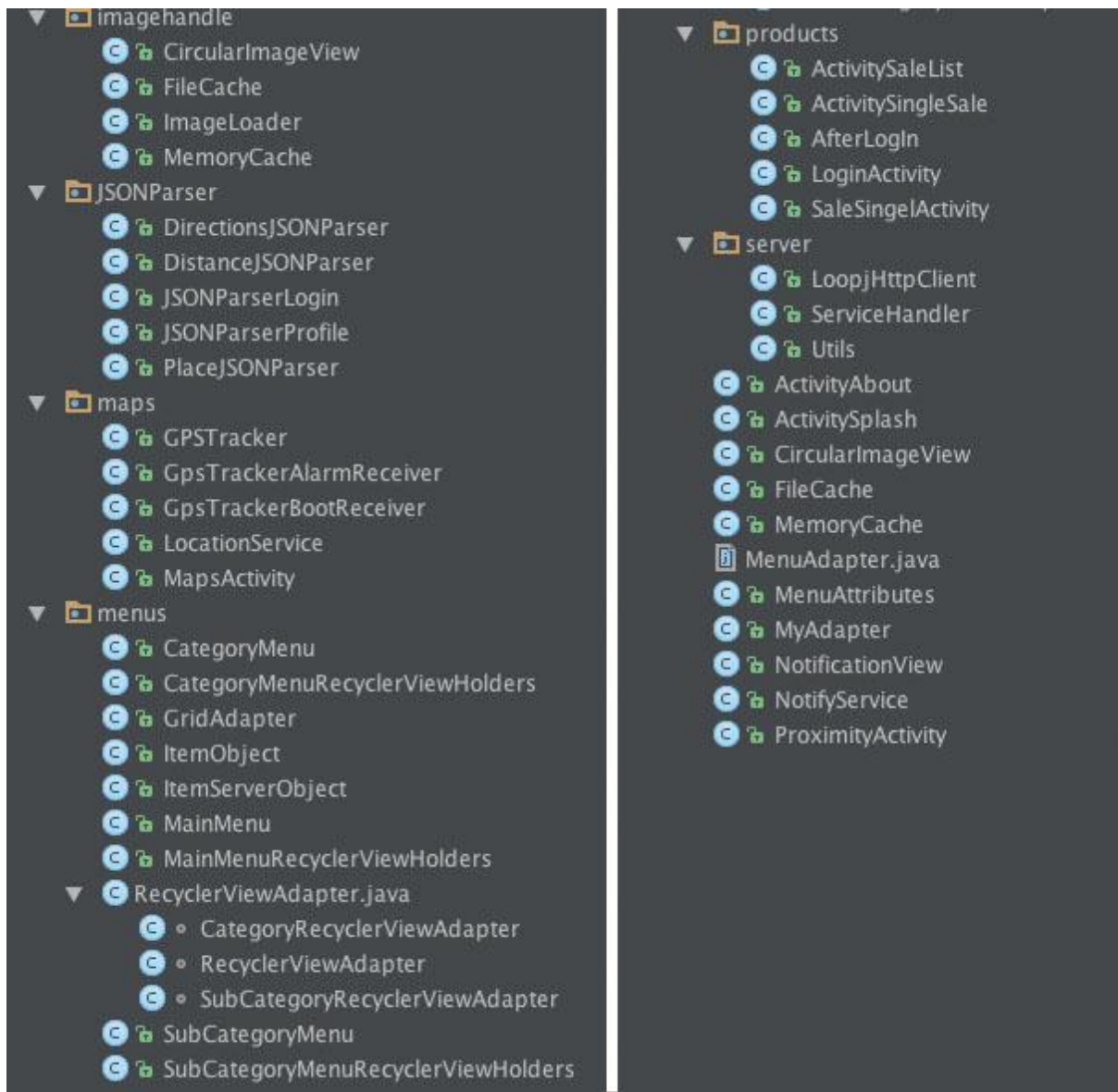


Fig 3.2.3.1 All the Files of Java files

### 3.3 Retailer Database



A retailer needs to register his/her shop in the central database. The registration process will have the option of selecting the market and in some cases shop no when registering. In some cases brand shops having stops all over Dhaka city will only need to update its promotional offer. System will automatically display the offer if consumer is nearing a market that has an outlet of that brand. Retailer provides all the necessary information including shop.

