Location Aware Personalized Services

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Certificate

We accept the work contained in this report as a confirmation to the required standard for the partial fulfillment of the degree of BS (CS).

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Dedication

In the name of Allah Almighty, the Most Merciful, the Most Beneficent

To our beloved parents and teachers, without whose unwavering support and cooperation

A work of this magnitude would not have been possible

Acknowledgements

There is no success without the will of ALLAH ALMIGHTY. We are thankful to ALLAH, who has given us enough power, guidance and strength that enabled us to accomplish this task. Whatever we have achieved, we owe it to Him, in totality. We are also grateful to our parents and family and well-wishers for their admirable support. We would like to thank our supervisor Dr. Imran Siddiqi for his help and motivation throughout the course of our project. Without his help we would have not been able to accomplish this project. Our family and Dr. Imran Siddiqi provided us with the opportunity to polish our technical skills and guided us into this area of learning.

Abstract

The last few years have witnessed a tremendous increase in the number of mobile devices. Consequently, the number of mobile applications has also increased manifolds. The early mobile applications mainly targeted email, calendar, contacts and information retrieval etc. In the recent years, however, mobile applications in various categories including games, banking services, location finders etc. and other GPS/internet based services are emerging at a rapid pace on a number of competing platforms/stores including Apple, Google, Microsoft, BlackBerry and Amazon.

Inspired by the usefulness of mobile applications and the potential they promise, our study is aimed at developing a mobile application that facilitates user access to local businesses and services as a function of their geographical location. The targeted services considered in our work include restaurants, fuel stations and ATM machines. The application not only indicates the nearby locations of these services to the user but also provides useful information relevant to a particular service like deals at a restaurant, availability of fuel at a particular filling station and the availability of cash at an ATM.

The application comprises three components, a central database, an interface for mobile users and a web based interface for service/business providers. The developed application is expected to be handy in assisting users on the move. The application can also be extended to include other services (theatres, shopping stores, reservations etc.

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Chapter # 1

Introduction

1. Introduction

1.1 Importance

The last few years have seen a tremendous increase in the number of hand held devices and the technology stays on the rise promising more powerful and compact devices. The early years of this century witnessed the replacement of traditional desktop machines by notebook computers which themselves are being replaced by hand held mobile devices during the last few years. The remarkable development in the hardware technology in terms of memory and processing power is making it possible to have more and more applications for these devices. This attracted a significant number of developers to shift their focus to what was later termed as mobile application (or mobile app) development. Today, mobile application development has emerged as a huge market (in addition to desktop or web development) valuing more than $27 billion [1] and has resulted in over 500 thousand jobs in Europe alone [2]. The popularity of mobile apps can be estimated by the fact that the word 'app' was listed as word of the year in 2010 [3].

The initial mobile applications mainly targeted email, calendar, contacts and information retrieval etc. The increasing expectations of the mobile users and the availability of development tools led to a tremendous growth of mobile applications in diverse categories including mobile games, banking services, online purchases, location finders and other GPS/internet based services. Today, mobile application development is expanding at an immense pace with a number of competing platforms/stores including Apple, Google, Microsoft, BlackBerry and Amazon [2]. Most of these stores have several billions of app downloads and the count is on the increase.

1.2 Problem statement

Inspired by the tremendous growth of mobile application development and the potential it offers, we our project is aimed at developing a mobile app. Among the wide variety of applications, we have targeted the facilitation of access to local businesses and services like dining, cash withdrawal and fueling etc. The proposed application is planned to suggest these services as a function of user location and also update the user about the current status of the services being offered.

1.3 Project scope

The most important parameter in defining the scope of our project is the number of businesses and services to be considered in our application. Initially we aim to target three services which include restaurants, filling stations and banks. Other services like shopping stores, theatres, rental and medical services etc. may also be incorporated in the later versions of the application.

1.4 Objectives

The objectives of our project include:

- ➢ To learn mobile application development/interfacing on Android OS.
- ➢ To learn and apply integration of Google APIs.
- ➢ To learn and apply databases using MySQL db.
- ➢ To learn and implement a web interface using php, json web services.
- ➢ To develop a useful location based application.

1.5 Organization of Report

This document is organized as follows. In the next chapter we present an overview of some existing applications similar to the ones that we have developed. Chapter 3 is dedicated to software requirements specifications followed by software design specifications. User interface design and implementation are presented in Chapters 5 and Chapter 6 respectively. Finally, we conclude the document with a discussion on future directions on this subject.

Chapter # 2

Literature Review

2. Literature Review

2.1 Introduction

We have developed an android application which will target the facilitation of access to local businesses and services like dining, cash withdrawal and fueling etc. to our users. The application suggests these services as a function of user location and also updates the user about the current status of the services being offered.

A number of applications have been developed which facilitate users by suggesting them nearest services like hospitals, shopping centers, restaurants, airports, fueling stations etc. Some notable of these applications are discussed in the following.

2.2 Android Location Based Tourist Application

An Android based tourist app [1] is a popular application that helps user perform different tourist activities while staying on tour, like tracking flights and flight status, weather updates, help in finding hotels, restaurants and markets. The best option for the user with all the useful and relevant information like the nearest located restaurant, its ratings, distance from user location is displayed on the app. The app also guides the path towards the destination. This application helps to reduce the overhead of finding and searching the desired destination [1].

2.3 Find Places Near Me

Find Places near Me, as illustrated in Figure 2.1, is a simple app that helps users find the nearest places/spots (such as florist, ATMs, gas stations and many more) based on their current location. Once a service is located, users can then find the details such as rating, address, telephone, direction and website link [2].
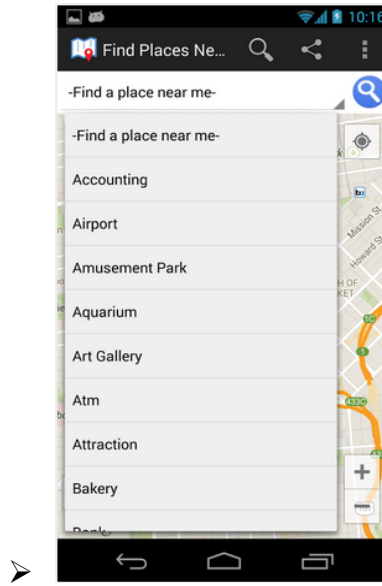
Figure 2-1 A snapshot of "Find Places Near Me"

2.4 Location Aware Personalized Assistance

This application performs a location based business search when a user arrives at a place. The location of a user is obtained using Google Maps by providing the GPS information and the data service / GPRS. Secondly, the information of nearby hotels, lodges and restaurants, doctors, vehicle rent services, tourist places, and other information is also provided to the user, through a central data base. The information is filtered according to the user preferences. The statistical analysis has been incorporated on the data collected from a subscriber such that a local database of user preferences can provide the designated information [3].

2.5 Near Me Locate and Navigate

"Near Me" searches nearby places around user location and the user may opt to navigate to a selected place on the map as illustrated in Figure 2.2. Clicking on the map view marker icon displays short information about the place. Clicking on the place information marker shows the navigation options – walking, biking, driving or using public Transport [4].

Figure 2-2 A snapshot of "near me locate and navigate"

2.6 Quick Place Finder

Quick Place Finder [5] is a free Android application which aims at simplifying the search of places using popular and useful keywords around current location of the user. The application includes popular search categories and can also store favorite places in the local phone database that can be accessed when the Internet is not available. User can manage search radius for filtering the results and can also share place details via email. A snapshot of this application is presented in Figure 2-3.

