Sri Lanka Institute of Information Technology

CUSTOMER TRACKING SYSTEM FOR PROMOTIONS AND OFFERS

Project Id – 19-081

Software Requirement Specification

Comprehensive Design Analysis Project - 1

(Search and Review Handling)

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 candidate is carrying out research for the undergraduate Dissertation under my supervision.

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

(Ms. Manori Gamage)

Table of content

Contents

LIST OF FIGURES

Page

LIST OF TABLES

Page

1 Introduction

1.1 Purpose

The purpose of this SRS document is to provide a complete description of search and review functions and specifications of the proposed customer tracking system for promotions and offers application and will serve as a guideline for this proposed system. Furthermore, it will explain the features, interfaces of the functions, what the functions will do, the constraints under which it must operate and how the functions will react. This Document will be focusing on describing the design decisions, architectural design and detailed design needed to implement the above-mentioned functions.
This also intends to inform the way that the functions expected to work and also developers, users, testers could refer this document for appropriate necessities. This document will help,

- Developers: To ensure that they are developing the correct functionalities that fulfills the requirement and specifications provided in this document.
- Testers: To have an exact set of the functions that must respond according to diagrams.
- Users: To get familiar with the functions and provide suggestions for the improvement of features.

1.2 Scope

This SRS document covers functional and non-functional requirements of 2 main components of the customer tracking system. Which are search and review management unit. And this document will help developers and designers throughout the development process. Search functionality is responsible for providing users with personalized search results, using machine learn technology. Review management unit is responsible for collecting user reviews for products. Which will help other users to make purchase

decisions and data collected by this unit will used by the application to provide more personalized product suggestions for the users.

1.3 Definitions, Acronyms, and Abbreviations

Acronym/Abbreviation	Definitions
SRS	Software Requirement Specification
DB	Database
SDK	Software development kit
UI	User interface

Table 1.3.1: Definitions, Acronyms and abbreviations

1.4 Overview

The rest of this SRS contains 2 chapters, appendixes and references. The second chapter provides an overview of the system. The third chapter provides requirement specification in detail and describes different system interfaces in detail.

2 Overall Descriptions

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 want to get a reasonable value for what they want to 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 consist of four components to provide better opportunity to customers to get notify about the offers while they are moving near shops. All the main components will be implemented to provide a better cross platform mobile application to send location-based notifications for customers and to send statistical data and recommendations for merchants. When we consider about the main components all the main components will be featured with specific objectives to achieve the functionality of those functions.

- 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.
- Prioritizing the collected offers using an algorithm and send only relevant location-based notifications to customers.
    - Develop offer and promotion notification functionality.
    - Develop a classification machine learning algorithm to categorize offers.
    - Develop a prediction machine learning algorithm to notify only the relevant offers and promotions to user.
- Provide recommendations for users when searching for offers by considering offer validity, ratings of merchants and search history.
    - Develop search functionality.
    - Develop an efficient algorithm to provide search predictions.
    - Gathering customer reviews about products and shops.
    - Analyze gathered data for predictions.

- Analyze customer reviews and create statistics by using data mining on monthly data and make aware merchants.
    - Analyze customer reviews for each shop.
    - According to customers reviews for month on offers create statistics and make aware the merchants.
    - Based on the customer reviews and feedback for a shop give suggestions to merchants for improvement of the shop.

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 analysing 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 2.1.1: Comparison of existing systems

2.1.1 System interfaces

- This application will be developed as a cross platform mobile application.
- A relational database built using MongoDB will be used to store and retrieve data generated by the application.