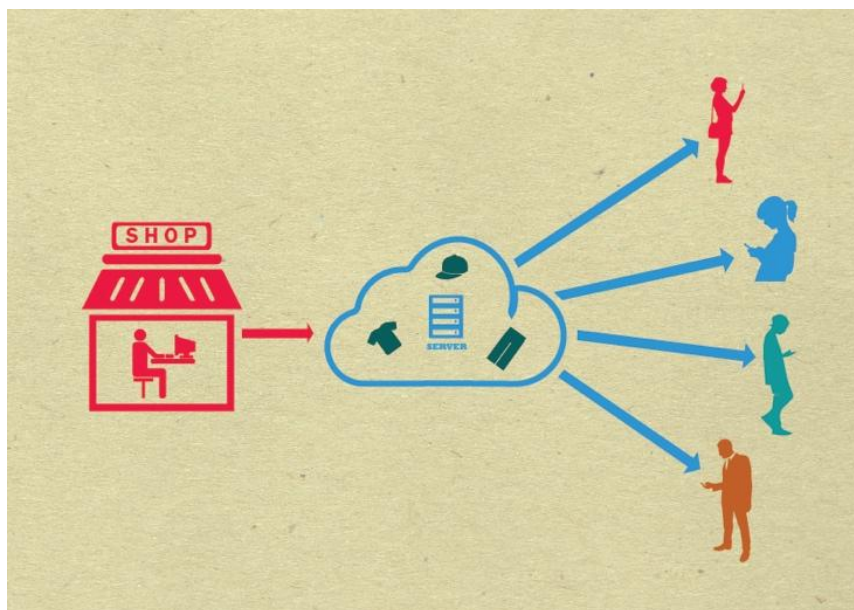


Fig. 3.3.1: Retailer is promoting the product and buyers are enjoying the on-sale products.

### User Registration

**Full Name**

**Username**

**Password**

**Re-enter Password**

**Birth Date**

**Address**

**City**

**Enter Email**

**Contact No.**

### Are You a Seller? Register Here!!!

**Name**

**Password**

**Re-enter Password**

**Shop Name**

**Market ID**

Fig. 3.3.2: Registration form for Retailer

### Upload New Product

**Upload Product Image**  
 No file chosen

**Seller ID**

**Category**

**Sub-Category**

**Gender**

**Brand**

**Price**

**Discount**

**Market**

**City**

Fig. 3.3.3: Promotion Upload Form













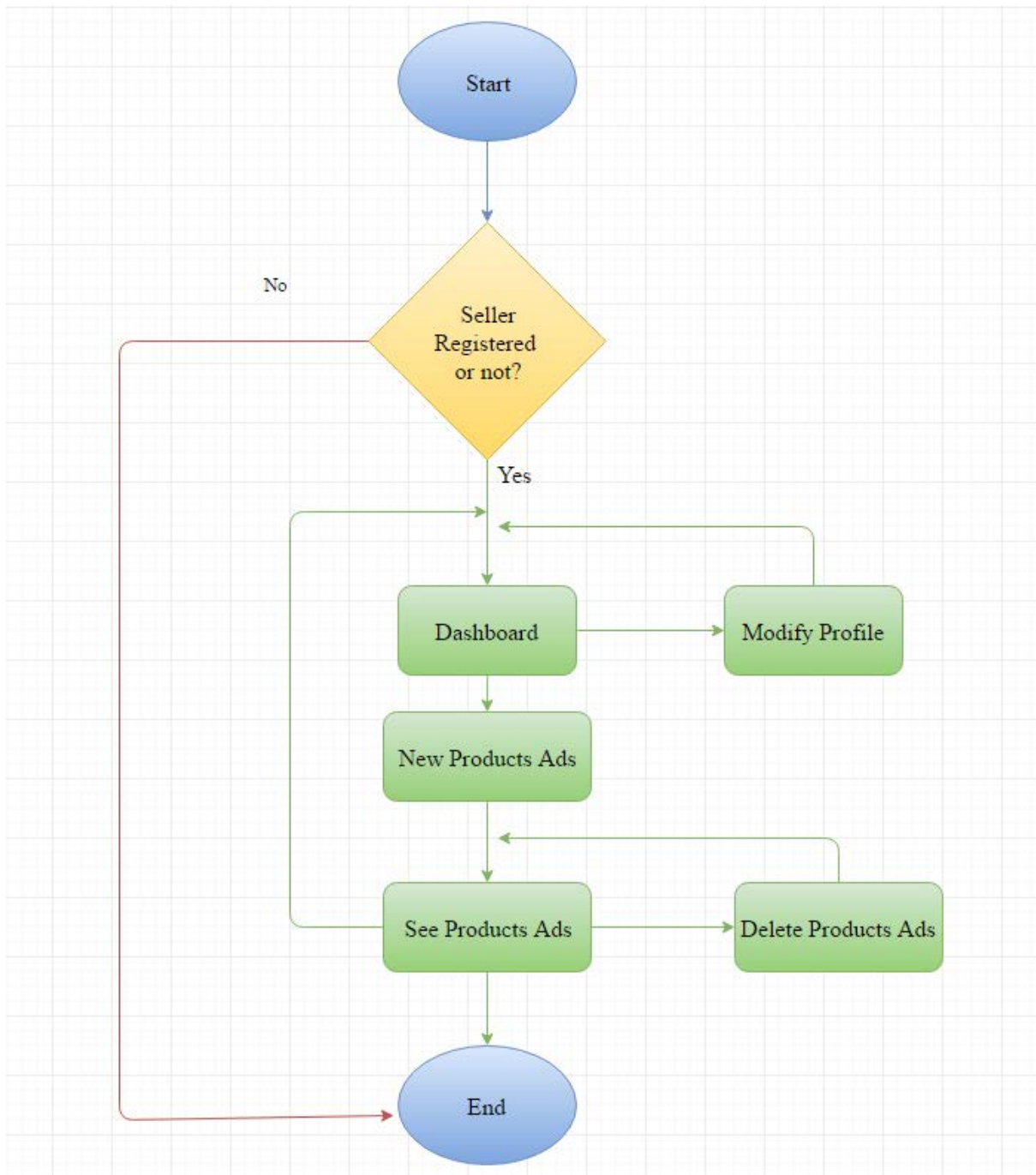
Serial	Product Name	Product Image	Category	Discount	Action
01	Men's Formal Shirt (Blue)		Clothing	10%	 
02	Men's Casual Pant (Black)		Clothing	13%	 
02	Men's Emporio Armani Watch		Watch	25%	 
03	Men's Jeans		Clothing	5%	 