Figure 2-3 A snapshot of "Quick Place Finder"

2.7 Near Me Fast Food Restaurants

This application employs GPS to find nearby fast food restaurants, access map with route, and other relevant information including address, phone number, website, customer ratings and reviews [6]. The application is very simple to use and allows users search for their favorite fast food restaurants in the proximity of their location. An interface of this application is illustrated in Figure 2.4.
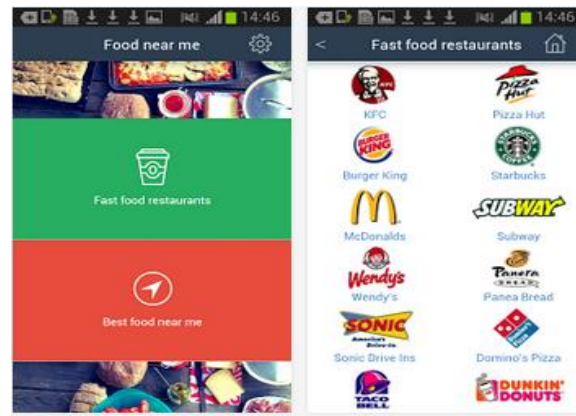
Figure 2-4 A snapshot of "Near me restaurants"

2.8 Summary

This chapter presented an overview of some of the notable applications which facilitate user access to businesses and services as a function of their physical location. The main motivation of our application comes from these similar applications. In most of the applications discussed in this chapter, the information about a service or a business is gathered and entered by the application developers. The main contribution of our project is allowing service providers to directly update their information in the central database and announce promotions or deals etc. Each service provider is allocated a username/password and using a web based interface they can update the information about their service. On one hand the user is able to find his/her desired businesses and on the other hand the business providers can market their products by directly updating their information in the database.

Chapter # 3

Requirement Specifications

3. Requirement Specifications

3.1 Purpose

We intend to develop a mobile based application that will facilitate access to local services and business including nearby, restaurants, fuel stations and ATM machines. The application will not only indicate the location of these businesses/services but will also provide useful information related to a particular service, for example, the current deals at a restaurant, the availability of fuel at a particular filling station. The information may also be filtered to match a particular user's preferences. This will naturally lead to a significant time saving by preventing users from physically visiting a business or a service where their desired product/service is not available.

3.1.1 Product Scope

In the first version of the application, we aim to target three services including restaurants, filling stations and banks. Other services like shopping stores, theatres, rental and medical services etc. may also be incorporated in a later version of the product.

3.1.2 Business Context

The application will be useful for users as well as service provider. Users will be able to search for their desired businesses and services while the service providers would be able to market their business and products.

3.2 Overall Description

3.2.1 Product Perspective

The primary perspective of the application is to facilitate user access to different businesses and services in the proximity of their current location. Not only will the application suggest the nearby outlets of a particular business or service but will also provide the latest/updated information/status of a selected outlet of a particular business/service. This will not only result in time saving for users on the move but will also offer a personalized business and social experience.

3.2.2 Product Functions

The key functions of the application are listed in the following.

a. The application will indicate the business/services in the proximity of the user.

b. The application will provide useful information related to a particular service. For example, the current deals at a restaurant, the availability of fuel at a particular filling station, availability of cash at a given ATM.

c. The information may also be filtered to match a particular user's preferences.

d. The system will allow service providers to add their businesses and update the information related to a particular service.

3.3 Operating Environment

The application will have three components, client interface, a central database and a web based interface for business/service providers. The location of the user will be obtained using the Google APIs by providing the GPS information while the information about nearby businesses and services will be retrieved from a central database. Optionally, the providers of a service/business like restaurants, ATMs and fueling stations will be able to update information through a web based interface with prior subscription. The application will also provide to store user preferences for a particular service/business so that only filtered information is presented to the user.

3.3.1 Design and Implementation Constraints
The developed application will be installed on Android based mobile devices. The application will not install on other platforms.

3.3.2 Assumptions and Dependencies

a. User has an android smart phone with Android version 4.2 or higher.
b. Internet Connection available
c. GPS services enabled.
d. Battery of phone should not be in power saver mode.

3.4 Functional Requirements

Following are the functional requirements that refer to the functionality of the system and the services it will provide to the user**.**

> **A. *The application will indicate the nearest location of businesses/services.***

Description

This functionality of application will provide access to local services and business which are in the proximity of the user. Services covered by our application include as restaurants, fuel stations and ATM machines etc. This functionality will be implemented by getting the location of the user through the GPS and sending user coordinates to the server. The application will then find the nearest desired business/service

Importance

From the view point of application, the idea is to provide the users of mobile devices an instant access to the information about different businesses/services in proximity of their physical location. For the business community it will help them in marketing of their services, as most of people passing through a certain location will see the particular business/service name in app and will be tempted to use these services (Cognitive Marketing).

Benefit

The application will serve not only in saving the time of users on the move but will also allow them choose the most appropriate and desired service from the available options in their proximity.

Criticality

This is the main functionality of the application and is therefore the most critical one.

Technical issues

If GPS is not working properly, the application will be provided with incorrect coordinates which will eventually give wrong/false locations to the user.

Risks

    a. User is using the application in a city where the services database does not exist.

    b. GPS is not working properly or the Internet connection is not available.

Dependencies with other requirements

The service provider must enter data for the services so that the application may find the nearby services with respect to a particular individual's location.

    B. The application will provide useful information related to the service or business.

Description

This functionality will allow user get relevant information about particular services or a business. The user will be kept updated about new offers/deal, about the availability of fuel at particular fuel station or the availability of cash at a particular ATM machine.

Benefits

The user will not have to physically visit the business or service to get to know if any deals of user interest are currently being offered or the desired service (like fueling, cash etc.) is available or not.

Criticality

This requirement is an added service and is not highly critical.

Technical issues

the service provider must regularly update data otherwise the information in the database will be out dated and user will not have the true information of the present state of a service or a business.

Risks

    a. User is using the application in a city where the services database does not exist.

    b. GPS is not working properly or the Internet connection is not available.

    c. The service provider does not update the information as required.

Dependencies with other requirements

The service provider must enter data for the services so that the application may find the nearby services and the relevant information for each service.

C. *The information may also be filtered to match a particular user's preferences.*

Description

The application will filter the information presented to a user based on their preferences. For example if a user is interested only in one particular type of business or service only the selected services will be displayed to the user.

Importance

The user will only get the information which is desired. All undesired information will be filtered and not presented.

Benefits

The users will not have to search or select their desired service. Only relevant information will be presented to the user.

Criticality

this requirement is not very critical as user may continue using the application even if they do not receive a filtered system response.

Technical issues

If the preferences are not set properly, user will get other irrelevant information as well.

Risks

    a. User is using the application in a city where the services database does not exist.

    b. GPS is not working properly or the Internet connection is not available.

Dependencies with other requirements

Service providers must enter data and the application must fetch data from the server so that it can be filtered and presented to the user.

    D. The system will allow service providers to add their businesses and update the information related to a particular service.

Description

The service providers will be provided with a web interface where they can register and add information about their business. Information on deals and packages and status of a service can also be updated.

Importance

This functionality will allow service providers to market their services and attract customers with announcements on promotions and packages.

Benefits

Service providers will be able to market their products and enhance their customer base.

Criticality

This requirement is critical as if the service providers do not enter data, the mobile users will not be able to find their desired businesses.

Technical issues

If the database server is down, information may not be updated.

Risks

Service providers may not be familiar with longitude/latitude information.

Dependencies with other requirements

None.

3.5 External Interface Requirements

3.5.1 User Interface

Users will interact with the application on an Android based mobile phone. The interface proposed for the application will include the following buttons.

