Sri Lanka Institute Of Information Technology

CUSTOMER TRACKING SYSTEM FOR PROMOTIONS AND OFFERS

Software Requirement Specification

Comprehensive Design Analysis Project - 1

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Declaration

I declare that this is my own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the Supervisor : ----------

(Ms. Manori Gamage)

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1 Introduction

1.1 Purpose

The purpose of this Software Requirements Specification document is to provide a detailed description of the functionalities of the proposed location based offer notification mobile application (cross platform). Furthermore this will explain the features, the interfaces of the system and what will be done by this component of the system. The developers, users and testers could refer this document for their appropriate necessities. This document will support,

Developers: To make sure whether they are developing the correct software requirements and specifications proposed in the previous stages.

Testers: To get the overall idea about the functionalities of the system which will be helpful for testing purposes.

Users: To get confirm whether the mentioned, proposed requirements are included in the software requirements and specifications. Also this document stands as a legal document between users and developers.

1.2 Scope

As the main data source for the application, the offers published on the public facebook pages will be extracted and will be saved in a local database. To extract and collect offer details, public facebook pages will be scraped and the images of the pages will be identified. From the identified images text will we extracted. By considering the drawbacks and advantages of existing text extraction methods a modified algorithm will be created to text extraction and it will be the research component. With the use of a classification algorithm of Machine Learning, offers details will be identified from extracted details and will be saved.

Login functionality will be implemented. User can use application login or else user can use the facebook login to sign in to the application. All the offers will be displayed in a particular UI by using an API. The API will retrieve the offer details from local database.

1.3 Definitions , Acronyms and Abbreviations

Acronym/Abbreviation	Definitions
SRS	Software Requirement Specification
API	Application Programmer Interface
UI	User Interface
ML	Machine Learning
User	Someone who gives the requirements of the system
Location Based Notification	User will notify once they are moving near shops
GPS	Global Positioning System

Table 1.1: Definitions, Acronyms and Abbreviations

1.4 Overview

The main goal of this cross platform mobile application is to send location based notifications about offers of the registered merchants of the system. For achieve that purpose the offer details should be collected by analyzing public Facebook pages of registered merchants. In more detail the proposed system will go through the public facebook pages of the registered merchants and will identify the offers among the uploaded content of their page. Data related to offers will be filtered out and all the texts of identified offer images will be extracted and displayed in a separate interface for customers.

2. Overall Description

In this modern world people do shopping every day in their lifestyle. People do shopping for various reasons. Likewise shopping has now been evolved and now its in the era of online shopping. Even though people do online they too do shopping by visiting the shops and find what they want in their choice of brand, price and quality. When it comes to shopping people waste hours and hours of time to find a shop which gives them good offer and best price for the goods they purchase. Likewise people wants to get a reasonable value for what they want buy as they don't proper way to get updated with current offers and promotions due to various reasons such as lack of offer awareness or busy with other works. So this application will be a better opportunity to customers to get notify about the offers. When considering about the component of extract offer related data, this component will be featured with specific objectives to achieve the functionality.

- Analyze public Facebook pages of registered merchants to identify offer related images and extract offer related details.
    - Identify an efficient text recognition method.
    - Develop an algorithm by modifying existing algorithms to identify offers or promotions.
    - Go through public Facebook pages or websites of registered merchants and identifying offers.
    - Design an interface containing all offers.

2.1 Product Perspective

There are some offer handling systems but most of them are not location based systems and also they don't collect offers from social medias. Optionally they are collecting data by providing another system to merchants to enter details of offers Most of the systems are just focusing on collect and display offers in the application and most of the tools don't send personalized location based notifications. And also they won't give facilities to get personalized search prediction results. Generating statistical charts and suggestions by analyzing customer reviews which will be useful to merchants won't be see in existing systems There are some commercialize offer handling systems available.

Here are some details about popular existing offer handling systems.

ODEL Smart Retail System [1]

A similar kind of project in ODEL colombo. For that project they are using Beacons to track customer and send retail details once they are moving inside shop.

Groupon.com [2]

Groupon.com is another similar kind of website which is listing down offers.

WebEngage.com [3]

A similar kind of system but the offers should upload to their own web application which will be an extra effort to merchants.

In our proposed system we will overcome above problems. Following chart represent the comparison of each of the system and proposed system.

	Feature	Proposed System	ODEL	Groupon.com	Webengage.com
1	Location based	Yes	Yes	No	No
2	Gather existing offers using public FB pages and shop's website	Yes	No	No	No
3	Prioritize offers according to customer's behaviour	Yes	No	No	No

Table 2.1: Comparison of existing systems

2.1.1 System Interfaces

- Cross Platform Mobile Application – Cross platform application will be developed which can be used in any smartphone with GPS facility.
- Database Access – The proposed database is MongoDB which can be use to save, retrieve, update and handle the data input by the user and generated by the system itself.