Fig. 3.3.4: Promoted Products showcase

It will keep the data like details, market name, market location etc. in the database. He or She can promote products and can see the popularity of products online. Retailer also can delete product advertisements when the time period is over or anytime retailer wants. *Fig 3.3.3* shows the promotion upload form for the retailer.

Fig.



3.3.5: Retailer Side Flow Diagram

### 3.4 Consumer Side

The objective of this App is to help consumer's shopping experience better. With this goal in mind, the App required that from the consumer side the App will be installed in their mobile phone. As the consumer moves around the city and nearing a market this App will notify any promotion offer in that market. Everyone can see the ads of on sale products and nearest markets. The registered users will have some extra features. They will have a dashboard where they can see options like Todays Sale, Categories, Nearest Markets, Favorite products, etc. They can bookmark the products. They can see the market position from his/her location in Google Map with the indicate which market has the sale.

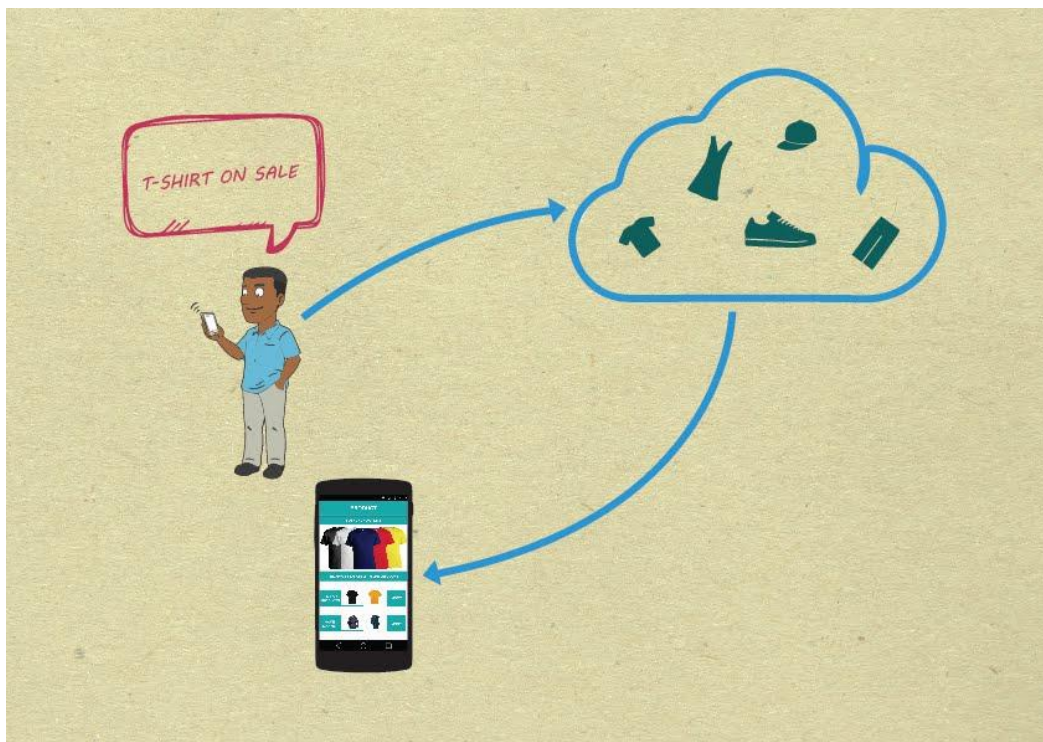


Fig. 3.4.1: Consumer is searching a product which is on-sale

In Registration, Login, Product search and Product showcase, I am using

- `com.loopj.android:android-async-http` [8]
- `org.apache.httpcomponents:httpmime` [9]

libraries to retrieve the data from server and show the products. I have made some PHP script to generate JSON format output of the databases data. So I m retrieving the JSON file using JSON Parsing classes.

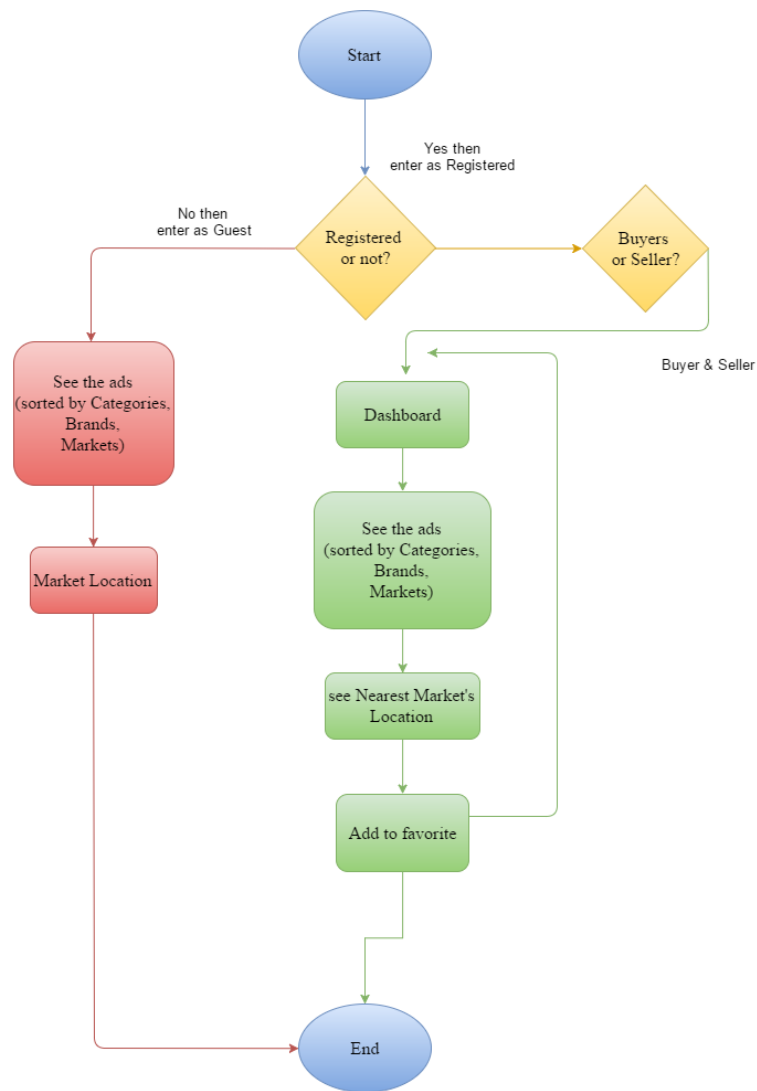


Fig. 3.4.2: Consumer Side Flow Diagram

Fig 5 shows registration process flow diagram. I am storing the data using SQLite [9] and SharedPreferences [8] so that user can see this product in offline. But in Offline mode, user can't use the google map and can't get the latest update of the promotions. Fig 6 show the view of the App from consumer side.



