



Restaurant2Eat

An android application to find a restaurant just right for you

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Declaration Sheet

Presented in partial fulfillment of the assessment requirements for the above award.

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Abstract

The report includes the development of restaurant finder application that helps to search for restaurant, locate nearest restaurant from the user's geo location. Restaurant owners can add restaurant and these restaurants are viewed by users. The project has been developed as per assignment of Module Final Year Project published by University of Wolverhampton.

The project has been assisted and been developed under the supervision of the personal supervisor. The project was developed using USDP (Unified Software Development Process) where Unified Modelling Language (UML) diagrams are used for design and documentations. The project was developed using Java in android, firebase as Real-time database along with various tools.

There are several chapters in the report starting from introduction, literature and background research, development phase and conclusion to end the report. Appendix is kept at the end of the report after the reference section. Due to word limitations, appendix part was included in the report kept separate from the main report. The appendix is supporting material for the report. All the contents of this report are the result of continuous research in Google and various published research papers and whitepapers.

Table of Contents

1	Introduction	1
1.1	General Introduction.....	1
1.2	Problem Domain	2
1.3	Project Title	2
1.4	Project as a Solution	2
1.5	Academic Questions	3
1.6	Aims of the Project	3
1.7	Objectives of the Project	3
1.8	Artefact.....	4
1.9	Research Methods	4
1.10	Scopes and Limitations.....	4
1.11	Report Structure.....	5
1.11.1	Introduction	5
1.11.2	Background (Literature Review).....	5
1.11.3	Main Body of the Project	5
1.11.4	Analysis.....	6
1.11.5	Conclusion and Future Recommendation	6
2	Background (Literature Review).....	7
2.1	Android Based System.....	7
1.1.	Android based system.....	7
2.2	Initial Research	9
2.2.1	Distributed method	9
2.2.2	Real-time feedback and survey performed on the project	10

2.3	Research and Main Literature	11
2.4	Technicality of the project	12
2.4.1	JAVA.....	12
2.4.2	Firebase Server	13
2.5	Similar System	14
I.	Zomato.....	14
II.	Foodmandu.....	15
III.	Yelp Restaurant	17
2.5.1	Analysis and Comparison of Similar Apps.....	18
2.6	Analysis of the existing System.....	19
3	Main Body of the report.....	20
3.1	Tools used for the project.....	20
3.1.1	Android Studio SDK.....	20
3.1.2	Google Maps API	21
3.1.3	GitHub	21
3.1.4	Microsoft Visio	22
3.1.5	Balsamiq Wireframe	22
3.2	Initial Designs.....	23
3.2.1	Wireframes	23
3.2.2	UML Diagrams.....	34
3.3	Development Methodology.....	41
3.3.1	Considered methodology.....	41
3.3.2	Selected methodology	43
3.4	Testing and Evaluation.....	46

4	Analysis.....	71
4.1	Critical Analysis.....	71
5	Conclusion and Future recommendations.....	74
5.1	Summary of key findings.....	74
5.2	Future Recommendation.....	75
6	References.....	76
	Appendix.....	81
	Work breakdown Structure.....	81
	Gantt chart of the whole project.....	79
	Remaining Questionnaire.....	81
	Github repository log.....	84

List of Figures

Figure 1 Android Architecture (SPlessons, 2015)	8
Figure 2 Pie chart showing people facing difficulty to find restaurant at new place	10
Figure 3 Pie chart showing peoples opinion about restaurant finder application	11
Figure 4 Zomato Search Screen	15
Figure 5 Foodmandu: Add to cart Screen	16
Figure 6 Foodmandu:Catagories Scree	16
Figure 7 Yelp Restaurant: Search feature	17
Figure 8 Wireframe of Login Signup Screen	24
Figure 9 Wireframe of Login Screen.....	25
Figure 10 Wireframe of Signup	26
Figure 11 Wireframe of Home Screen.....	27
Figure 12 Wireframe of Restaurant category	28
Figure 13 Wireframe of Map Screen	29
Figure 14 Wireframe of Profile Screen	30
Figure 15 Wireframe of Restaurant Details	31
Figure 16 Wireframe of Admin Add Restaurant Screen	32
Figure 17 Wirefreame of Delete Restaurant Screen	33
Figure 18 Use Case Diagram of the Project.....	35
Figure 19 Event flow of use case	37
Figure 20 Sequence Diagram of Restaurant Owner	37
Figure 21 Sequence diagram of Customer App	38
Figure 22 Activity diagram of a Customer	39
Figure 23 Activity diagram of a Restaurant Owner	40

Figure 24 Phases of USDP methodology (Abbas, 2012)	44
Figure 25 User registration and validation.....	47
Figure 26 Firebase updated after successful signup	47
Figure 27 Testing as No field must be left empty	47
Figure 28 Correct password and Phone allows successful login.....	49
Figure 29 Account Creating unsuccessful as credential not matched	51
Figure 30 Account Creating unsuccessful as credential matched	52
Figure 31 Checking Credentials Figure 32 Unsuccessful Message	53
Figure 33 Login Successful (Home screen of Restaurant Owner)	53
Figure 34 Adding restaurant.....	55
Figure 35 Firebase after successful addition of restaurant.....	55
Figure 36 Validation check no field must be left empty	56
Figure 37 Added restaurant displayed on customers app	57
Figure 38 Updating the Added Field.....	58
Figure 39 Firebase after the field has been updated	59
Figure 40 Firebase After updating profile	61
Figure 41 Updating Profile.....	61
Figure 42 Firebase after comment has been updated.....	62
Figure 43 Test Comment on restaurant.....	63
Figure 44 Before and After Liking.....	64
Figure 45 Firebase after post has been liked	65
Figure 46 Review in app and Firebase after the review is posted	66
Figure 47 Search Feature	67
Figure 48 Comment from User's app	69