- ATM
- Restaurants
- Fueling Stations
- My Location
- Settings
- About us
- Feedback

If the user presses any of the ATM, Restaurants or Petrol Pump buttons, a new screen will open showing the map with respect to the current location of user and the outlets of selected service within the proximity of the current location. Each service will be highlighted by an icon on the map and clicking the icon will result in a small dialog box telling the name of the service. Further details on the service will also be provided if the user selects a particular service. The user will also be able to set preferences on the "Settings" screen as illustrated in Figure 3.1.
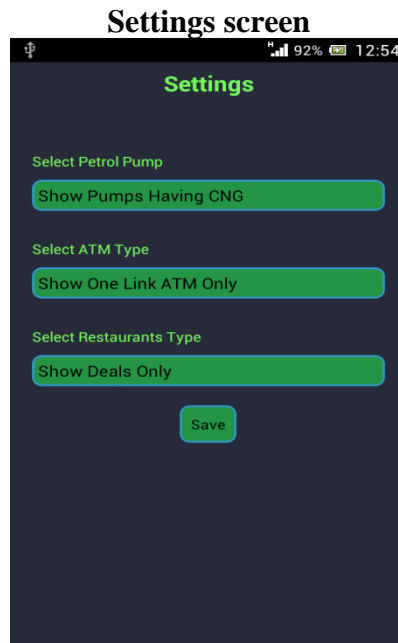
Settings screen

Figure 3-1: "Settings" screen of the application

3.5.2 Hardware Interfaces

The application will run on Android based devices.

3.5.3 Software Interfaces

The application is intended to be developed on Android platform, so it will use the routines and procedures of the underlying OS. The implementation of the application is supported by certain google libraries/APIs which will be integrated in the application.

3.5.4 Communications Interfaces

a. To establish a connection with the Internet, Wi-Fi or packet data will be used.

b. The location of the user will be obtained using the Google APIs by providing the GPS information and will be sent to the central server.

c. The information about nearby businesses and services will be retrieved from a central database through Internet and presented to the user.

d. The service provider will connect to the central server through a web based interface and update the service information.

Chapter # 4

Software Design

Specifications

4.1 System Architecture

4.1.1 Overview

The system is decomposed into two interfaces, one at the user end, and one at the service provider end, User will interact with the Android application and information will be retrieved from central server as illustrated in Figure 4.1. Service provider will update the service data through web interface by simply logging in to the web page. Service provider updates the central server, and all the information will be retrieved from the central server.
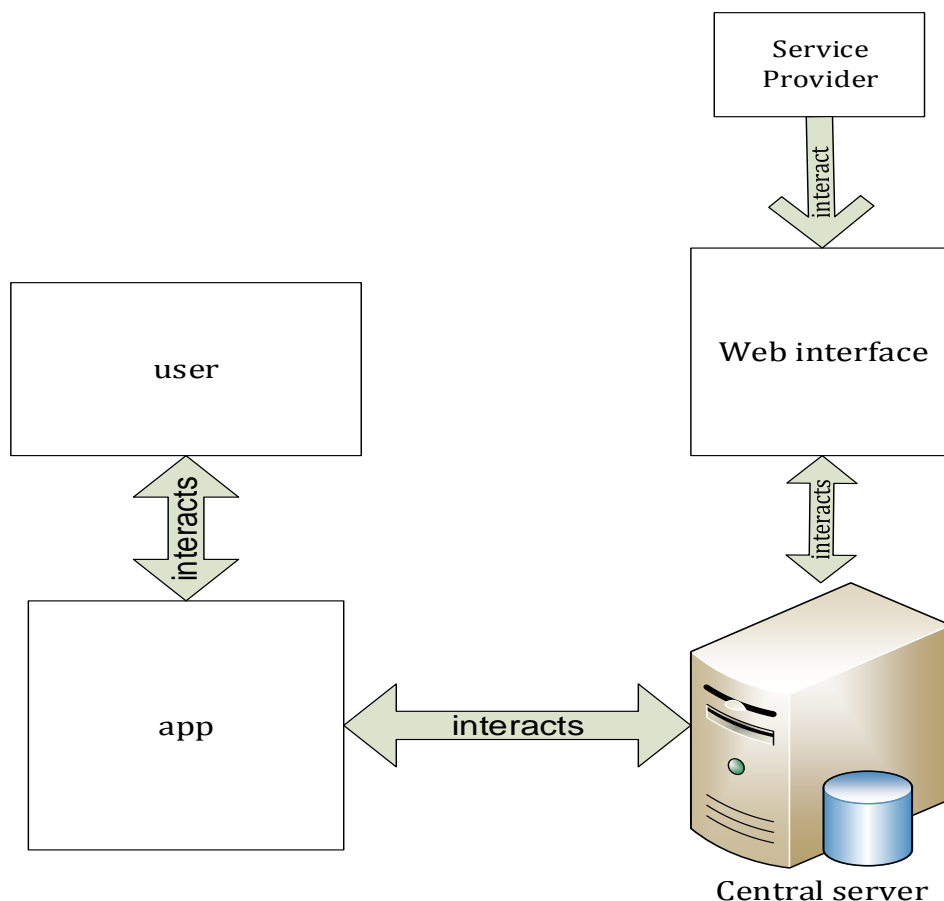

Figure 4-1 System block diagram

4.2 Software Components

Our project contains following software components:

- ➢ **Operating Systems**
  - Android OS
  - Windows on the central server

- ➢ **Software Packages**
  - Android SDK(Software Development Kit)
  - Eclipse IDE(Integrated Development Environment)
  - Java Development Kit (JDK)
  - PHP, Myadmin, My Sqldb