Fig. 3.4.3: Consumer's View of the Promotions



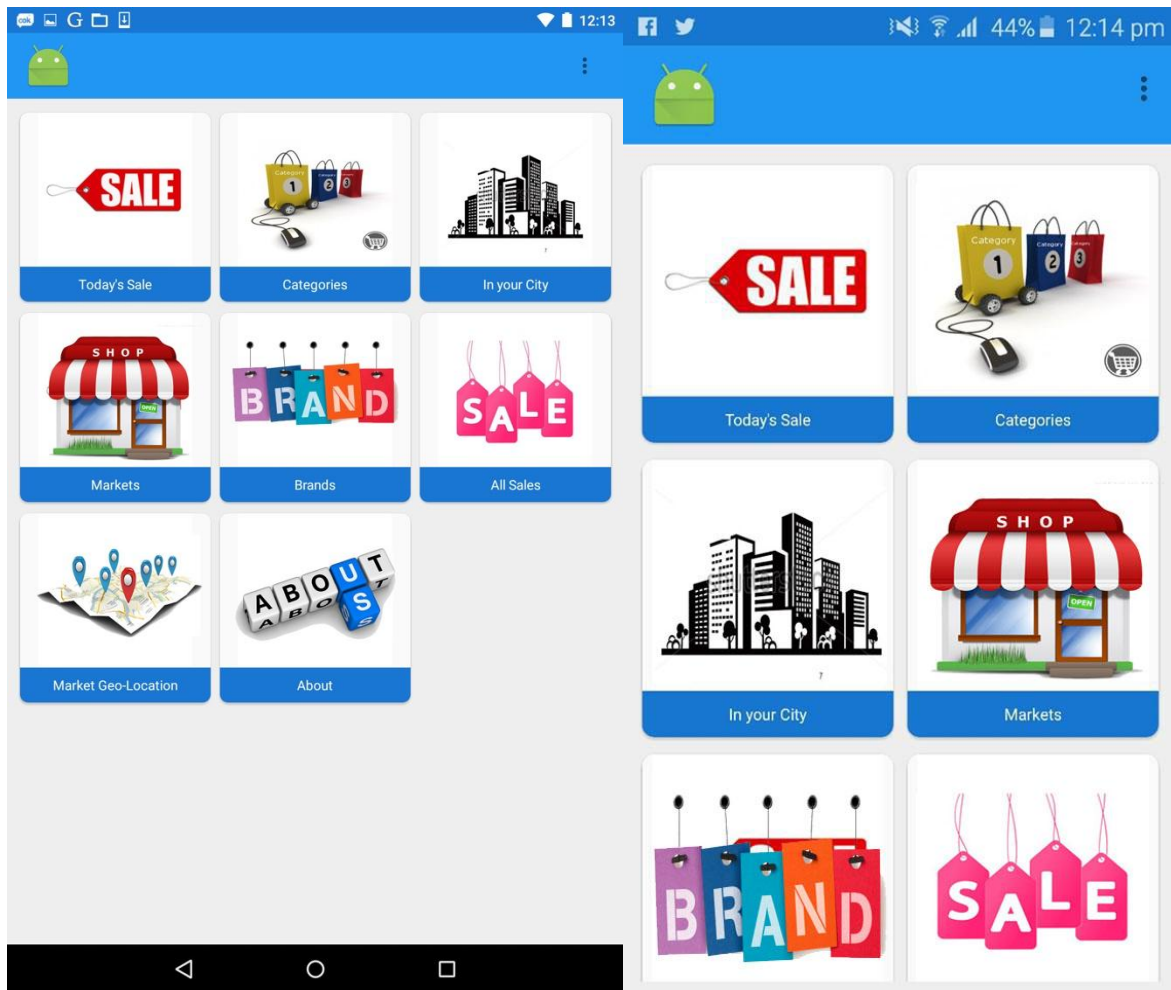


Fig. 3.4.4: Multiple Display

For the Geo Location, I m using a third party library of a project known as GpsTracker [10]. If the user turn-on the GPS and the Internet connectivity, they can use the geo location and see nearest market close to their position. If GPS or the Internet connection isn't available, user can't access the google map. Here I m using Distance API and Duration API which are a part of Google Map for Android v2 [11]. Fig 7 shows what consumer will see when the App starts.