2.1.2 User Interfaces

- Sign In Interface
- Sign Up Interfaces
- Detailed Offer List Interface

2.1.3 Hardware Interfaces

- A smart phone with GPS and internet facility.

2.1.4 Software Interfaces

- Visual Studio Code
- Webstom
- TensorFlow library
- mongoDB
- Python
- React Native

2.1.5 Communication Interfaces

- Network Router , dongle or mobile data to communicate with cloud as the database will be hosted in cloud.
- JavaScript will be used to communicate with frontend and backend.

2.1.6 Memory Constraints

- Our application is expected to use no more than 50MB of RAM and 40MB of external storage
- For the DB it will use around 2GB of space, which will increase with the time.

2.1.7 Operations

- Proposed Mobile Application will allow user to do the below mentioned operations.
    - Both users and merchants have to register for the mobile application.
    - Users can login to the application.
    - User can view all kind of offers of registered merchants.

2.1.8 Site Adaptation Requirements

- Since this is a mobile application, there should be a android or IOS device. The device should have a minimum of,
    - SDK version 4.1 or above for android
    - SDK version 7 or above for IOS

2.2 Product Functions

Filter out offers and promotions

The main functionality of this function is to identify and filter out offers and promotions from merchants' websites or public Facebook pages.

Images will be identified using a tool like Web Scraper.

Data will be extracted from identified images by modifying existing text extraction methods with machine learning algorithms.

A data model will be trained to identify offer related details from extracted data.