4.3 Hardware Components

- ➢ Personal Computer(s)
- ➢ Android based mobile device
- ➢ Central Server

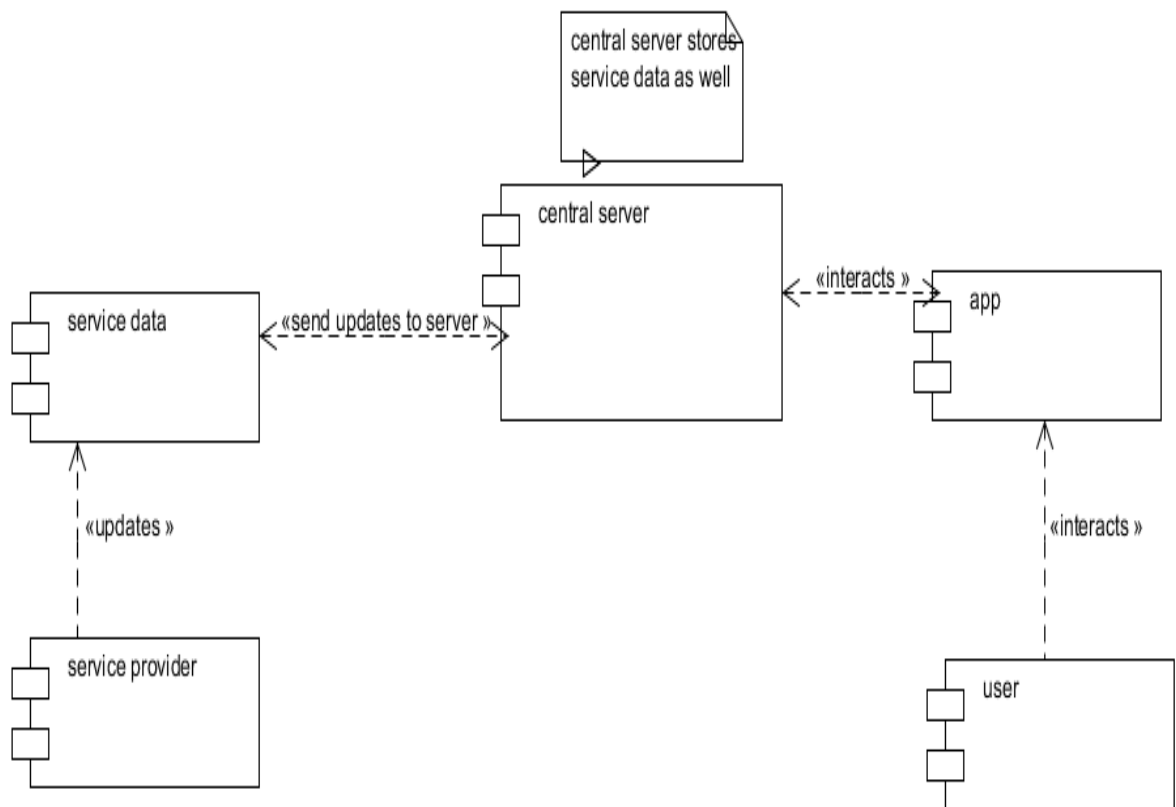## 4.4 Component diagram

Figure 4-2 Component Diagram
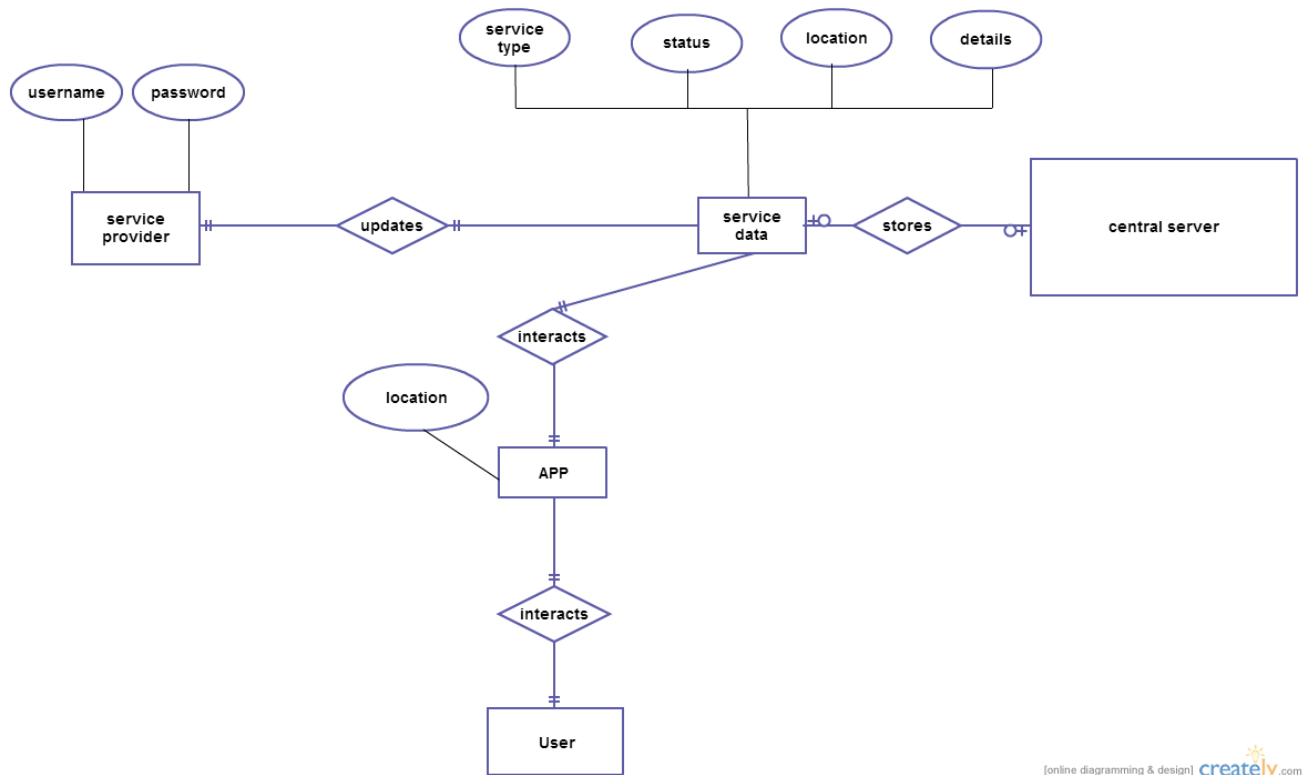
4.5 Entity Relationship Diagram

Figure 4-3 ER Diagram
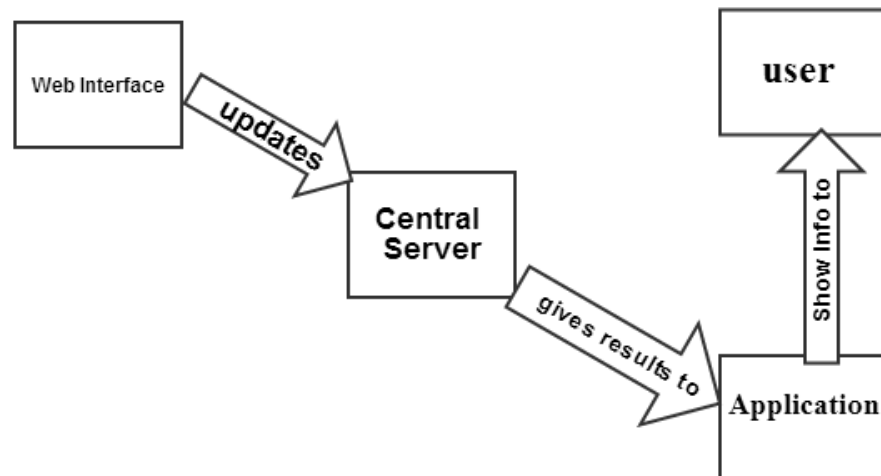
4.6 High Level Design Diagram (Modules Identification)