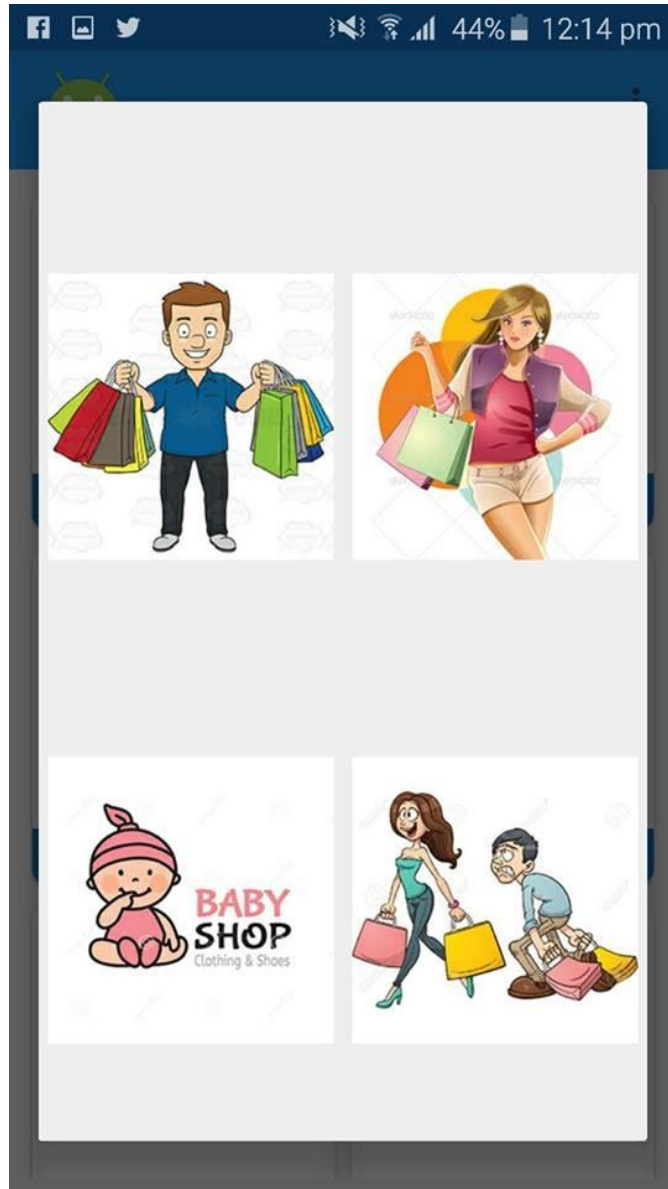


Fig. 3.4.5: Category Menu

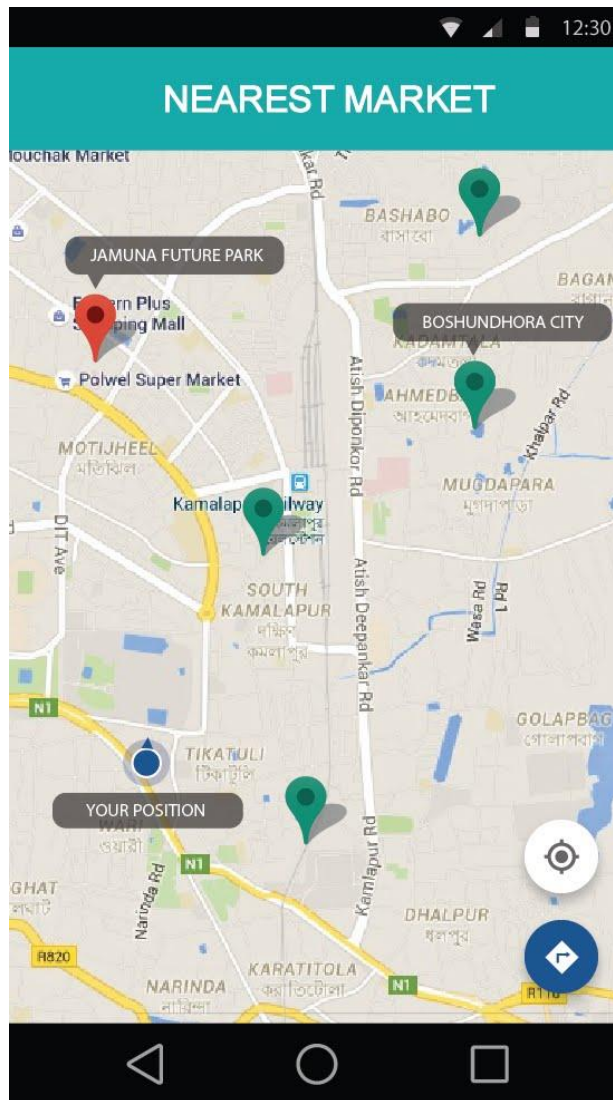


Fig. 3.4.6: Consumer's View of the Application

### 3.5 Algorithm with Code in Java and PHP

```

require_once __DIR__ . '/config.php';

$wishlist = array();
$date = date("Y-m-d");
$sql = "SELECT * FROM product ORDER BY brand ASC";
// echo $sql.'  
';
//ORDER BY key_part1 DESC, key_part2 ;
$mysqli = new mysqli(DB_HOST, DB_USER, DB_PASS, DB_NAME);

// echo "Created date is " . date("Y-m-d").'  
';

if($res = $mysqli->query($sql)){
    while($row=$res->fetch_assoc()){

        $image= $row['image'];
        $price= $row['price'];
        $discount= $row['discount'];
        $market_name= $row['market_name'];
        $brand= $row['brand'];
        $category= $row['category'];

        $data= array("image"=>$image,"price"=>$price,"discount"=>$discount,
"market_name"=>$market_name,"brand"=>$brand,"category"=>$category);
        $wishlistsingle[] = $data;
    }
    $wishlist = array("product"=>$wishlistsingle);
    echo json_encode($wishlist);
}

```

Fig 3.5.1 How to retrieve products from the DB and convert into Json

```

@Override
protected void doInBackground(Void... arg0) {
    // Creating service handler class instance
    ServiceHandler sh = new ServiceHandler();
    // Making a request to url and getting response
    cm = (ConnectivityManager) getSystemService(Context.CONNECTIVITY_SERVICE);
    ninfo = cm.getActiveNetworkInfo();

    if (ninfo != null && ninfo.isConnectedOrConnecting() == true) {
        jsonStr = sh.makeServiceCall(cusmyurl, ServiceHandler.GET);
        tmpjsonStr = jsonStr;
        SharedPreferences.Editor editor = preferences.edit();