2.1.2 User interfaces

- **Search Interface**

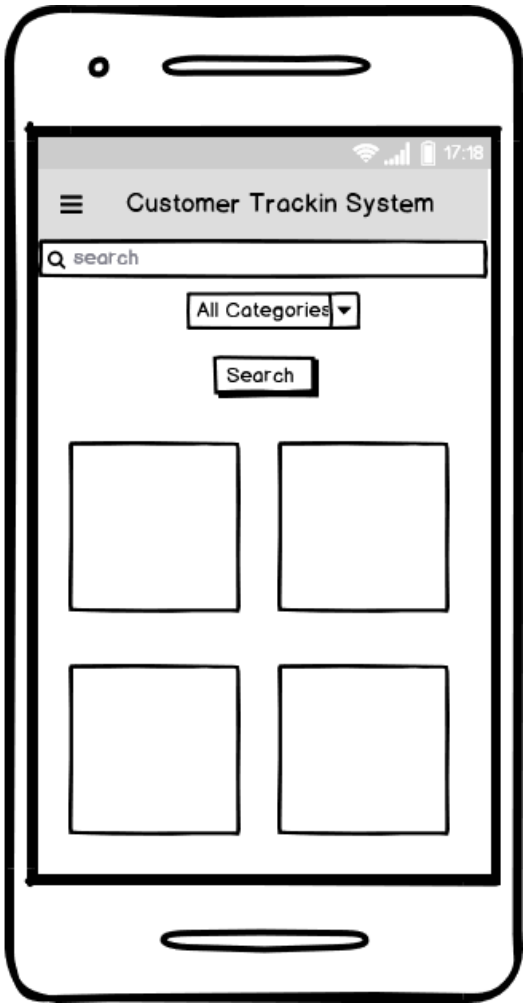

Figure 2.1.2.1: Search interface

- **Review Interface**

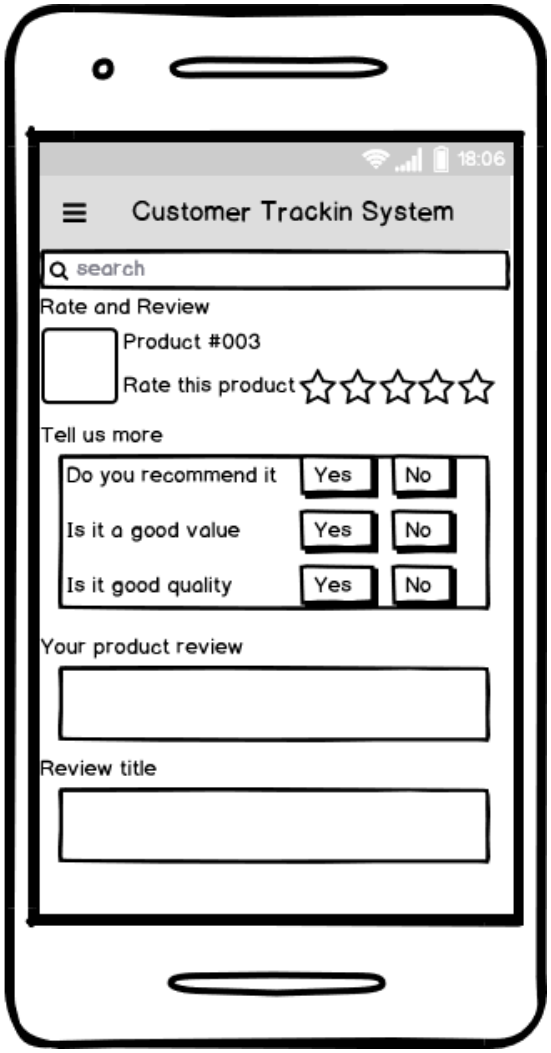

Figure 2.1.2.2: Review interface

2.1.3 Hardware interfaces

- A smart phone with internet connection and GPS capability will be needed for use this application.

2.1.4 Software interfaces

- Development

    1. This application will be developed using Webstorm by Jetbrains.
    2. TenserFlow will be used to develop and train machine learning models

- Source control

    GitHub will be used for source controlling.

2.1.5 Communication interfaces

- Internet is needed for app since the DB will be deployed in the cloud.
- Since customer is tracked using GPS, active internet connection is needed.

2.1.6 Memory constraints

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

2.1.7 Operations

Following are the operations that can be followed by the users when using search and review functions.

- Register with application.
- Login
- Searching for promotions and offers.
- Reviewing products and shops.

2.1.8 Site adaptation requirements

To run the mobile application successfully the user needs a mobile device with a minimum SDK of android 4.1(Jelly Bean) or above and if the user is using an iPhone SDK of iOS 7 or above. Also, the mobile device will have to contain sufficient amount of memory (minimum 1024 MB) and at least 200 MB of secondary memory.

2.2 Product functions

In this SRS document search and review functions of this application is described.

1. **Search Predictions**

Main objective of this function is to provide personalized search suggestions for users by analyzing search history, purchasing patterns of this particular user and users which share similar interests.

Data extracted in following ways will be used to improve predictions;

- When registering, users will be provided with a small questionnaire which will help to get an idea about the interests of the user.
- With the permission of the user, search history data will be collected and will be used with the algorithm for making search predictions.
- Users will be given the option to share reviews and experiences with shops and products with other users.

According to the analyzed data users will be put into target groups for each product category. When searching this will be helpful to give more personalized search result for users.

User feedback and ratings also will be considered when providing search results. Search results will be prioritized according to user interest as well as user feedback using ranking algorithms.

2. Review Handling

Main objective of this function is to provide users to provide a platform which enables to share their experience with products and shops with other users. This will be helpful to users which they can use this information to make purchase decisions. Also, shops can identify their flaws through this information and they can take necessary actions.