Figure 4-4 Module Diagram

Modules

1. Web Site

2. Central Server
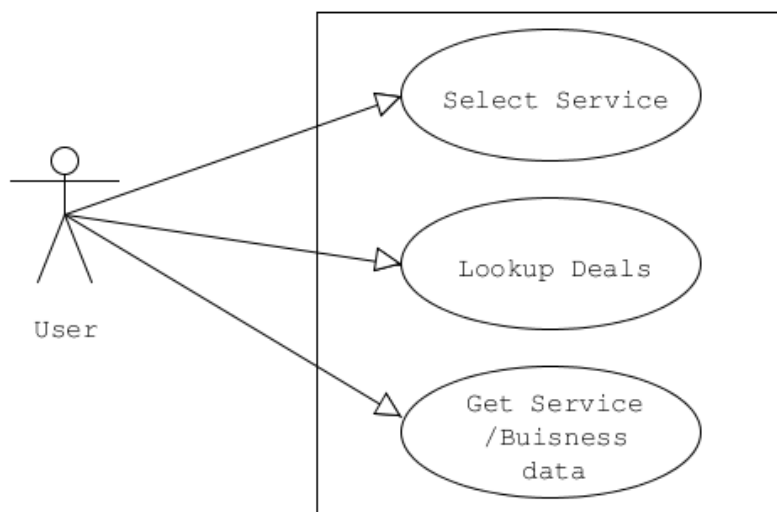
3. Android Application

4.7 App-User use case

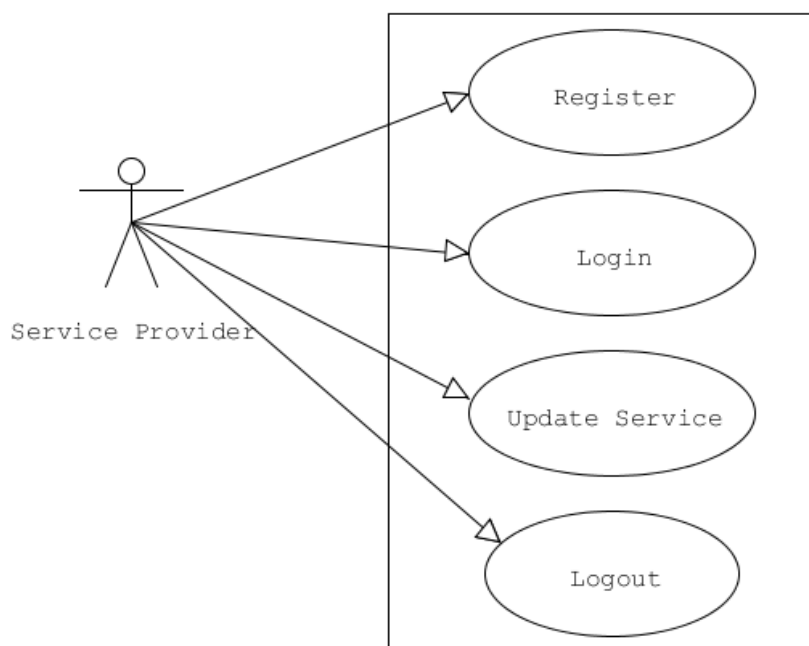Figure 4-5 User Use case

4.8 Service provider use case

Figure 4-6 Service Provider Use case

4.7.1 App User Use-Case Description

Title	App user use- case
Version No.	1.0
Actors	User
Description	This use case is intended for the application user and includes the following. a.Select service b.Lookup deals c.Get Service /Business data
Trigger	User will run the application and press the particular service button

Main Success Scenario	Step	Action
	1.	User will select service type
	2.	User will select the particular service on Google map

	3.	User will have the following options:
		    a. Current location
		    b. Nearest services
		    c. Current Deals at particular service
		    d. Useful information about services

Alternate Flows	None
Special Requirements	Internet connection should be established.
Assumptions	The user has installed the android application and it's ready to use.
Pre-conditions	GPS/Location services are turned on.
Post-conditions	-
User interface	Android mobile device
Issues	The connection to the internet may be lost.

4.8.1 service provider use-case description

Title	Service Provider use- case
Version No.	1.0
Actors	Service Provider
Description	This use case concerns the service provider and allows the following. a.Register b.Login c.Update Service d.Logout
Trigger	Service Provider will open the website interface

Main Success Scenario	**Step**	**Action**
	1.	Service Provider will register for website
	2.	Service Provider will login after registration
	3	Service provider will update the service by clicking on add product button

	3.	Service Provider will have the following form fields to update a particular service :
		    a. Service name
		    b. Details
		    c. Category
		    d. Latitude
		    e. Longitude
		    f. Expire in days

Alternate Flows	None
Special Requirements	Internet connection should be established.
Assumptions	The Service Provider has a personal computer and internet connection is established.
Pre-conditions	Wi-Fi/ internet connection is turned on.
Post-conditions	The Service Provider is registered and the form entry is updated in the database
Service Provider interface	Any web browser Mozilla Firefox, Google chrome ,opera etc.
Issues	The connection to the Internet may be lost.

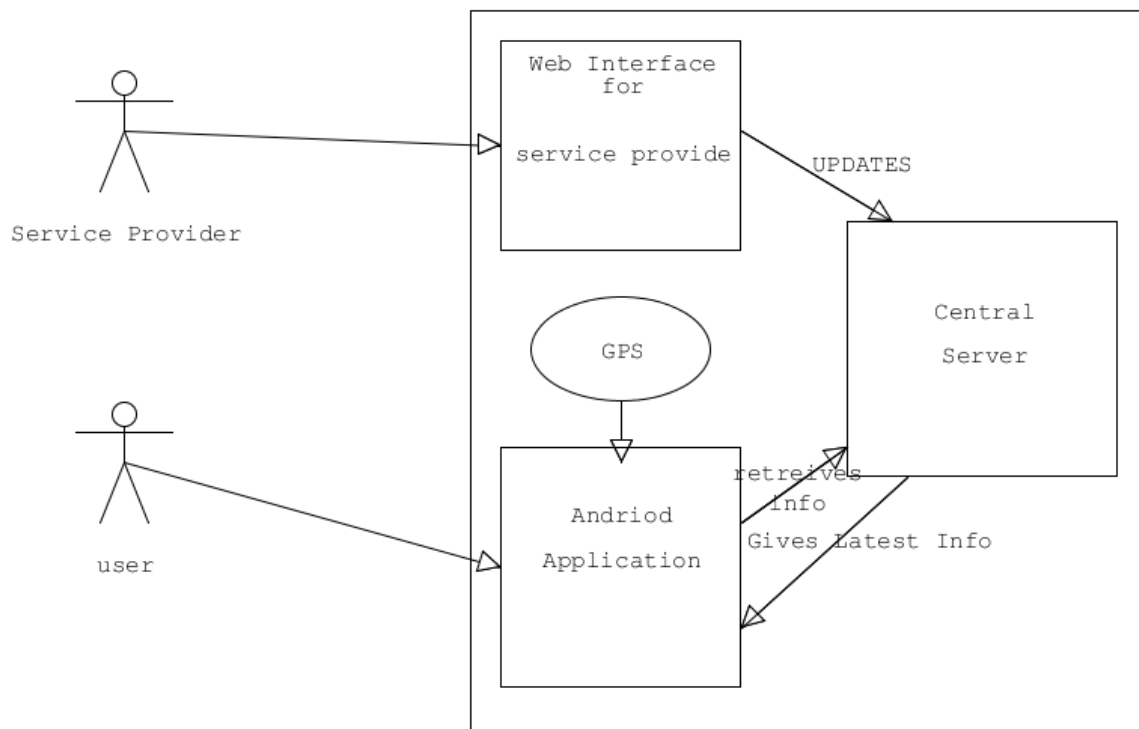## 4.9 System Environment
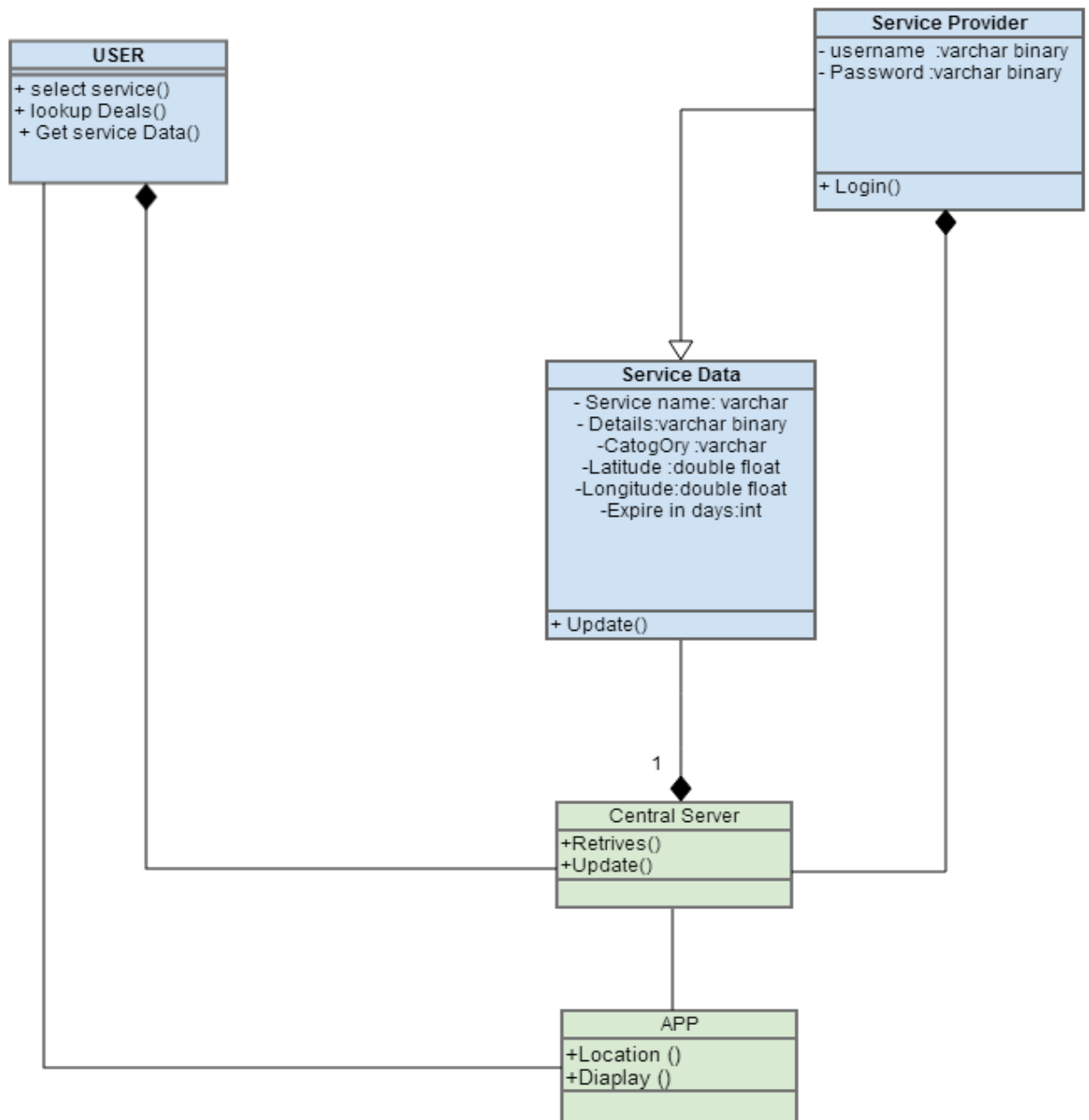