Figure 49 Comments displayed on owner’s app	69
Figure 50 Searching nearby restaurants	70
Figure 51 High Level Work Breakdown Structure	81
Figure 52 Initial Gantt chart of the project	79
Figure 53 Final Gantt chart of the Project.....	80
Figure 54 Survey response on people eating in Canteen.....	81
Figure 55 Difficulties faced to find restaurant at new place	81
Figure 56 Pie chart to show people who have searched restaurant online	82
Figure 57 Pie chart showing people searching restaurant online	82
Figure 58 Pie chart showing people agreeing on adding review system	83
Figure 59 Survey results on if Sentimental Analysis would be good in the application .	83

List of Tables

Table 1 Comparison of Similar Apps	18
Table 2 Test case Signup customer	46
Table 3 Test case Login Customer	48
Table 4 Test case Signup Restaurant Owner.....	50
Table 5 Test case Login Restaurant owner.....	52
Table 6 Test case Adding restaurant.....	54
Table 7 Test case to check if posts are displayed correctly	57
Table 8 To check if the update works properly.....	58
Table 9 Test case to check if the restaurant is deleted successfully	60
Table 10 Test Cast to update user profile	60
Table 11 Test case to test if the comment features work	62
Table 12 Test Case if the like functionality works.....	64
Table 13 Test case to check Review Function	65
Table 14 Test Case to check the search functionality	67
Table 15 Test case Comment update on admin app.....	68
Table 16 Test case to search for nearby restaurant.....	70

1 Introduction

1.1 General Introduction

Mobile Application abbreviated as Mobile App is the type of application software that is designed to run on mobile devices like; smartphone and tablet computers. These applications are more limited and are for specific functionality like, gaming, calculator, browsing. Mobile app takes advantages of both hardware and software of the mobile device to provide feature to the end user. Apps that use LBS (Location Based Service) are fundamentally built from the ground up for mobile devices given that this feature cannot be implemented on a PC as PC lacks location services (Techopedia Inc., 2017). Mobile app has been used in various sectors as of lately. Education, health, transportation, shopping, communication, restaurants and ordering food and beverages has all become easier through mobile application. Now, people seek for updated version of their day to day app and developers also have been constantly working on to provide update on timely basis through the user feedbacks to make user use their application. Due to this, there has been increase in app developers and new app development companies recently in the market (Oza, 2017).

Currently in the year 2019, there are two methods to develop mobile application. The two platforms for app development as per mid of 2018 are Android and IOS. As of mid-2018 about 88% of smartphone operate on android and 11.9% smartphone are running IOS (Statista, 2018).

Android was developed by Google back in 2007 and since then its popularity has grown immensely since its arrival and is now one of the most popular smartphone operating system. Over a course of decade, the android OS user has increased rapidly from 5.9 Million in 2009 to 2.3 Billion by 2018 (Statista, 2018).

1.2 Problem Domain

It's difficult to find desired restaurant whenever needed, when particular type of food type at a particular time. It is not possible to go street by street searching for the restaurant and for the food they desire is already a very tiring task. At this day and time with the advancement of technology the internet data consumption is increasing rapidly and so it is getting cheaper and faster. People tend not to go around places to search for a place to eat. Not every day a person wants to eat same type of food. Food taste keeps on changing and searching restaurant is not easy task. Everyone today carries a smartphone and most of them carry android smartphone. A mobile system is needed that searches for the restaurant at nearby location (LovelyCoding, 2018).

1.3 Project Title

Resturant2Eat is an android application which helps to search for desired restaurant at nearby places anytime.

1.4 Project as a Solution

Restaurant2Eat is a service oriented android application which will display the nearest restaurant location to the user according to their taste and food type. It is a platform where restaurant owner can register their restaurant update the information of restaurant so the customers (end-user) who are in search of restaurant can easily access the information provided. The users can search for the restaurant on the namely basis for the food they want to eat and review about the restaurant. The user can choose the food categories and search the desired restaurant (LovelyCoding , 2018). Logged in user can comment add reviews and rate the restaurants. Admin will view all the members comment of their respective restaurant given by the customers (end-user) (Fabbrizio, Gupta, & Mani, 2010).

1.5 Academic Questions

What are the problems faced by people who go out and find difficulties in searching the restaurant and what can be done to solve them?

1.6 Aims of the Project

The aims of the project are:

- i. To develop an android application that help to search for desired restaurant.
- ii. To develop a working prototype
- iii. To follow proper methodologies and time schedule
- iv. To generate final report

1.7 Objectives of the Project

The objectives of the project are:

- i. To combine wireless technology (mobile data and Wi-Fi) and Android platform to search for ideal restaurant
- ii. To enable real time feedback and review system.
- iii. To provide user-friendly mobile application to end user.
- iv. To build two separate app for admin (restaurant owners) as customers (end-user).