2.2.1 System Overview diagram

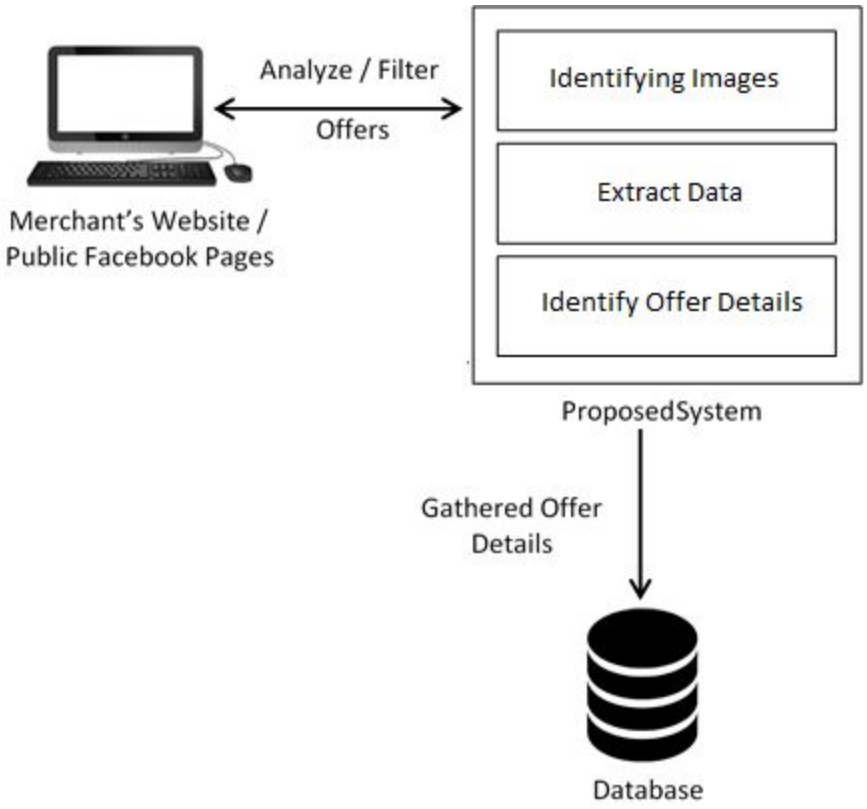

Figure 2.1 : System Overview diagram for Collect Offers

2.2.2 Use Case diagram

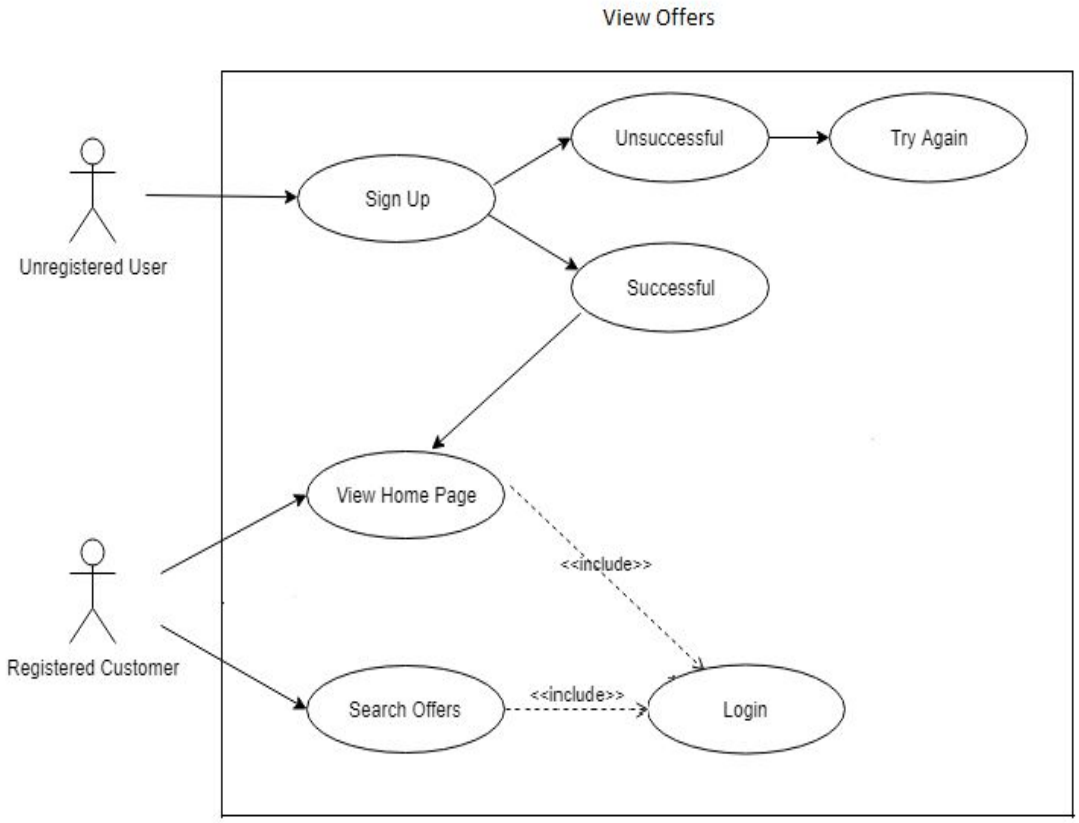

Figure 2.2 : Use Case diagram for View Offers

Use case scenarios

Use case number	01
Use case name	Login
Actors	User
Pre-conditions	User must exist in the database.
Flow of event	1. System displays the Login interface. 2. User enter credentials. 3. System redirect the user to Dashboard.
Post Conditions	User can access the system.

Table 2.2: Use Case Scenario for Login

Use case number	02
Use case name	View Offers
Actors	User
Pre-conditions	User should sign in to the application.
Flow of event	1. Clicks on ‘View Offers’ button in Dashboard. 2. Scroll down the offers card views.
Post Conditions	Different offers will be displayed in the application.