Also, this information will be used to provide users personalized suggestions when they are using the app in the future.

2.2.1 Use Case Diagram

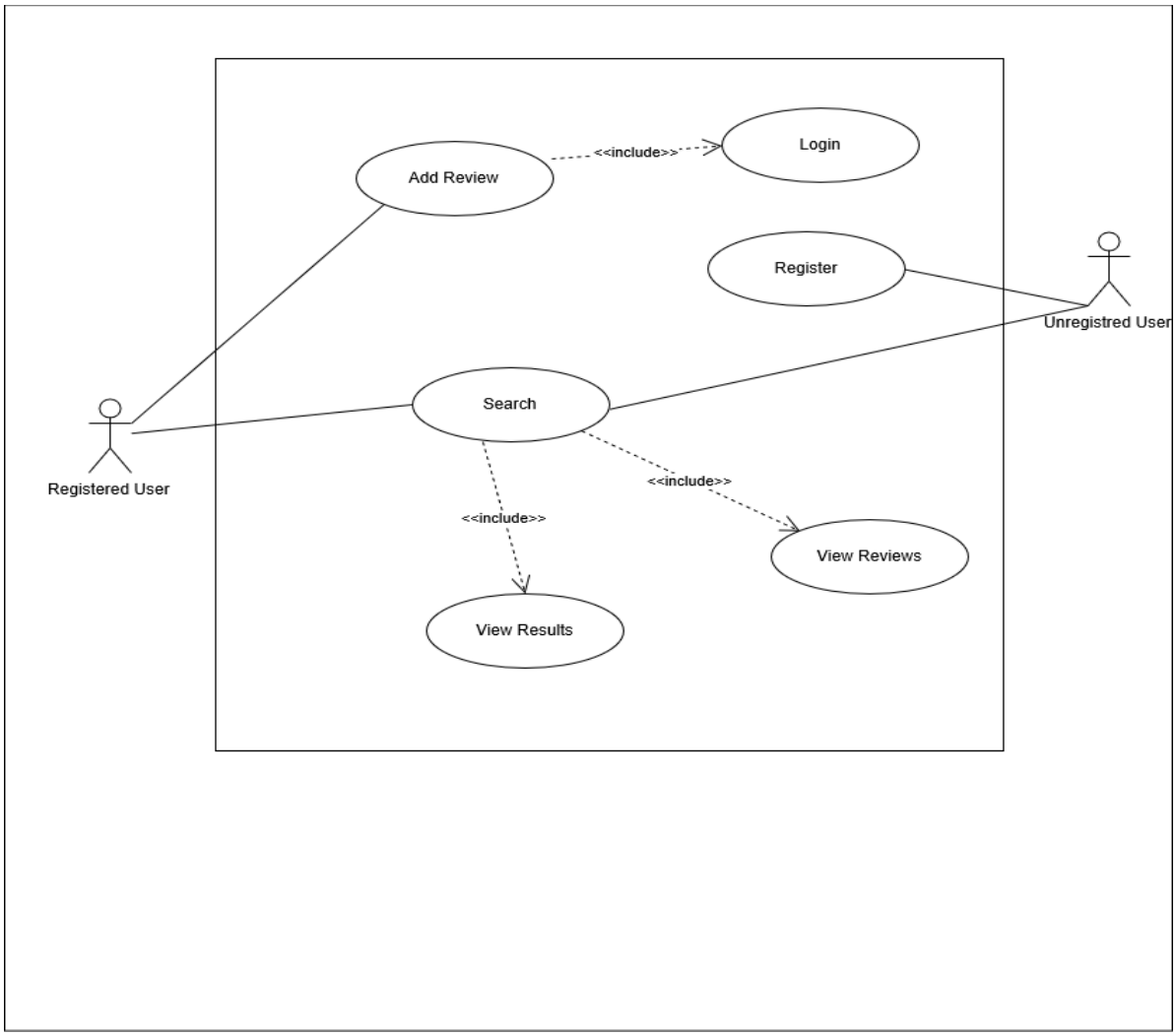

Figure 2.2.1.1: Use case diagram

Use case number	01
Use case name	Search
Actors	Registered Users Unregistered Users
Pre-conditions	Must have an active internet connection
Flow of event	1. Search for orders and offers 2. View most relevant results

Table 2.2.1.1: Use case for search function

Use case number	02
Use case name	Review
Actors	Registered Users
Pre-conditions	Must have an active internet connection
Flow of event	1. Add reviews for products and offers