1.8 Artefact

Through research from various research papers and journals various key components were detailed for further evolvement of project, hence the proposed artefacts are:

- i. A mobile application prototype of restaurant locator application for android smartphone.
- ii. A mobile Application that uses Location Based Service (LBS) that helps to display the nearby restaurant by obtaining user's current location.
- iii. A mobile application that allows user to give feedback about the restaurant
- iv. A mobile application that displays nearby restaurant on real-time on the map.

1.9 Research Methods

Descriptive Research was conducted before the development of the project. Questionnaires was made using Google Forms and was distributed to over number of people through social media. The review was positive and mixed but the problem with most of the user was same, having difficulty to find restaurant at new place due to their food type and environment of the restaurant. The detailed research description is discussed in literature part of the report and the result from the research is kept in the appendix of the report.

1.10 Scopes and Limitations

The project focuses more for the people who eat out in restaurants but have difficulties in finding them because they are new to the place, they don't know how the food is and the environment of that place is. The age group focused by this application is mostly youngster aged grouped (18-25) because these aged group people are the one who travel a lot and are the most active people on the internet.

The app is in not really advance as it is the first version and further updates will assure its improvement. Likewise, the coverage is only limited to Kathmandu. In the future update and growing demand, the app will be implemented in the other places and new features will be added.

1.11 Report Structure

The report consists of the following topics:

1.11.1 Introduction

This section contains general introduction about the mobile application, problem domain and the project topic as solution to the problem. This section also explains the aims and objective of the project along with the artefacts to develop and possible scopes and limitations.

1.11.2 Background (Literature Review)

This section contains the research and investigation for the project and all the literature found during research phase are included here. Some similar mobile applications have been compared and evaluated in this section.

1.11.3 Main Body of the Project

This section includes the design documents for the project and also the wireframes, use case diagrams, entity relationship Diagrams, class diagrams and sequence diagram and activity diagram. This section also includes all the tools and techniques used for the development of the project and details about the artefact developed. It also includes the methodology used during the development phase of the artefact. All the testing performed under different circumstances and debugging if necessary are included as well.

1.11.4 Analysis

This section includes the analysis of the report and the outcome of questionnaires

1.11.5 Conclusion and Future Recommendation

This section includes summary of the report and future recommendation for the project (application).

2 Background (Literature Review)

Android operating system brought the revolution in the field of smartphone and computing. When no other companies competed against the first iPhone launched by Apple in 2007, Google announced beta version of Android OS in November 5, 2007 (Callaham, 2018). And same time around announced Open Handset Alliance (OHA) for the purpose of developing open mobile device standards. As it was open source the popularity of this mobile Operating System (OS) rumbled around all the other mobile development companies. Currently there are over 84 member companies working to develop open standards for mobile devices (Open Handset Alliance, 2011). Since then, everything since then has been technology and mobile devices have become more popular over desktop due to its compatibility and user friendliness. Researches have shown vast majority of people own a smartphone and mobile applications have become an integral part of life ([JMango 360, 2018](#)).

2.1 Android Based System

1.1. Android based system

Restuarant2Eat is an Android based system developed for android smartphones users. It uses android based User Interface for review and searching of the restaurant. For searching it uses location-based service, Location based service (LBS) allows Android OS to obtain the phone's current location. Android provides location manager at application framework layer and enables access of the location of the nearest restaurant and the user current geo-location. LBS have two services; obtaining the location and utilizing the location to provide service to user ([Kushwaha & Kushwaha, 2011](#)). User Interface is simple and easy to interact with not much complexity to design.

The android architecture is divided into five sections and four main layers:

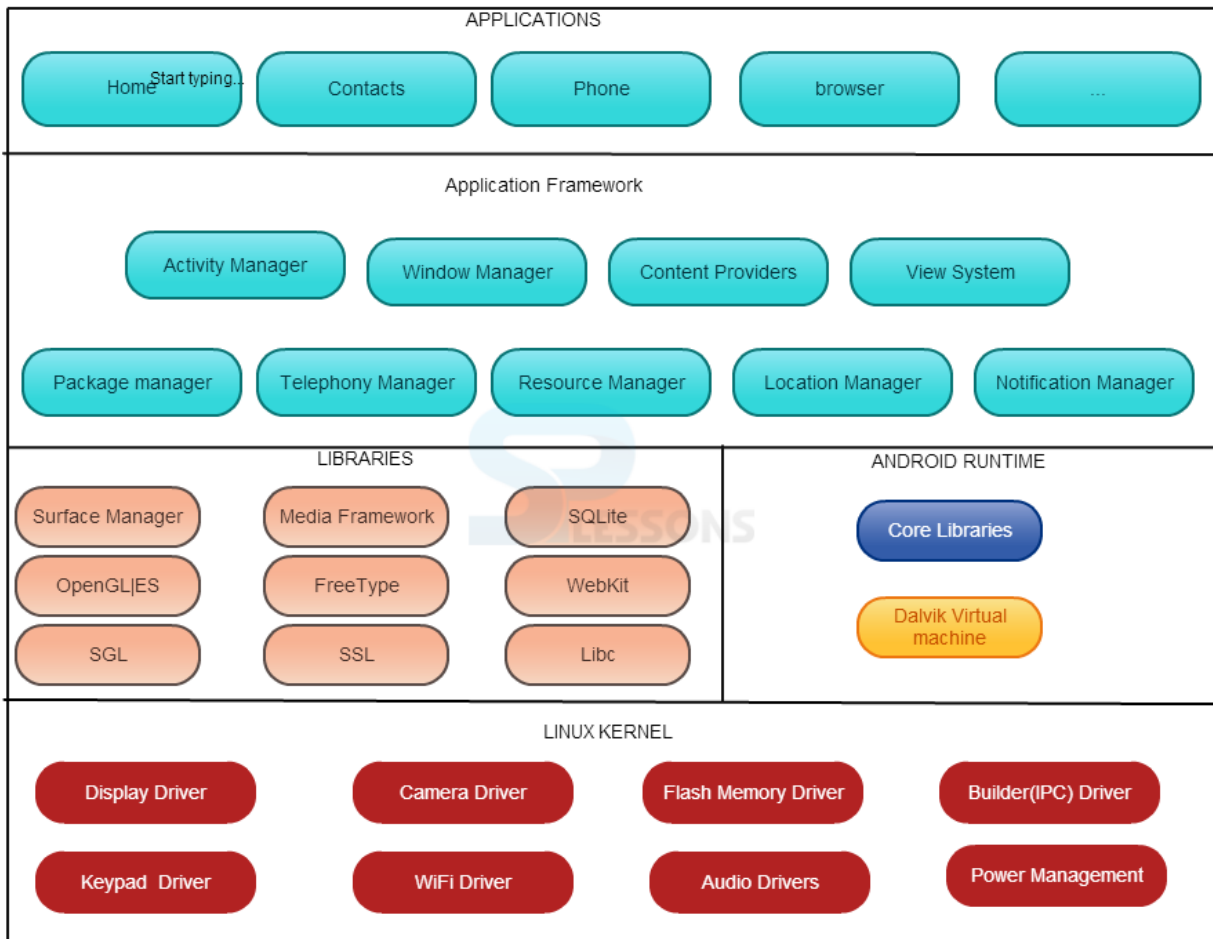


Figure 1 Android Architecture (SPlessons, 2015)

The lowermost and the most powerful layer of the android is the Linux kernel which supports wide range of hardware drivers. The kernel is the heart of the OS which manages all the input and output requests. On top of the Linux there are set of libraries for different kind of features like database, webkit, audio and video. Android Runtime is responsible for running application on the android devices. It provides a key component called Dalvik Virtual Machine (DVM). It optimizes memory, battery life and performance of the device. The application framework layers provide many higher level services windows manager, system manager, etc. and APIs like user interface (UI), location, content provider telephony. The application layer is the top most layer of the architecture.

Application are written and installed in this layer. Application like web browser, phone, and contacts run on this layer (Agrawal, 2015).

2.2 Initial Research

A questionnaire was created as part of initial research to get to know better about the need of the system. The dictionary definition of questionnaire is, "A questionnaire is defined as a research instrument that consists a set of questions or other types of prompts that aims to collect information from a respondent." (Bhat, 2015). It means as a part of research, basis information is collected from respondent that might be either open or close ended.

The research was basically unstructured as the data collected from this was qualitative data. The questions were basically very close ended (Bhat, 2015). The questions were really basic, followed the basic structure of unstructured questionnaire and some of them were branching and only few question asked for respondent's opinion.

2.2.1 Distributed method

The Questionnaire was sent over email and through other online medium like Facebook. One of the advantages of this system is that, it is very cost efficient as well as time efficient. The respondent can easily answer it during his/her leisure time and there is no pressure of time at all so the review is effective. Due to this the responses can be even more accurate (Bhat, 2015). Since, every coins has its two sides, this method of research has its disadvantage as well. Few of the people didn't respond to it and some of them responded it randomly with no proper information. These types of response were filtered out as it had impact on the total result.

2.2.2 Real-time feedback and survey performed on the project

The survey was conducted questionnaire, were sent through online medium Facebook to be precise. The responses were good and the feedbacks were very inspiring to develop the application. Most of the respondents were really supportive about this type of application in Nepal as it helps every individual to find a restaurant near to him/her whenever needed.

The questions that were asked were during initial survey are:

While travelling or going to new place, do you have difficulties finding restaurant?

32 responses

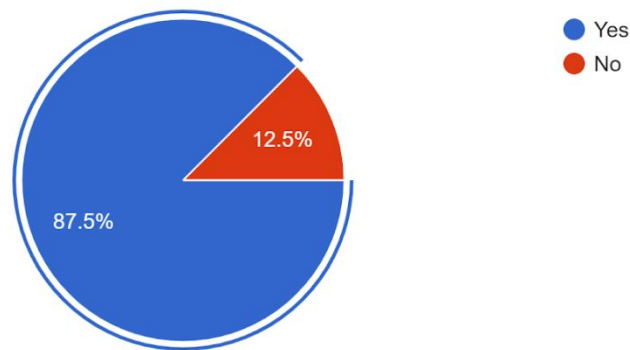


Figure 2 Pie chart showing people facing difficulty to find restaurant at new place

Out of 32 respondent majority i.e. 28 of them responded, they had difficulty in finding restaurants at new place which meant the scope of the project was feasible in the context.