Table 2.3: Use Case Scenario for View Offers

2.2.3 Activity diagrams

View Offers

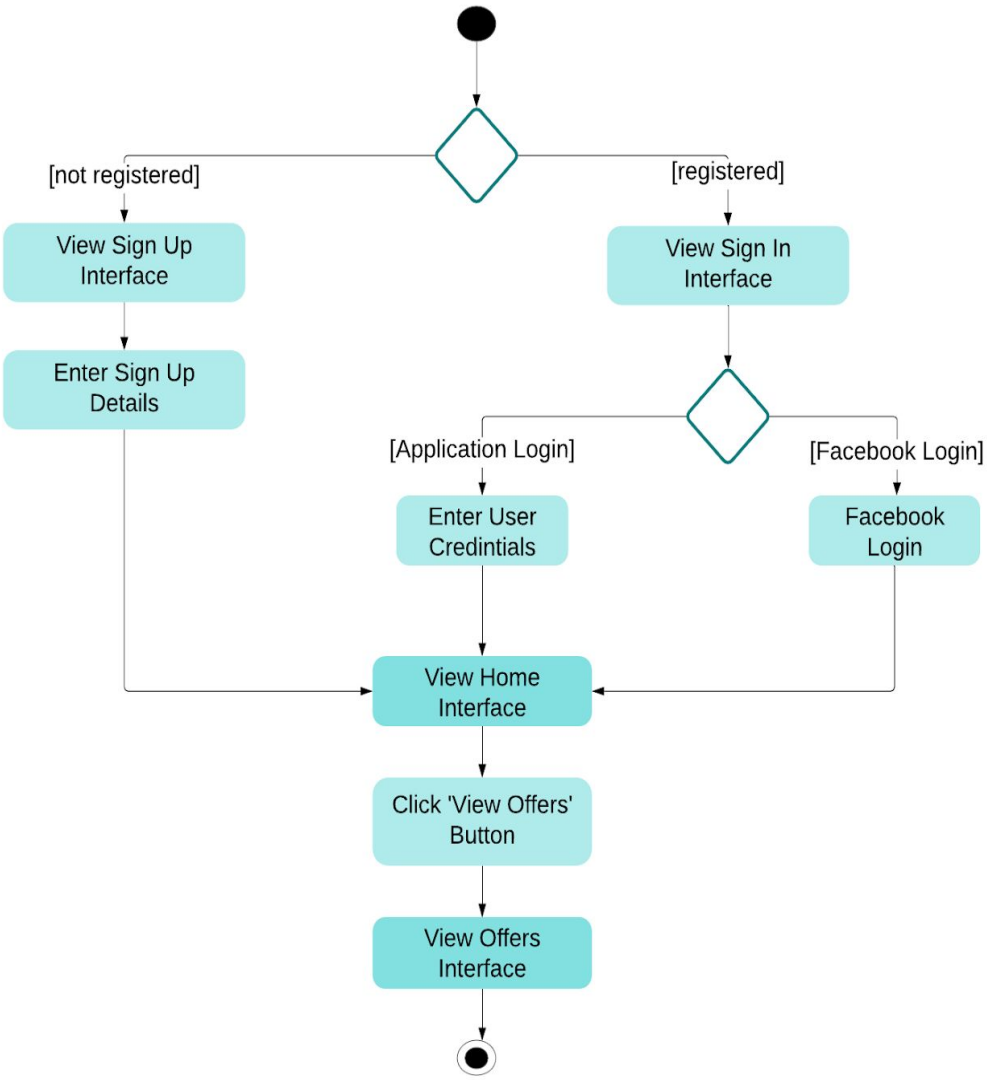

Figure 2.3 : Activity diagram for View Offers

Collect Offers from Merchants Public Facebook Pages

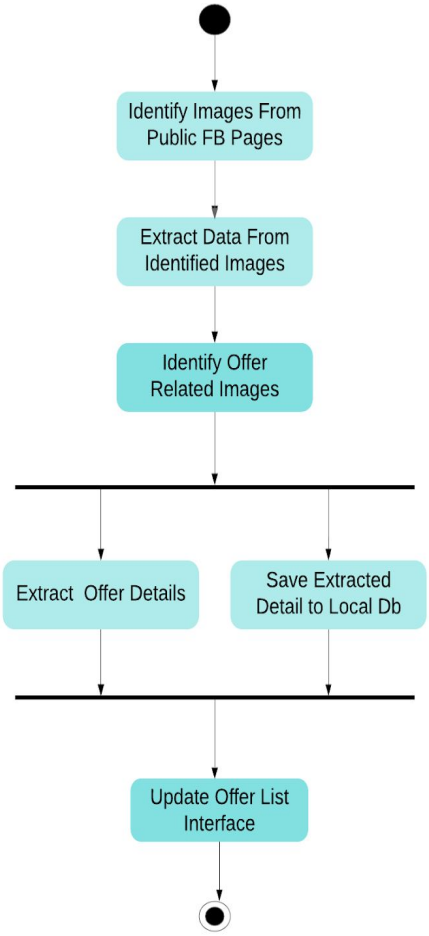

Figure 2.4 : Activity diagram for Collect Offers from Merchants

2.2.4 Sequence diagrams

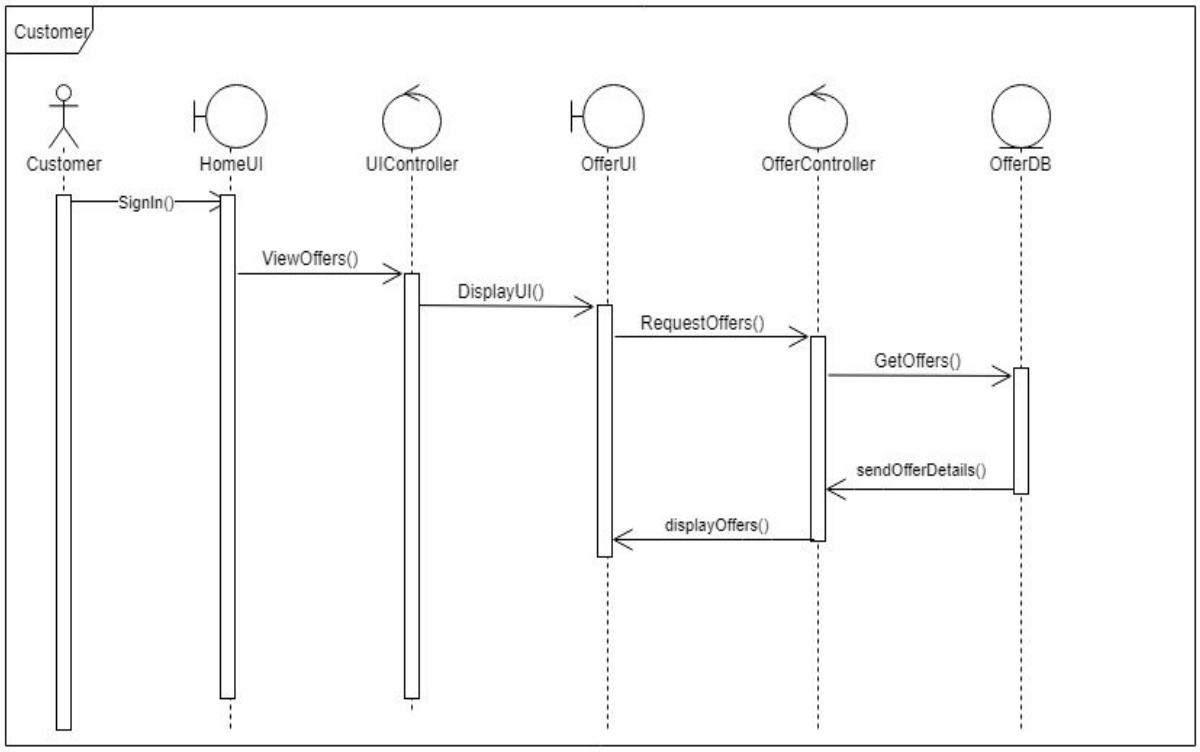

Figure 2.5 : Sequence diagram for View Offers

2.3 User Characteristics

The intended users of this application will be customers who are doing day-to-day shopping and the merchants who are willing to give offers to improve their sales. Also anyone who interested about different offers can use this application. Every user of this application can get personalized and location based offers. Also they can search or look for offers through this application. Merchants can get statistical data related to review analysis and new suggestions to improve business.

2.4 Constraints

- Location based notifications will depend on internet connection and the type of the mobile device.
- User has to give reviews, feedbacks to get more relevant personalized offers.
- Merchants should have an updated public Facebook page which contains offers details.

2.5 Assumptions and dependencies

- This mobile application will be compatible with both android and IOS devices as this is a cross platform mobile application.
- User will enable mobile data and GPS when they need to get location based notifications in background.
- Android API level should be 16 or higher, android version should be 4.1 (Jelly Bean) or higher and the IOS SDK should be IOS 7.

2.6 Apportioning of requirements

The requirements specified in first and second phase of this report are represented as primary specifications; the requirements in third section are represented as functional specifications. In the event that a requirement is stated within both primary and functional specifications, functional specifications will be used to build the application as they are more detailed specifications. When considering the third section the Essential requirements are to be implemented for 1.1 version of the mobile application. In the Release state Desirable requirements will be planned and implemented. It can be expected in the future release. Developers will decide about the implementation of Optional requirements of the system. The interfaces described in the third section might have alterations, and some of the requirements will be change according to client requests and feasibility. Other than that this application will only have slight changes in the development process of this application.

3. Specific requirements

3.1 External interface requirements

3.1.1 User Interfaces

Offer List Interface

Figure 3.1 : Offers List UI

User can view listed down offers in the system in a proper categorization manner. Once user clicks on the search button search feature will be enabled.