Table 2.2.1.2: Use case for review function

2.2.2 Activity Diagrams

Search Function

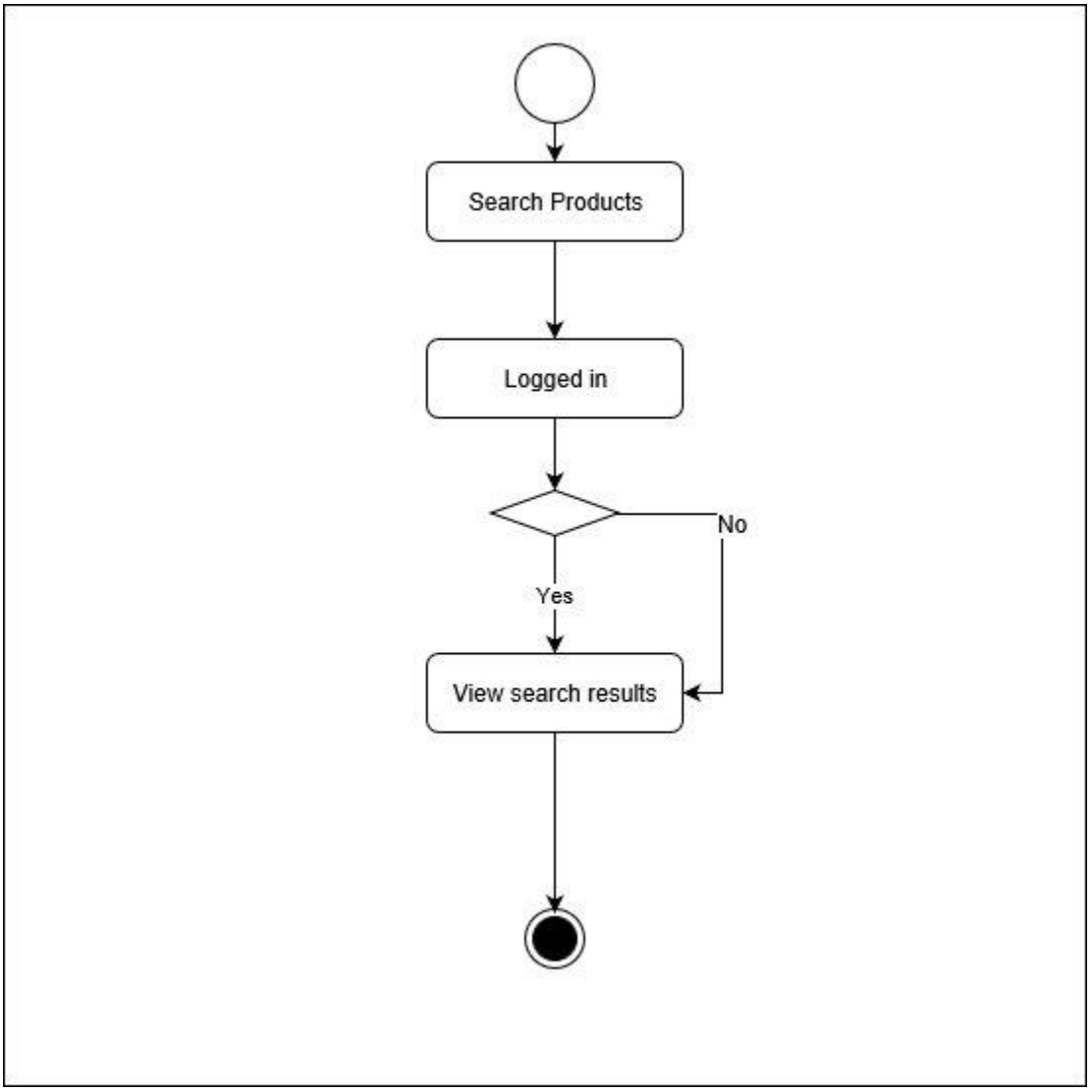

Figure 2.2.2.1: Activity diagram for Search function

Review Function