What do you think of a mobile application to search for restaurant

32 responses

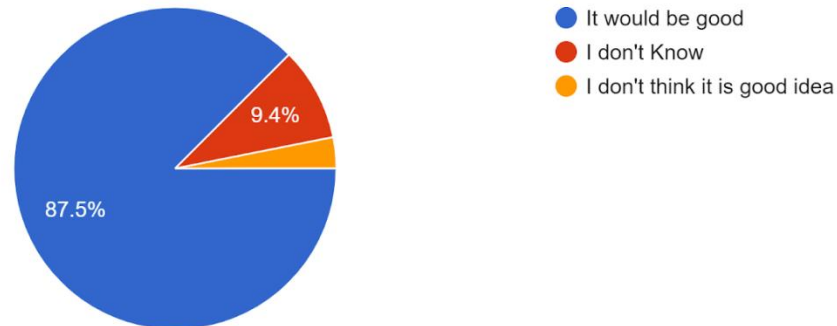


Figure 3 Pie chart showing peoples opinion about restaurant finder application

Likewise, the same numbers of respondent were positive about the mobile application. So, the initial analysis proved that the mobile application would be feasible. The remaining questionnaires are kept in appendix part of the report.

2.3 Research and Main Literature

Through the initial research it was found that smartphone have serviced people in a lot of day to day activity. Online food ordering, searching restaurants, hotels through mobile apps have become common. Foodmandu, Bhojdeals, 911FoodExpress are among the most common and popular food ordering systems in Nepal (Quora, 2018). Likewise, Zomato, LocalEats, UberEats and Have2eat are some of the example of restaurant finder apps that searches for restaurants. These applications help user to find and assess nearby restaurants. But in Nepal there are no such dedicated mobile apps that searches and find a restaurant. (Allen, 2014).

Restaurant2Eat is one of the first restaurant locator applications in the Nepalese context. It is an Android based system developed for android smartphones users which uses android based User Interface for review and searching of the restaurant.

User Interface is simple and easy to interact with not much complexity to design. User can add review about various aspects of restaurant and like if they like the services offered by the restaurant which can be viewed by other people before going to the restaurant. End users can update and maintain their profile in the application and users can choose the food categories and search the desired restaurant through this app. Restaurant2Eat will improve the relation between the owner of the restaurant and the customer. Commenting feature and liking feature is one of the feature which helps to improve restaurant's quality and different other aspects like food, environment, price as well (Fabrizio, Gupta, & Mani, 2010). It is important to be aware of data privacy of each and every user. The application is aware of this kind of threats and all the users data are secured in firebase so breaching of personal information is protected. Apart from this, registration is also really easy as people need not connect to any social network site. Signing up is through mobile number of the user so, signing up is easier and takes only few minutes. Restaurant Admin can manage and moderate their posts, view the reviews of their restaurant through the restaurant app (Zozulya, 2017).

2.4 Technicality of the project

2.4.1 JAVA

Java is a programming language released by Sun Microsystems in the year 1995. From the data of 2013, over 3 billion devices run on java (Hess, 2013). This clarifies it is the most popular programming language. Some of the features have made Java stand out of the crowd. Java was built with the philosophy of "Write Once Run Anywhere" (WORA). It is object oriented language, which is one of the popular programming styles. Java code is capable of running in any platform without any modification (Programwiz, 2017).

Java is first official language for android development so, it is the first and foremost option to develop android app. Most of the apps in play store built with this app and Google's support are also available (Sinicki, 2017). Kotlin was another language that was an option. Although was easier to learn but Java was

chosen over Kotlin as, programming skills and knowledge of java was better because it was taught over previous 4 semesters.

2.4.2 Firebase Server

Firebase is Backend as a Service platform for mobile and web app development that provides developer with tools and service to help them with their development work. Firebase is a Real-time database is a cloud-hosted NoSQL database that lets user to store sync data in real-time which stores data for future use. Apps connected to Firebase are connected are connected through WebSocket rather than through normal HTTP (Esplin, 2016). Real-time syncing helps user to access data from anywhere and makes users' collaboration easy and fast. Firebase stores files in binary format. It provides security, and ensure network resiliency (Google, 2016).

Besides Firebase, other available cloud servers are: AWS Mobile, Azure Mobile, IBM Bluemix, Kinvey. Since Google own firebase and provides constant updates and These are some of the major reason for choosing Firebase Database over any other databases.

2.5 Similar System

I.Zomato

Deepindra Goyal with his friends and colleague came up with a mission for no one to ever to have bad meal ever again, by helping people discover great places to eat around them back in 2008. It was based on an idea to enable user to order food from the local restaurants and find the restaurants nearest the user and In the span of decades, it has emerged as India's largest online restaurant discovery service. Currently there are various outlets all over the country 4000 outlets serving Mumbai alone. It allows viewer to write reviews about the restaurant and its food. Top Brands and restaurant are listed with all the cuisines and features of the restaurant (Dhaliwal, 2015).

Zomato received initial investment of 4.7 crore from Edge-India in 2010 due to its popularity and growth in the market. The preceding year saw the increase in capital to Rs. 13.5 crore. Currently the company generates 95% of its annual revenue from the advertisement itself (Dhaliwal, 2015). In the Fiscal year 2018 itself it generated annual revenue of \$100 million dollars (Srinivasan, 2018).