Figure 4-7 System Environment

4.10 UML Class Diagram

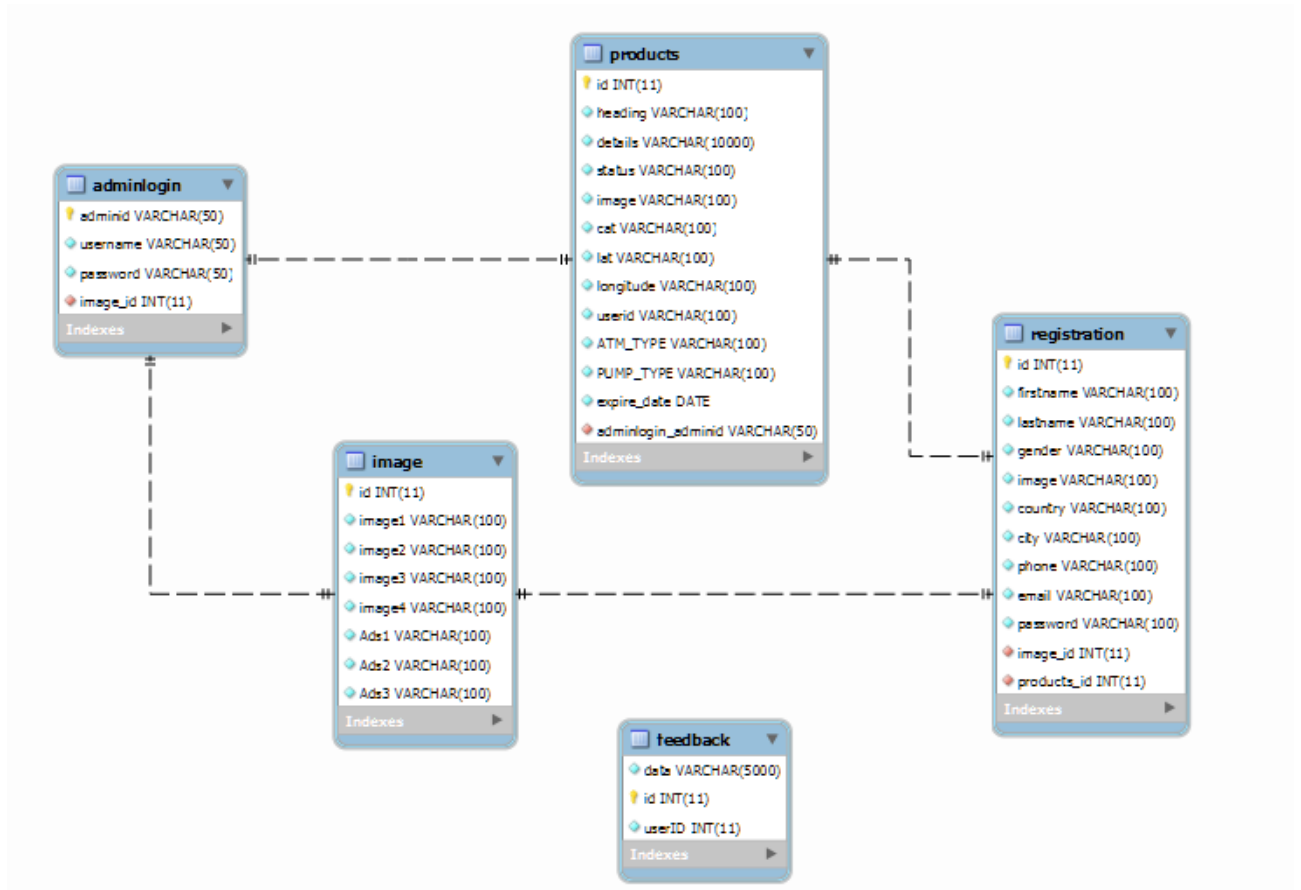Figure 4-8 UML Class Diagram

4.11 Data base design Diagram

Figure 4-9 Database Base Design Diagram

4.12 Snapshot of Database

4.13 Database – Products Record

4.14 Database – Registration

Chapter # 5

Interface Design

5.1 Introduction

This chapter describes the system design in terms of its graphical user interface discussed in the following sections. The user interface design of the application has been kept very simple and user friendly. The GUI has the following components.

5.2 Splash screen

On start of application splash screen will appear for few seconds as illustrated in Figure 5-1
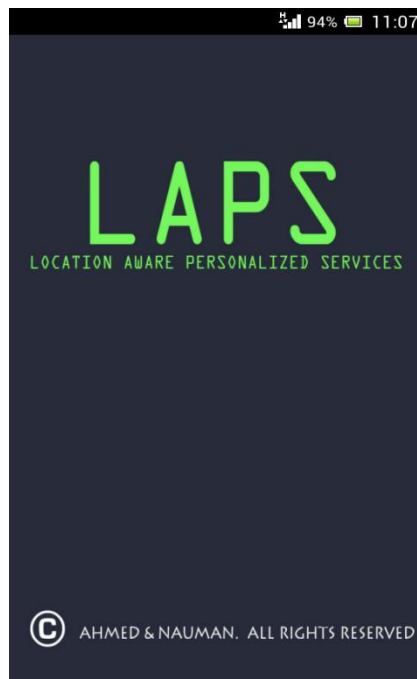
Figure 5-1 A snapshot of "Splash screen"

5.3 Home Screen

Home screen has a grid view and have following buttons as illustrated in Figure 5-2.