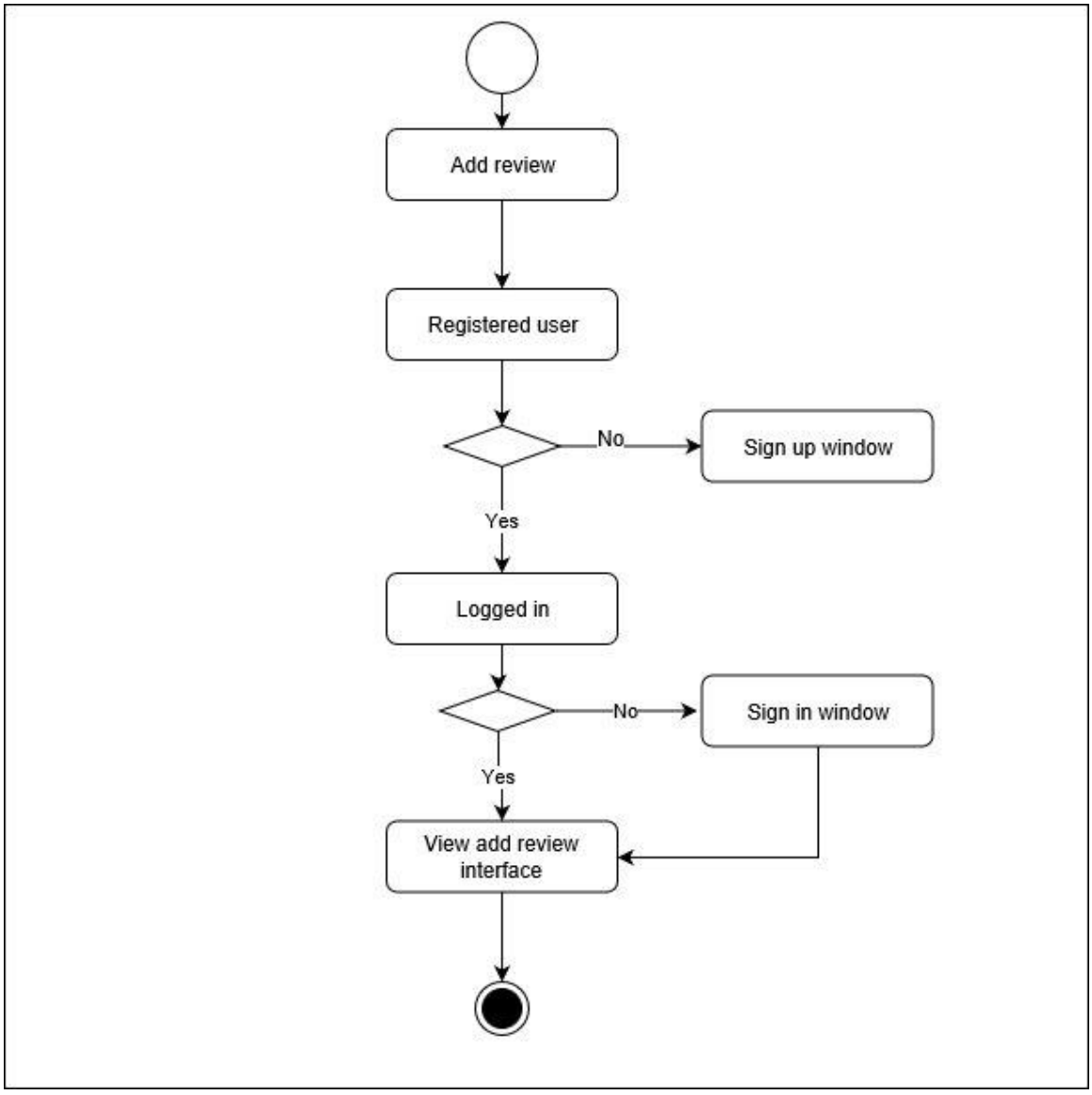

Figure 2.2.2.2: Activity diagram for Review function

2.2.3 Sequence Diagram

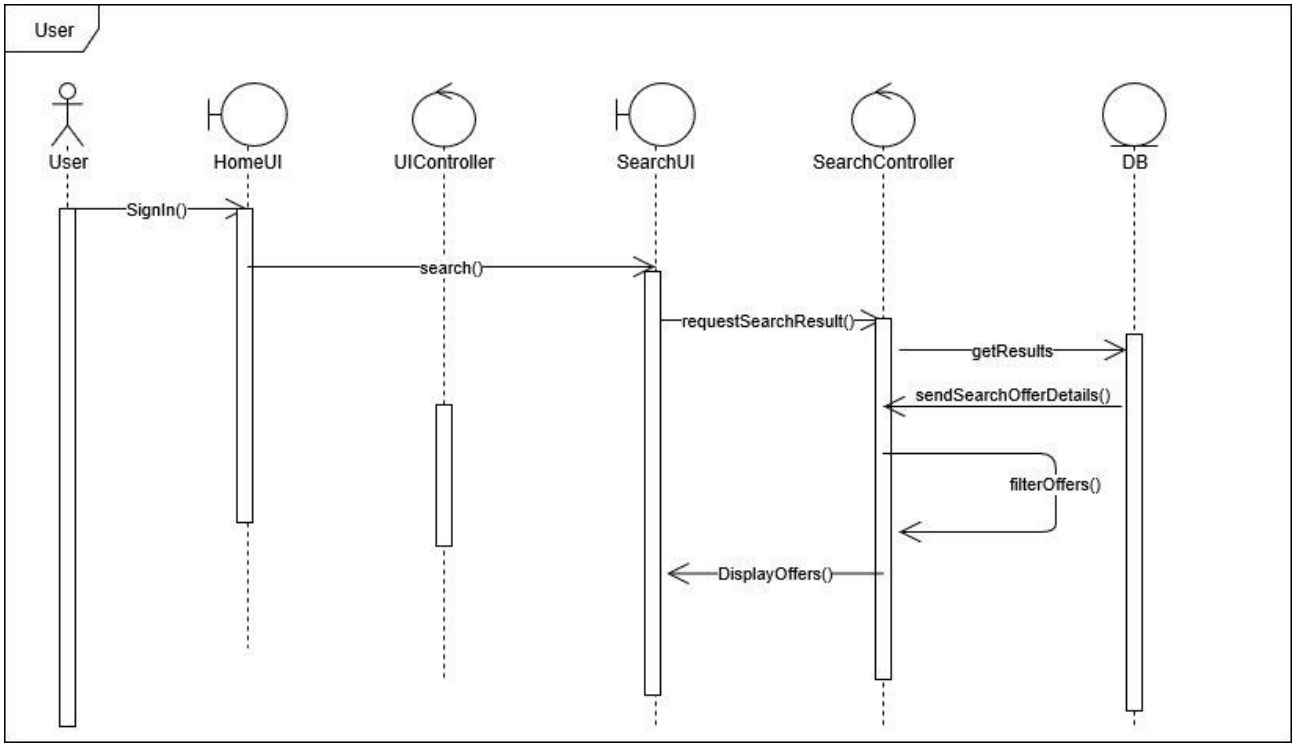

Figure 2.2.3.1: Sequence diagram for search function