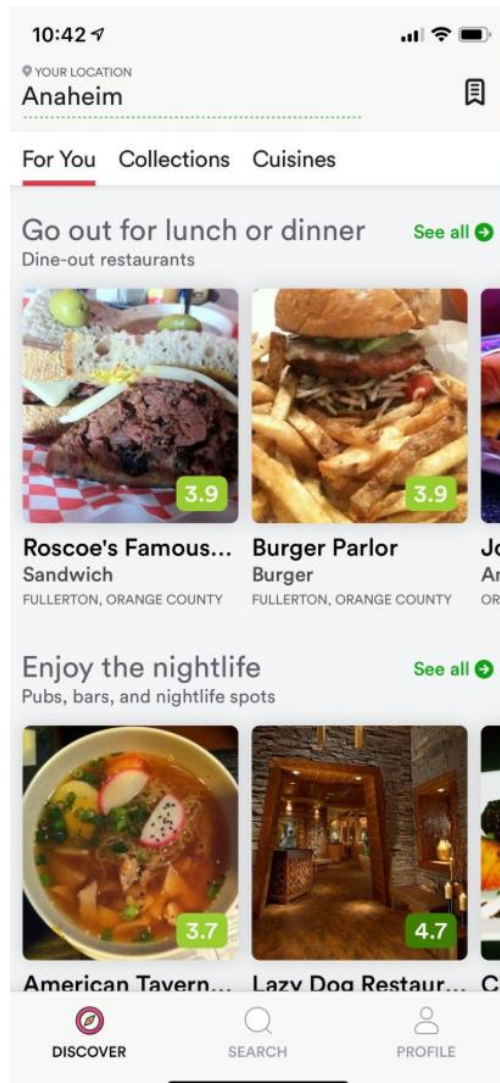


Figure 4 Zomato Search Screen

II. Foodmandu

Foodmandu is one of the leading food delivery app which has revolutionized the Kathmandu value. It is first of a kind in Kathmandu and delivers food all around the Kathmandu valley from over 130 known restaurants which includes most of the popular restaurant which serves multi cuisine from Nepali to international well under 45 minutes around Kathmandu valley. Clients can order foods from their favorite restaurant. The user friendly UI allows users to easily search for their favorite restaurants and menu. It was developed using Android SDK. programming language used was JAVA (Bhattarai, 2017).