Sign Up Interfaces

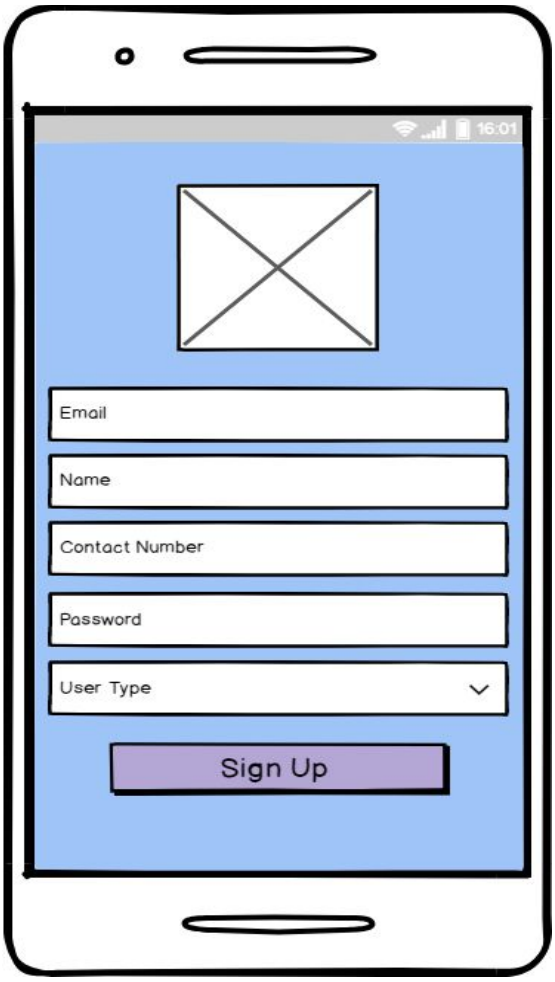

Figure 3.2 : Sign Up UI

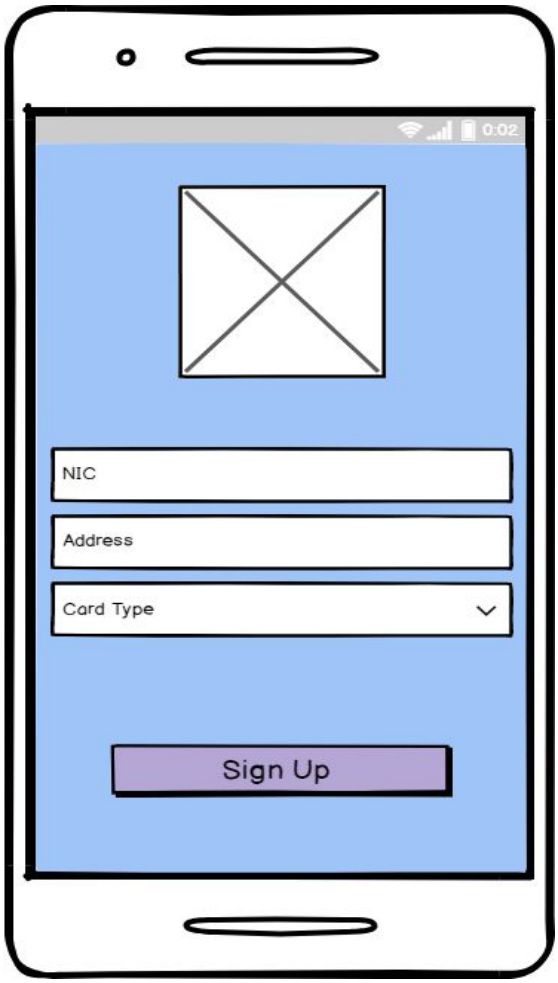

Figure 3.3 : Sign Up UI 1

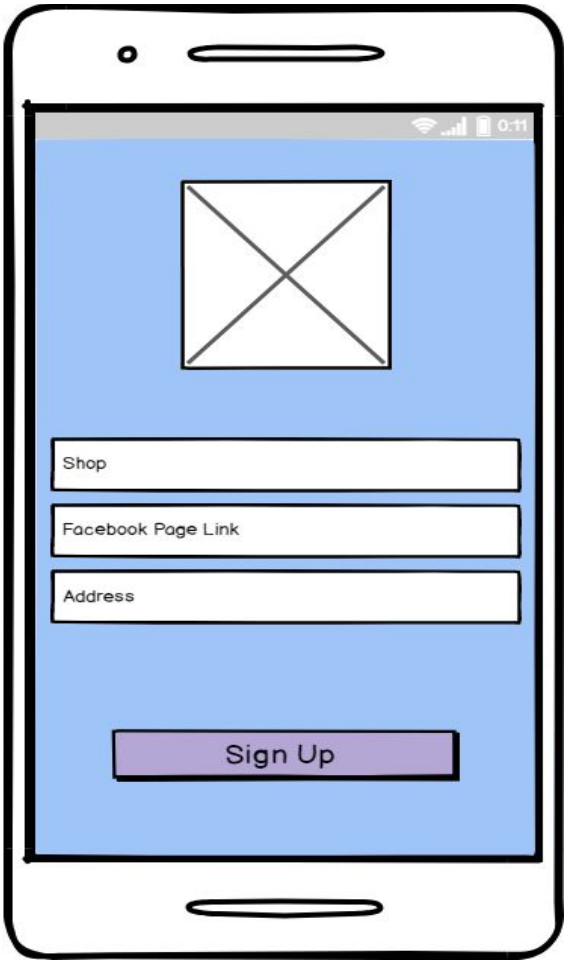

Figure 3.4 : Sign Up UI 2

User who is installing the application for the first time can use this interface and sign up to the application to get the benefit of receiving offer notifications.