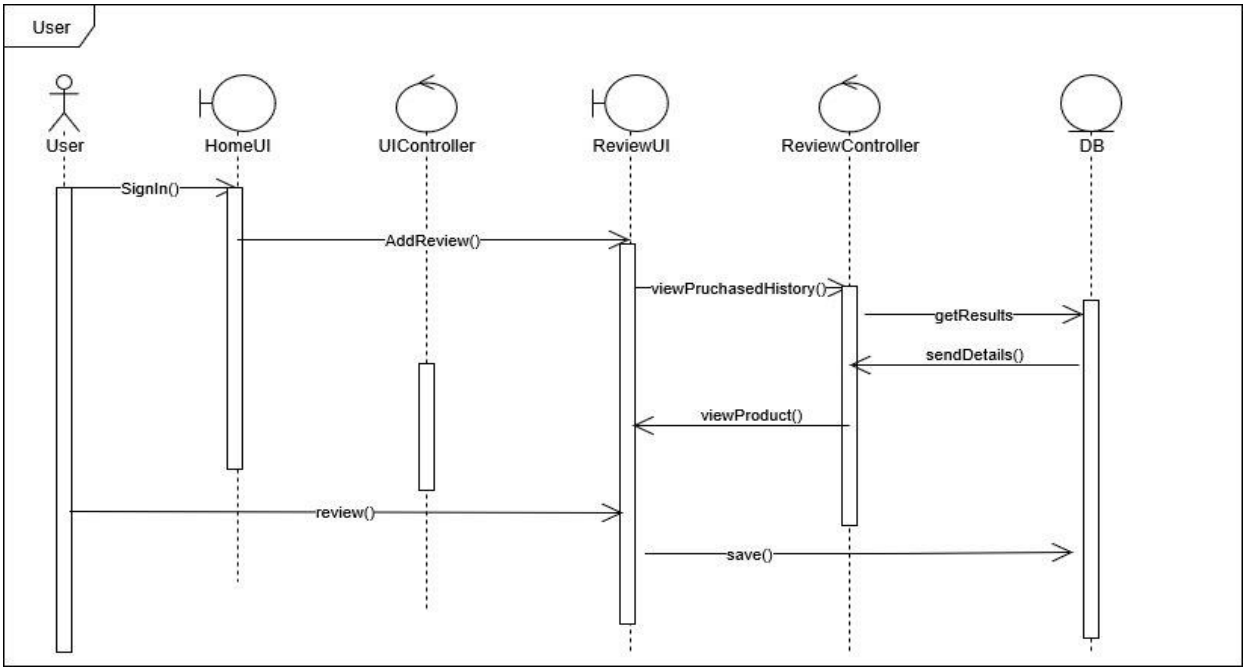

Figure 2.2.3.2: Sequence diagram for review function

2.3 User characteristics

- This system mainly focuses people which are familiar with ecommerce and ecommerce shops.