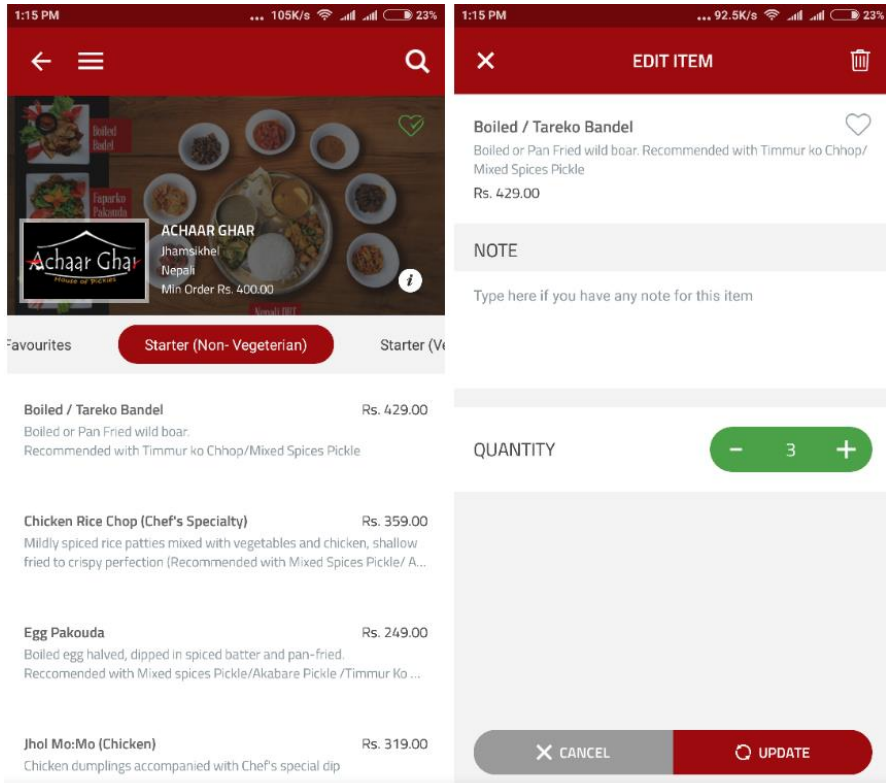


Figure 5 Foodmandu: Add to cart Screen

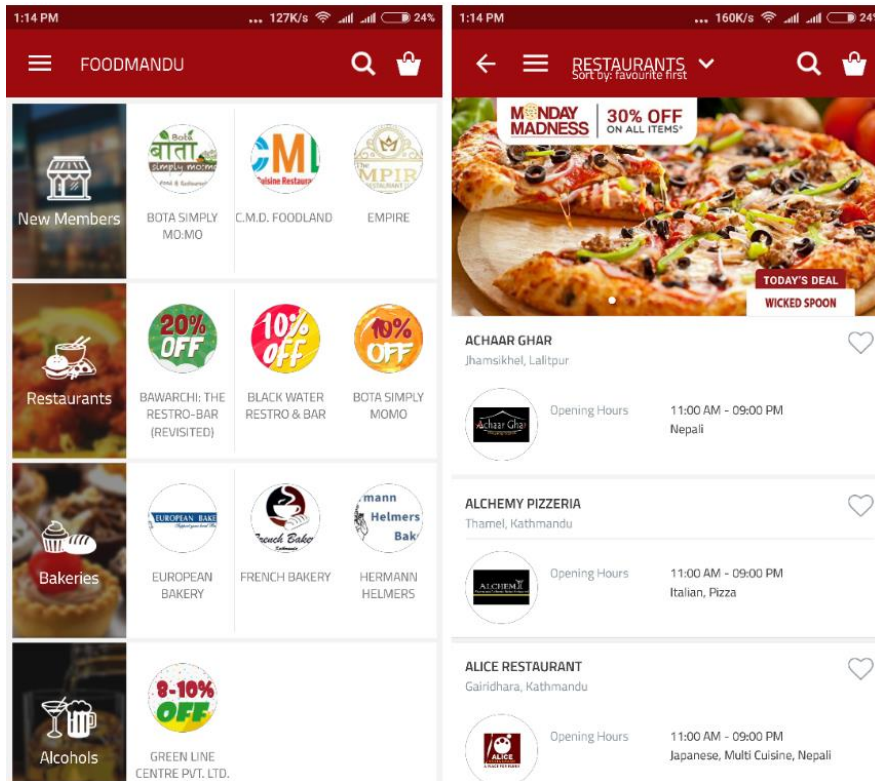


Figure 6 Foodmandu:Categories Screenshot

III. Yelp Restaurant

Yelp is one of the biggest and best mobile app that started way back in 2004 that helped people find great local businesses like dentists, hair stylists and mechanics. The scope of this project was not limited to this. Yelp Restaurant made it easy for local users to easily search for nearby restaurants, read reviews, and even view great local deals and photos of the place. Users have written more than 177 million reviews by the end of 2018. Yelp restaurant is one of the best and biggest in the business when it comes to searching nearby places (Yelp, 2019).

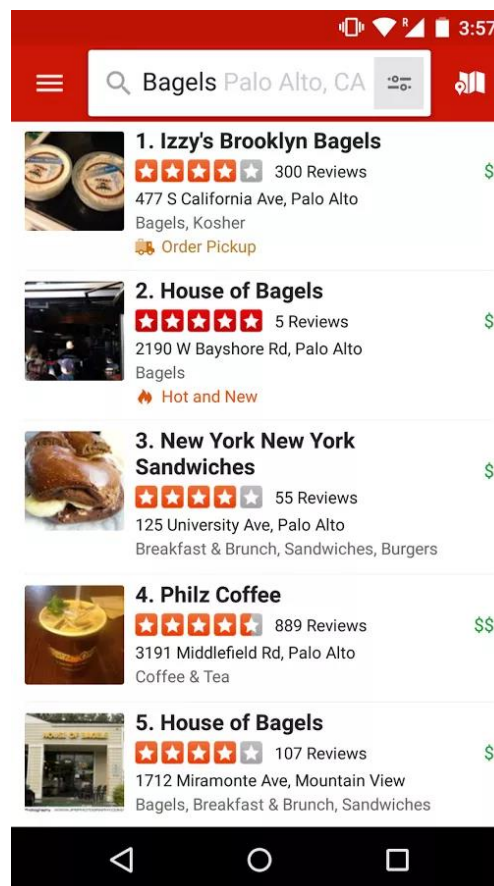


Figure 7 Yelp Restaurant: Search feature

2.5.1 Analysis and Comparison of Similar Apps

Similar Application	Zomato	Foodmandu	Yelp	Restaurant2Eat
Mission	Discover great places to eat around you	Order food from the widest range of restaurants.	Find the Best restaurant in Town	Find ideal restaurant just right For you
Coverage area	24 countries (Nepal not included)	Kathmandu	32 Countries (Nepal not included)	Kathmandu
User Profile	Yes	Yes	Yes	Yes
Separate App For Restaurant Owner and end user	No	No	No	Yes
Ordering system	Yes	Yes	Yes	No
Restaurant Review System	Yes	No	Yes	Yes
Database/Storage Type	MySQL with MEMCACHE	Realm Database	MySQL	Firestore(NOSQL)

Table 1 Comparison of Similar Apps

2.6 Analysis of the existing System

Upon proper evaluation it can be stated that all these application has great features and have been serving thousands of people on daily basis. The business model and uniqueness of idea has made it stand out in the current market. Although these applications have a lot of advantages, there are some features and limitations that are holding them back.

The research and finding about the Yelp showed that Users had a hard time finding the share link, eventually resulting the users to take screen shots or retying the name or type of restaurant. It might seem a small problem considering how big the business is but these small things are to be considered for long term (Madison Holbrok, 2018). System like Zomato has special privileges for its premium (patrons) users. Only these users are able to view the details of the restaurant. Also, these systems are not available in the context of Kathmandu (Nepal) (Diwan, Gawade, Patil, & Thigle, 2016). So, using these systems is not possible as these international applications are not available in Nepal. There are not many apps with the business model here, rather the ones available are more into food ordering and delivering. Restaurant searching, finding and review are not available in Foodmandu. Foodmandu is generally for delivering foods from multi-cuisine restaurants into the doorsteps (Bhattarai, 2017). Ordering and delivering of food can be added as new business model in the further updates of the new application when more restaurants are registered using this application. If possible, features like adding chat bot, restaurant recommendation according to food type of the user on can be implemented. Thus, research of analysis of these existing systems helped to find some of the limitations of the existing system that can be taken in consideration and well implemented in the new system.