Sign In Interface

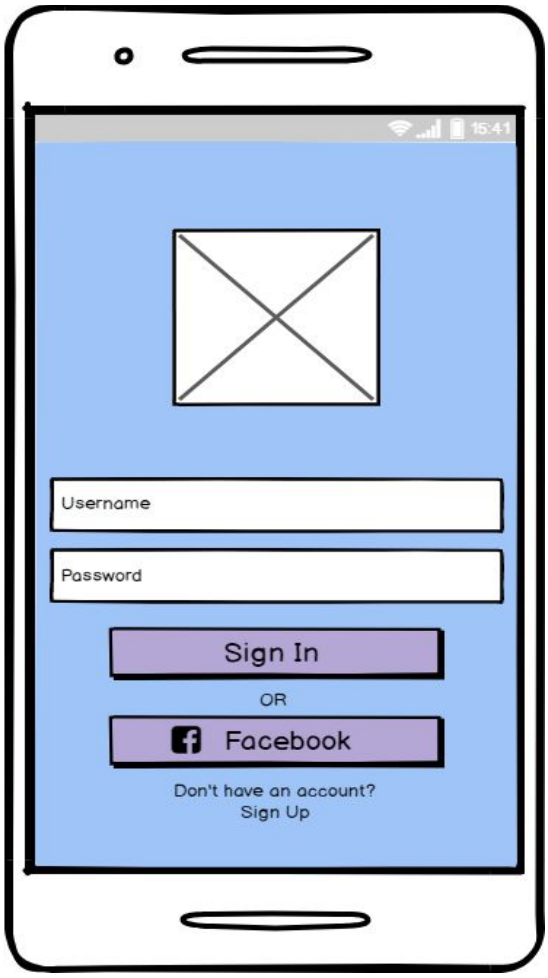

Figure 3.5 : Sign In UI

Registered users can sign in to the application to get the benefits of the application by using this interface.

Home Page Interface

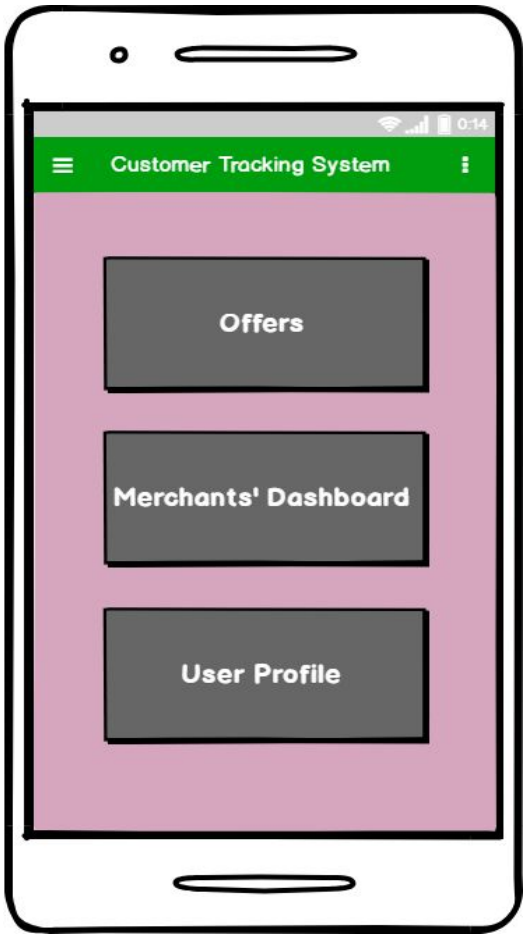

Figure 3.6 : Home Page UI

All registered users will be directed to this interface. Users can navigate to offers UI or profile UI and merchants can direct to merchants' dashboard.

3.1.2 Hardware Interfaces

- Android or IOS smartphone – A smartphone will be needed to install the application and to get background notifications.

3.1.3 Software Interfaces

- Visual Studio Code IDE will be used as the frontend developing platform.
- MongoDB uses as a database management system. By using MongoDB offer details will be saved. Data documents of MongoDB can be used to retrieve offer details for different functionalities in the application. Mainely MongoDB is a NoSQL database and it is cross platform. And also it is a open source database.
- GitHub will be use as a code hosting platform. Basically it is consider as a version control system. Team members will work as collaborators. Collaborators can commit there changes to the github and others can get those modifications. And also finally all collaborators can access full source code easily.
- Draw.io, Creately.com is used to create different UML diagrams such as Activity diagrams , Use Case diagrams , Sequence diagrams, Class diagram.
- All the UI wireframes designed using balsamiq cloud.