2.4 Constraints

- Search and review functionalities will only work if the mobile phone is connected to an active internet connection.

2.5 Assumptions and dependencies

- This cross-platform application is compatible with any android or iOS mobile phone running minimum android SDK: Android 4.1(Jelly Bean) or iOS version 7.
- Mobile phone is connected to mobile data or Wi-Fi when using the mobile application.

2.6 Apportioning of requirements

The requirements described in sections 1 and 2 of this document are referred to as primary specifications; those in section 3 are referred to as requirements (or functional) specifications. The two levels of requirements are intended to be consistent. Inconsistencies are to be logged as defects. In the event that a requirement is stated within both primary and functional specifications, the application will be built from functional specification since it is more detailed.

'Essential requirements' (referred to in section 3) are to be implemented for this version of 1.0.0.0. 'Desirable requirements' are to be implemented in this release if possible but are not committed to by the developers. It is anticipated that they will be part of future release. 'Optional requirements' will be implemented at the discretion of developers.

3 Specific requirements

3.1 External interface requirements

3.1.1 User interfaces

- **Search**

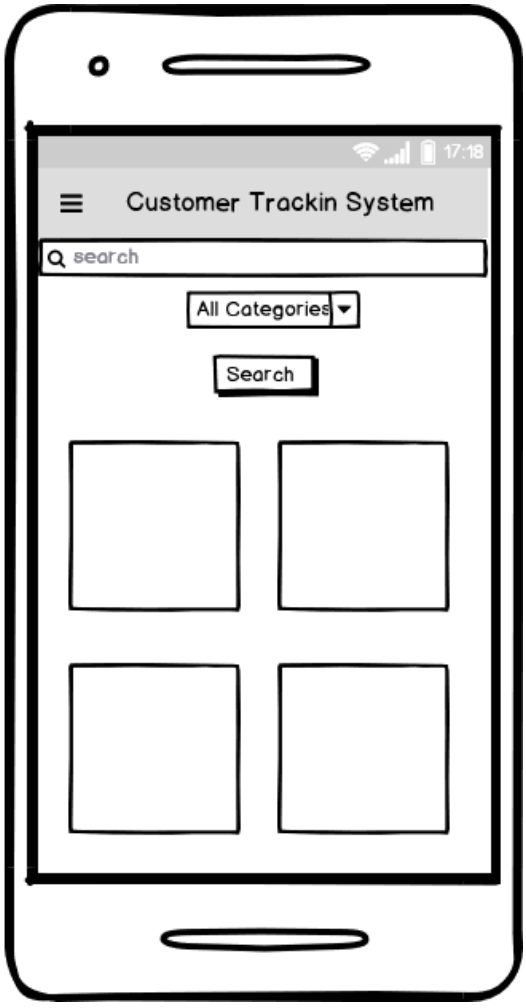

Figure 3.1.1.1: Search interface

Users will be able to search products through this interface. If users want to narrow the search, they can select a category from the dropdown. Then the search results will be shown from that category only. Search results will be displayed in the same interface.

- **Review**

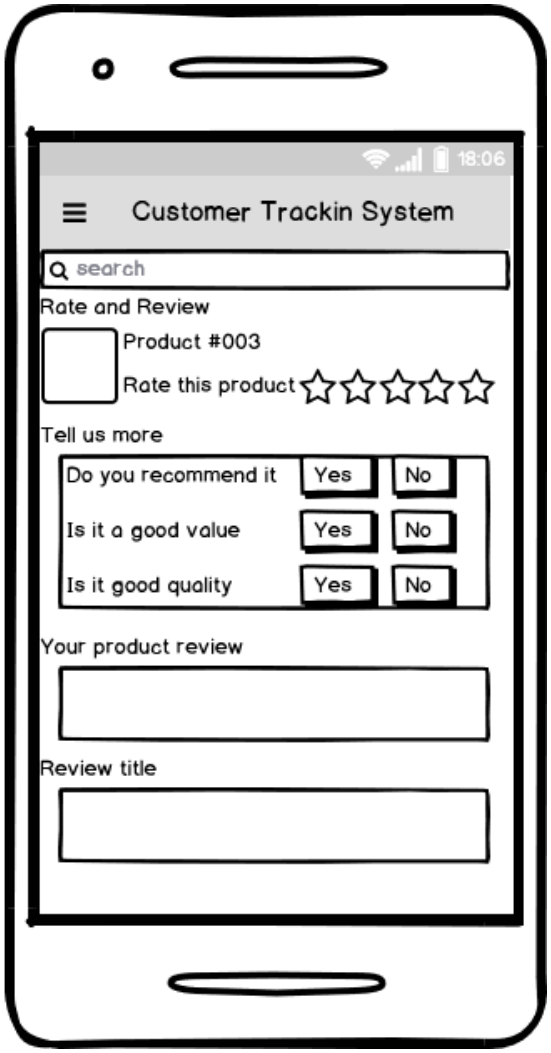

Figure 3.1.1.2: Review interface

Users will be able to products that they have been purchased through this interface. Through this, users will be able to share their experience with products and shops with other users.