        editor.putString(SaleListCache, jsonStr);
        editor.commit();
    } else {
        tmpjsonStr = cachjsonStr;
    }

    if (tmpjsonStr != null) {
        try {
            JSONObject jsonObj = new JSONObject(tmpjsonStr);
            // JSONObject planObj = new JSONObject(TAG_SALELIST);
            JSONArray team = jsonObj.getJSONArray(TAG_SALELIST);

            // looping through All vol
            for (int j = 0; j < team.length(); j++) {
                JSONObject c = team.getJSONObject(j);
                HashMap<String, String> SaleListArr = new HashMap<>();

                String image = c.getString(TAG_IMAGE);
                String category = c.getString(TAG_CATEGORY);
                String brand = c.getString(TAG_BRAND).toUpperCase();
                String price = c.getString(TAG_PRICE);
                String discount = c.getString(TAG_DISCOUNT);
                String market_name = c.getString(TAG_MARKET_NAME);

                SaleListArr.put(TAG_IMAGE, image);
                SaleListArr.put(TAG_CATEGORY, category);
                SaleListArr.put(TAG_BRAND, brand);
                SaleListArr.put(TAG_PRICE, price);
                SaleListArr.put(TAG_DISCOUNT, discount);
                SaleListArr.put(TAG_MARKET_NAME, market_name);

                Log.d("*****", image_path);
                Log.d("*****", name);
                SalesList.add(SaleListArr);
            }
        } catch (JSONException e) {
            e.printStackTrace();
        }
    } else {
        Toast.makeText(getApplicationContext(), "Couldn't get any data from the url", Toast.LENGTH_SHORT).show();
    }
}