1. ATM

2. Petrol Pumps

3. Restaurants

4. About Us

5. Settings

6. My Location
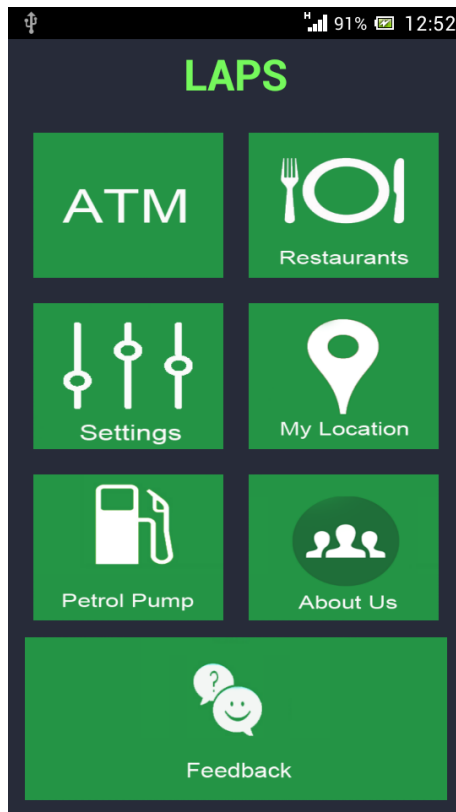
Figure 5-2 A snapshot of "Home Screen"

5.4 ATM Screen

On pressing the ATM button from the home screen a new screen will open having Google map and showing the location of ATM machines in the proximity of the current location of the user (Figure 5-3). Each ATM will be highlighted by an icon on map. Clicking the icon will show a small dialog box with the branch and bank name of the ATM machine. The user can also check further details on the ATM (Cash available or not).
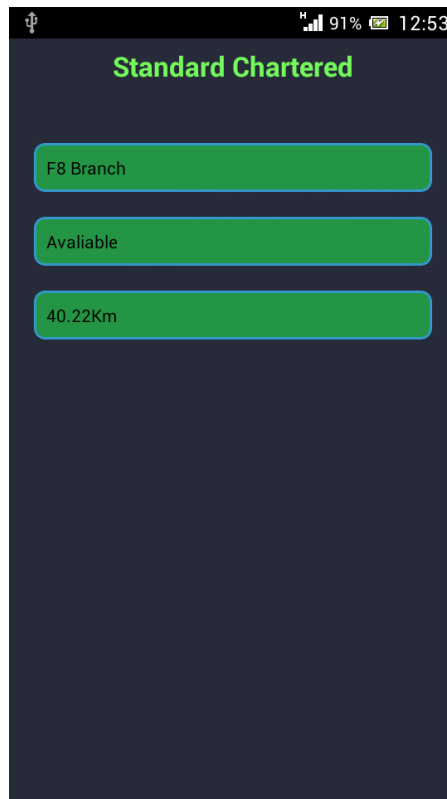
Figure 5-3 A snapshot of "ATM Screen"

5.5 Petrol Pump Screen

Similar to the information on ATM machines, user can access information about nearby petrol pumps by pressing the respective button and get information on whether the fuel is available or not. A screen shot of the petrol pump screen is illustrated in Figure 5-4.
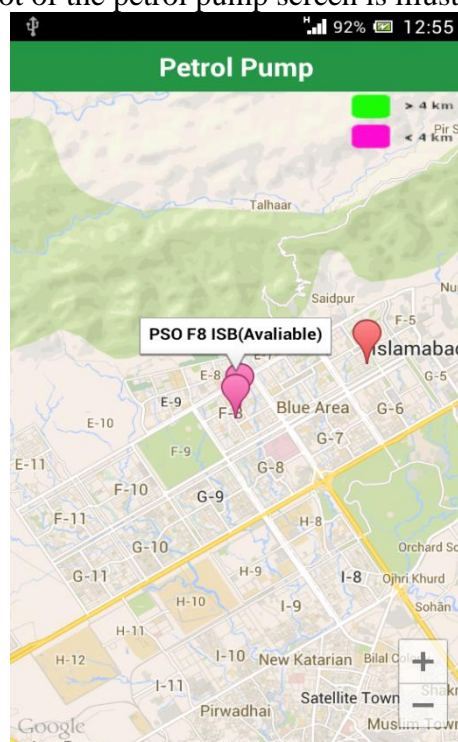
Figure 5-4 A snapshot of "Petrol Pump Screen"

5.6 Restaurants Screen

An example of a restaurant information screen is shown in Figure 5-5 where the user can not only find the nearby restaurants but also see any special deals or packages being offered by the restaurant.
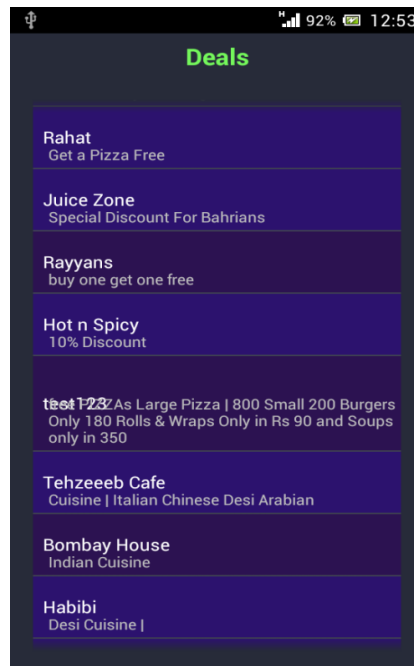
Figure 5-5 A snapshot of "Restaurant Screen"

5.7 Settings screen

The 'settings' option allow users to filter what services they should see in the proximity of their present location. The users may choose one or more services to be displayed as a function of their location as illustrated in Figure 5-6.
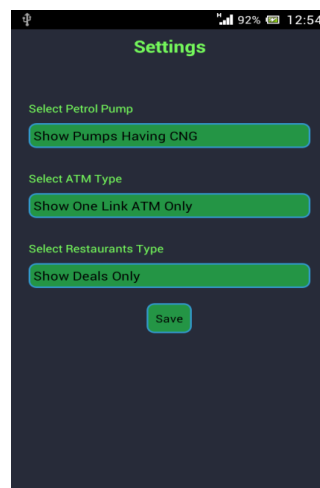
Figure 5-6 A snapshot of "Settings screen"

Chapter # 6

System Implementation

6.1 System Components

➢ Android based mobile device

➢ Personal computer

➢ Database server

6.2 Functionality of the Components

The application will be installed on Android based mobile devices. The database will be maintained on a central server. The service providers will connect to the database through a web interface and update their information. The mobile application will retrieve information about services in the proximity of the server from the database.

6.3 Communication between the Components

The components will communicate with each other using internet.

6.4 Tools and Technology Used

Eclipse, Notepad ++

MYSQL, Java, XML, PHP

6.5 Processing Logic/Algorithms

JSON Web Services in PHP (Output in JSON).Security via live validation Java script library.

6.6 Steps Involved In Development

- Designing and development of the database.

- Designing and development of the Android application.

- Designing and development of website.

- Designing of the user interface of Android application.

- Linking of android to database and website.

- Testing of each functionality of the system.

6.7 Database Security

There is no direct access to the database. Access is via Jason web services. Only authorized requests will be entertained by Web-Services.

Chapter # 7

System Testing and Evaluation

7.1 Introduction

This chapter details the testing of the application which was carried out by designing a number of test cases as discussed in the following sections.