3.1.2 Hardware interfaces

- Android or Apple phone running minimum SDK will need to use application.

3.1.3 Software interfaces

- Webstorm by Jetbrains – IDE for mobile application development.
- MongoDB – Application related data storage.
- TenserFlow – Framework for building machine learning models.

3.2 Classes/Objects

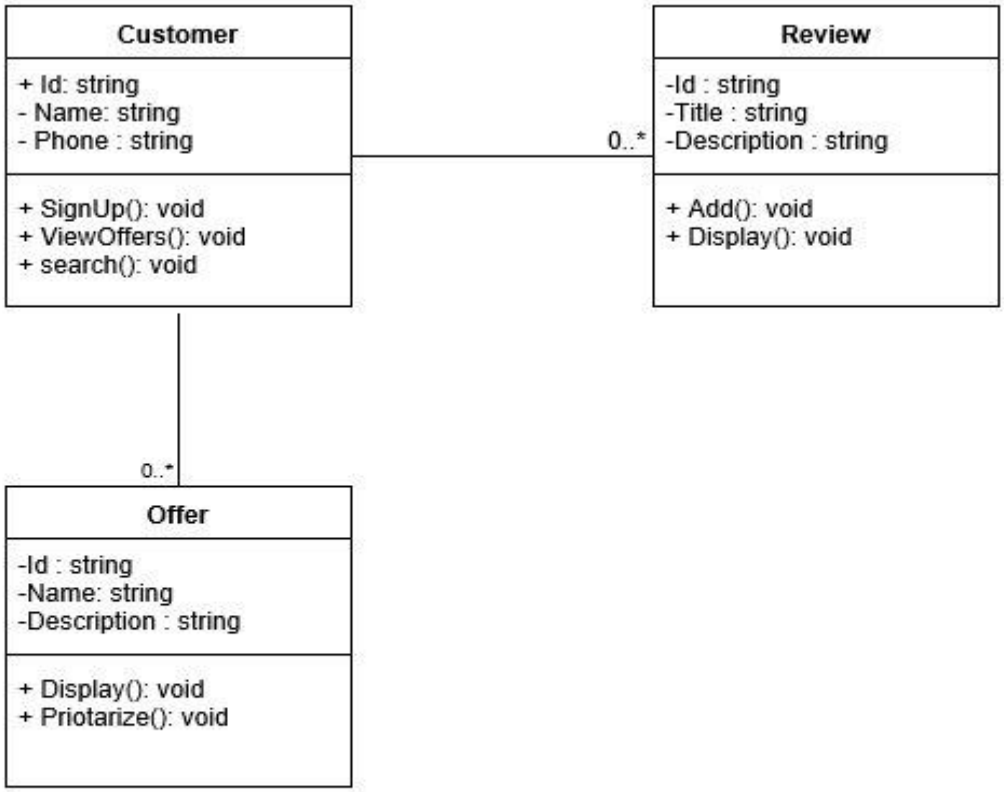

Figure 3.2.1: Class diagram

3.3 Performance requirements

- This mobile application will be developed for minimum android API level 16 and iOS 7, which will need phone having minimum of dual core processor.
- Minimum of 512MB RAM will be required.
- At least 100MB of free storage will be required to install the application.

3.4 Design constraints

- User interfaces must be simple, easy to use, attractive and consistent.

3.5 Software system attributes

3.5.1 Reliability

- Application should be able to perform search without any problems and should provide search results.
- Application should be able to store and retrieve user reviews without any problems.

3.5.2 Availability

- Application should be able to provide search results, retrieve or store user reviews at any time.

3.5.3 Security

- Users must be logged into their accounts before posting reviews.

3.5.4 Maintainability

- Proper coding standards will be used when developing the application which will increase the app maintainability.

3.6 Other requirements

3.6.1 Accessibility

- UI must be easily understandable for users with different experience levels.

3.6.2 Modifiability

- App should support modifications and cost of change must be low.

5 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] “WebEngage.com” [Online]. Available: https://webengage.com/