```

Fig 3.5.2 How to retrieve products from the server to app

```
{
  "product": {
    "image": "http://dreamogrammers.com/thesis/images/shoe-2.jpg",
    "price": "3244",
    "discount": "30",
    "market_name": "bcity",
    "brand": "Other",
    "category": "Footwear"
  },
  "image": "https://www.nataneljewelry.com/img/home.jpg",
  "price": "4500",
  "discount": "30",
  "market_name": "Jamuna Future Park",
  "brand": "diamond",
  "category": "Jewellery"
},
  "image": "http://dreamogrammers.com/thesis/images/dj.PNG",
  "price": "34",
  "discount": "33",
  "market_name": "Bashundhara City",
  "brand": "Other",
  "category": "Clothing"
},
  "image": "http://dreamogrammers.com/thesis/images/enan22.png",
  "price": "543",
  "discount": "4543",
  "market_name": "sunmar",
  "brand": "Other",
  "category": "Clothing"
},
  "image": "http://dreamogrammers.com/thesis/images/dfdf.jpg",
  "price": "33",
  "discount": "33",
  "market_name": "Bashundhara City",
  "brand": "Other",
  "category": "Clothing"
},
  "image": "http://i01.aliimg.com/wsphoto/v0/717287995/OPK-JEWELLERY-wedding-jewelry18K-Gold-plated-Bracelet-handmade-Fashion-Jewelry-top-quality-361.jpg",
  "price": "300.75974",
  "discount": "0",
  "market_name": "Bashundhara City",
  "brand": "gold",
  "category": "Jewellery"
},
  "image": "http://www.esho.com/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/d/did10p01.jpg",
  "price": "1200",
  "discount": "20",
  "market_name": "Bashundhara City",
  "brand": "artisit",
  "category": "Panjabi"
},
  "image": "http://www.catseye.com.bd/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/c/e/ce_d-shirt_zn2261_3056_2_308_1_tk_1690_on-127-_2_.jpg",
  "price": "1500",
  "discount": "0",
  "market_name": "Bashundhara City",
  "brand": "cats eye",
  "category": "Shirt"
},
  "image": "https://www.showerspazz.com/sites/default/files/styles/960w/public/images/products/Men-s-Rogue-Pant-Brown-front.jpg?itok=06hP9r4N",
  "price": "1200",
  "discount": "20",
  "market_name": "Bashundhara City",
  "brand": "esctasy",
  "category": "Pant"
},
  "image": "http://greatcites.com/images/gc/v3/goog/startex_sc.jpg",
  "price": "1800",
  "discount": "10",
  "market_name": "Pink City",
  "brand": "cats eye",
  "category": "Shirt"
}
}
```

Fig 3.5.3 Output of the retrieved products from the DB to Json

```
public double distFrom(double lat1, double lng1, double lat2, double lng2) {
    double earthRadius = 3958.75;
    double dLat = Math.toRadians(lat2 - lat1);
    double dLng = Math.toRadians(lng2 - lng1);
    double sindLat = Math.sin(dLat / 2);
    double sindLng = Math.sin(dLng / 2);
    double a = Math.pow(sindLat, 2) + Math.pow(sindLng, 2)
        * Math.cos(Math.toRadians(lat1))
        * Math.cos(Math.toRadians(lat2));
    double c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1 - a));
    double dist = earthRadius * c * 1.609344;
    return dist;
}
```

Fig 3.5.4 Algorithm of the Distance between two Geo-Location point

```
private void retrieveGPSLocation() {
    if (gps.canGetLocation()) {
        mLatitude = gps.getLatitude();
        mLongitude = gps.getLongitude();
        LatLng latLng = new LatLng(mLatitude, mLongitude);

        CameraPosition cameraPosition = new CameraPosition.Builder()
            .target(latLng) // Sets the center of the map to Mountain View
            .zoom(13) // Sets the zoom
            .build(); // Creates a CameraPosition from the builder
        googleMap.animateCamera(CameraUpdateFactory.newCameraPosition(cameraPosition));
    } else {
        gps.showSettingsAlert();
    }
}
```

Fig 3.5.5 Retrieve the Geo-Location and mark in the Google Map

# Chapter 4

## Challenges and Limitations

This project faces some challenges in the development phase. One of the main challenges was to gather the exact shop/market location. To develop this project, I collected exact GPS location manually and inserted those into the database. As prototype this is App works only for Dhanmondi area and markets around that area. The developers are currently working on gather GPS data for most of the markets at Dhaka and add those position into the database. Some issues with the user interface design remain which can be solved after collecting user feedback from google play store.

# Chapter 5



## **Future Work**

- It will also available in every platform like Website, iOS version, Microsoft Phone version etc.
- Server will be more efficient, strong security and fast
- Codes will be more compressed and optimized.
- UX will be more attractive and UI will be easier to use
- App size will be reduced
- Promote the app to the public
- People's and Retailers desire

## **Conclusion**

This paper presents a mobile application named CHAAR, that allows consumer to see promotional offers of their favorite products from various outlets. This is designed keeping in mind of a very simple user interface as well as registration process. All the offers will be authentic since only retailers have the option to upload/update the a promotional offer. This an App this is developed using the concept of location based service. One of the major point of this App is that this is the first App of this kind in Bangladesh. Authors are working on elimination some of the limitations mentions in the previous section.

# Chapter 6

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