7.2 Test cases for the Application

Test Case 1: Select "ATM"

Test Case ID	TC_Select_ATM_01	
Description	Test the ATM Button	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android mobile device, and the device should be connected to the internet; GPS should be enabled.	
Step	**Procedural Steps**	
1	Turn on WI-FI	
2	Start the application.	
3	Select the ATM button	
Step	**Task & Expected Result**	**Status**
1	Show all nearest ATM	Pass
2	Upon selecting an ATM, following are displayed • Google Map • Current location • Nearest ATMs • Cash Availability • ATM Location • Distance	Pass
3	If the internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 2: Select "Restaurants"

Test Case ID	TC_Select_Restaurants_02	
Description	Test the Restaurants Button.	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android mobile device, and the device should be connected to the internet; GPS should be enabled.	
Step	**Procedural Steps**	
1	Turn on the WI-FI	
2	Start the Application	
3	Press the Restaurants Button	
Step	**Task & Expected Result**	**Status**
1	All nearest Restaurants should be displayed.	Pass
2	Upon selecting Restaurants, following are displayed • Google Map • Current location • Nearest Restaurants • Restaurants location • Availability • Latest Deals • Distance	Pass
3	If the internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 3: "Select Petrol Pumps"

Test Case ID	TC_Select_Petrol Pumps_03	
Description	Test the Petrol Pumps Button	
Applicable for	Android mobile device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android mobile device, and the device should be connected to the internet; GPS services enabled.	
Step	**Procedural Steps**	
1	Turn on the WI-FI	
2	Start the Application	
3	Touch/press the Petrol Pump button	
Step	**Task & Expected Result**	**Status**
1	All nearest petrol pumps should be displayed.	Pass
2	Upon selecting Petrol Pumps, following are displayed • Google Map • Current location • Nearest Petrol Pumps • Petrol Pump location • Within Range 4 KM.	Pass
3	If the internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 4: Select "My Location"

Test Case ID	TC_Select_My Location_04	
Description	Test the select My Location option.	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be Turned on	
Initial Conditions	Application should be installed on Android Mobile Device, and the device should be connected to the internet; GPS services enabled.	
Step	**Procedural Steps**	
1	Turn on the WI-FI	
2	Start the application	
3	Touch/press My Location Button.	
Step	**Task & Expected Result**	**Status**
1	Longitude Latitude should be displayed	Pass
2	Upon selecting an ATM, following are displayed • Longitude • Latitude	Pass
3	If the Internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 5: Select "Settings"

Test Case ID	TC_Select_Settings_03	
Description	Test the select Petrol Pumps Button.	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android Mobile Device, and the device should be connected to the internet; GPS services enabled.	
Step	Procedural Steps	
1	Turn on the WI-FI	
2	Start the Application	
3	Touch/press the settings button	
Step	Task & Expected Result	Status
1	Settings for petrol pumps, ATMs and restaurants should be displayed	Pass
2	Upon selecting Settings button, following are displayed • Show all pumps • Show pumps having CNG • Show all ATMs • Show One Link ATM Only • Show Locations • Show Deals Only	Pass
3	If the Internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 6: Select "About us"

Test Case ID	TC_Select_About Us_06	
Description	Test the select About Us Button.	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android Mobile Device, and the device should be connected to the internet; GPS services enabled.	
Step	**Procedural Steps**	
1	Turn on the WI-FI	
2	Start the Application	
3	Touch/press the About Us button	
Step	**Task & Expected Result**	**Status**
1	Brief introduction of application and developers should be displayed with signatures	Pass
2	Upon selecting "About Us", following are displayed • Brief introduction of team members • Introduction of application • Benefits of application • Signatures	Pass
3	If the Internet connection is disabled the application will responds with please connect to Internet message.	Pass

Test Case 7: Select "Feedback"

Test Case ID	TC_Select_Feedback_07	
Description	Test the "Feedback" button	
Applicable for	Android Mobile Device	
Requirements	Wi-Fi and GPS should be enabled	
Initial Conditions	Application should be installed on Android Mobile Device, and the device should be connected to the internet; GPS services enabled.	
Step	**Procedural Steps**	
1	Turn on the WI-FI	
2	Start the Application	
3	Touch/press the Feedback button	
Step	**Task & Expected Result**	**Status**
1	It should redirect the user to the application website	Pass
2	Upon selecting Feedback button, following are displayed • Suggestions	Pass
3	If the Internet connection is disabled the application will responds with please connect to Internet message.	pass

7.3 Test cases for the Website

Test Case 8: Select "Register"

Test Case ID	TC_Select_Register_08	
Description	Test the "Register" button	
kApplicable for	Any Personal Computer	
Requirements	Internet connection should be established	
Initial Conditions	Website URL should be known by the user and the computer should be connected to the Internet	
Step	Procedural Steps	
1	Turn on the WI-FI/internet	
2	Enter the website address	
3	Click on the register button	
Step	Task & Expected Result	Status
1	Registration form should be displayed	Pass
2	Upon clicking the registration button following fields are displayed - First name - Last name - Gender - Image - City - Phone # - Email - Password	Pass
3	If the user does not enter data in the mandatory fields, registration cannot be completed.	Pass

Test Case 9: Select "Add product"

Test Case ID	TC_Select_Add Product_09	
Description	Test the "Add product" option	
Applicable for	Any Personal Computer	
Requirements	Internet connection should be enabled	
Initial Conditions	Website URL should be known by the user and the computer should be connected to the Internet.	
Step	**Procedural Steps**	
1	Turn on the WI-FI/internet	
2	Enter the website address	
3	Click on the "add product" option	
Step	**Task & Expected Result**	**Status**
1	Product form should be displayed	Pass
2	Upon clicking the add product option following fields are displayed - Service name - Details - Category - Latitude - Longitude - Expire days - Google Map	Pass
3	If the user does not fill any of the mandatory fields an error message is displayed the product cannot be added.	Pass

Test Case 10: Select "View Products"

Test Case ID	TC_Select_View products_10	
Description	Test the "View products" option.	
Applicable for	Any Personal Computer	
Requirements	Internet connection should be enabled	
Initial Conditions	Website URL should be known by the user and the computer should be connected to the internet.	
Step	**Procedural Steps**	
1	Turn on the WI-FI/internet	
2	Enter the website address	
3	Click on the view products option	
Step	**Task & Expected Result**	**Status**
1	"Edit product History" should be displayed	Pass
2	Upon clicking the view products option following fields are displayed • Headings • Details • Category • Latitude • Longitude • Expire day	Pass
3	If user has not added any product, the history fields will be empty	Pass

7.4 Software Performance Testing

The application was tested in three sectors of Islamabad, E8, F8 and F6. The application was tested for all services while the website was also thoroughly tested by making registrations and entering product details. The application successfully retrieved data from the central server and displayed it on the map. Since the application mainly relies on Google APIs, a standard error of 1-2 kilometers is expected in the retrieved results.

7.5 Compatibility testing

The application is compatible with Android mobile devices only and does not work on other platforms. The application was installed on three different versions of Android and different features were evaluated. The web based interface for service providers can be accessed from any system.

7.6 Security testing

Only authorized and registered users can add products using our website.

7.7 Installation testing

To install the application on Android phone, users will be able to download it from the Google play store once the app is available there. For the time being the application is available on our webpage from where it can be downloaded. As a test case, the application was downloaded and installed on a mobile device.

Chapter # 8

Conclusion

8.1 Conclusion

The aim of this project was to develop an Android based mobile application that facilitates user access to local businesses and services as a function of their physical location. The developed application not only suggests the nearby services and applications but also provides the latest relevant information regarding a particular service. Three services are incorporated in the developed version of the application, restaurants, fuel stations and ATM machines. Another interesting and unique aspect of the application is that the service providers can regularly update information about their products or deals and packages through a web based interface. This application can therefore be used for effective marketing of their businesses and products.

8.2 Perspectives

The developed application can be further enhanced to incorporate a number of interesting features. In addition to the three categories of services covered, a number of other businesses and services including stores, banks, parks, hospitals and theatres etc. can also be covered. Users may also be notified about the latest promotions and packages as a function of their preferences. Service providers could also be provided with more options like adding images of their products or online reception of orders etc. Finally, the authors expect that this application will not only make life easier for users on the move but will also offer a personalized business and social experience.

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