3.1.4 Communication interfaces

- This application shall use the HTTP protocol for communication over the internet and TCP/IP protocol will be suite for the intranet communication.
- In this proposed system cloud will be used to host the database, therefore internet facility will be needed to get the benefit of this application.

3.2 Classes/Objects

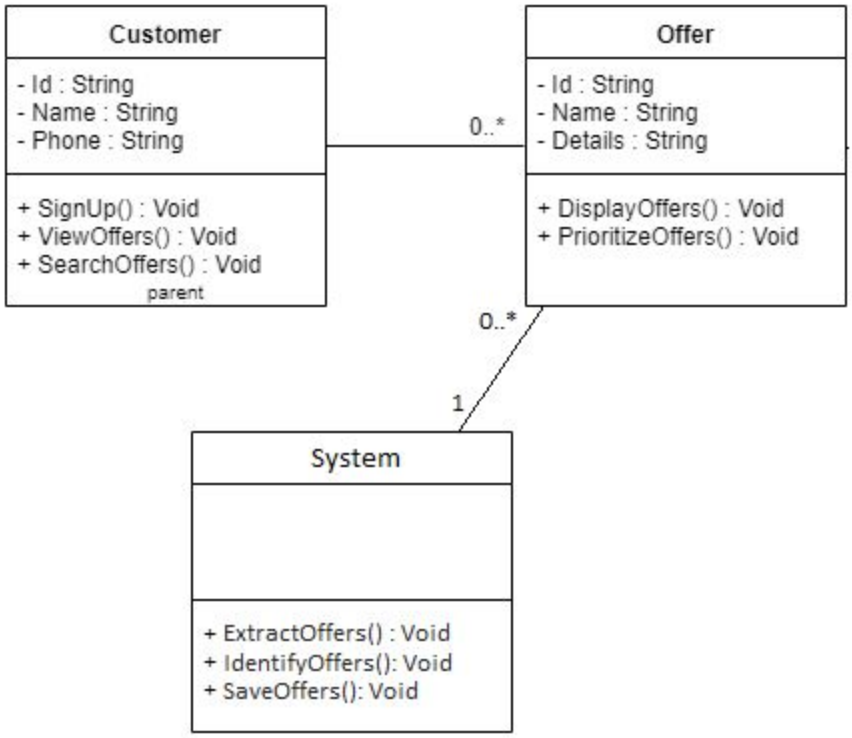

Figure 3.7 : Class Diagram

3.3 Performance requirements

- Notifications should receive when connected to the internet and enabled GPS.
- Notifications should be received from shops within 100 meters.

3.4 Design constraints

- Cloud should be purchased by the development team for hosting purposes.
- User interfaces should be attractive and clear as user should get correct details without much effort.

3.5 Software system attributes

3.5.1 Reliability

System need to be capable of carry out all meant operations and functions without experiencing failure (device crash). That manner all functionalities have to perform without crashing. Reliability is an important attribute in the system. When many users login to system all users should receive personalized location based notifications without crashing.

3.5.2 Security

This application assumes that only the registered user could have get right of entry to his/her phone. Merchants' Dashboard is access denied for customers. A verification process will be done while authentication process which will help to control access permissions on Merchants' Dashboard.

3.5.3 Maintainability

Maintainability is described because the chance of performing a a success restore action within a given time. In other words, maintainability measures the speed and ease with which a application can be restored to operational repute after a failure occurs. We might be specializing in retaining a good maintainability by following,

- Clean and documented code.
- Simple mistakes additionally may be corrected within the time they occurs.
- Make modifications to help tools, operating systems and new environments.
- Limit the quantity of outside libraries

3.5.4 Availability

Whenever the users want to get entry to the application it should to be to be enable for the users. Every function should to be available.

3.6 Other Requirements

3.6.1 Accessibility

The front end of the system must be developed in a way that it attracts more users and it will be developed in an easily reachable manner because users are finding for various offers an also they are expecting notifications for worthy offers.

3.6.2 Extensibility

The application should be capable of be given extensions or modifications. It may be including the capabilities of editing existing features or adding new features.

4 Supporting Information

4.1 References

[1]"Dialog and Odel pioneer revolutionary smart retail with D-Beacon" [Online]. Available: http://www.ft.lk/article/425697/Dialog-and-Odel-pioneer-revolutionary-smart-retail-with-D-Beacon

[2] "Groupon.com" [Online]. Available: https://www.groupon.com/

[3] "WebngageEngage.com" [Online]. Available: https://webengage.com/