3 Main Body of the report

3.1 Tools used for the project

Various tools were used during the development of the project. Categorized as hardware and software tools for the project, the list of Software tools used in the project are:

3.1.1 Android Studio SDK

Android studio is the official Integrated Development Environment (IDE) for Google's Android operating system, built on Jet Brains' IntelliJ IDEA software and designed specifically for Android development. It was released by Google in 2014. The Android SDK includes sample projects with source code, development tools, an emulator, and required libraries to build Android applications (Rouse, Android Studio, 2018).

As android Studio is the official IDE developed by Google, it is supported not only by Google, but also by a huge and actively engaged community of Android developers so Android Studio was preferred over Eclipse as before Android Studio they were preferred IDE (Stone, 2018). Some of the features that define the Android Studio SDK over other IDEs are: a flexible Gradle-based build system, Instant Run to see the changes without installing the mobile application. GitHub Integration helps to easily push and commit codes whenever needed (Developers Android, 2018).

3.1.2 Google Maps API

Google Maps is a web based, web mapping service developed by Google that provides detailed information about a physical region. It provides satellite imagery, aerial photography, street maps, 360 degree street view (Rouse, whatis techtarge, 2019).

Google Maps Application Program Interface (API) makes it possible for developers of website and mobile apps to embed Google Maps into their website of mobile application. There are various APIs provided by Google Maps, most popular being Distance Matrix API, Places API, Street View Static API, Directions API (Rouse, whatis techtarge, 2019). Some of the other Maps APIs like Fencer API and Fencer API were also available but due to lack of documentation and tutorials on these API on the internet, Google Maps API was preafereed.

3.1.3 GitHub

GitHub is a web-based version control and collaboration for software developers founded on 2008. It holds Saas (Software as a service) as its business model. It creates repository of the source code of the projects, all the previous version and changes made in the code are stored (Rouse, DEFINITION GITHUB, 2018).

GitHub was used over some of the other VCS like; AWS CodeCommit, GitLab, GitBucket because of its efficient integration with Android Studio as commit, push was easier through the IDE itself once GitHub was logged in from the android studio.

Besides, these for designing wireframes, UML diagrams, Gantt chart following software tools were used:

3.1.4 Microsoft Visio

MS Visio is one of the many diagramming and vector graphic application under Microsoft family. UML diagram helps to sight the behaviour of the system so this core architecture is developed using MS Visio. MS Visio contains various designing tools that helps in easy making of use cases, activity diagram, and communication diagram in short time (Krause, 2017).

Microsoft Visio was used to make Gantt chart, UML diagrams in the design stage of the project. Making diagrams Using Visio are faster and easier than using any other online drawing tools and software.

3.1.5 Balsamiq Wireframe

Balsamiq Wireframes is a UI wireframing tool for drawing, sketching on to a computer itself. It focuses on structure and content, avoiding lengthy discussions rather, it's like a prototype before the development of the real project and helps to know more about the design part of the project (Balsamiq wireframes, 2016).

Balsamiq Wireframes was used for developing wireframes for the project, Initial design or layout was developed and later on this design was implemented on the project itself with few changes.

3.2 Initial Designs

3.2.1 Wireframes

Wireframes are used in early development phase of software development life cycle. They are used to design a website, app or any software at the structural level. The development of the application will be done on the basis of the wireframes built. It establishes the basic structure of a page/screen before visual design and content is added. All the key interface elements on a particular screen is demonstrated on a single wireframe (experienceux, 2019). The initial design can be changed so wireframing stage is really very important once the design is completed and anything in the development phase needs to be changes it is really very difficult to change the design of the product. It takes time and labor.

Wireframes were created as Initial designs. 10 wireframes were created, the designs were changed as per requirement but most of the designs were the same. The wireframes of the project are designed below.

I. Screen to either Login or Signup (Admin and User)



Figure 8 Wireframe of Login Signup Screen

II. Login Screen (Admin and User)

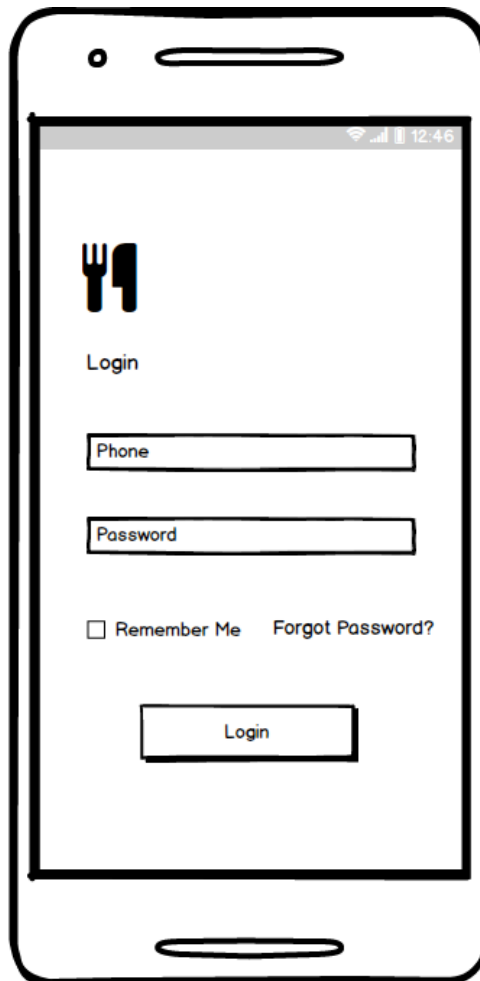


Figure 9 Wireframe of Login Screen

III. Signup Screen (Admin and User)

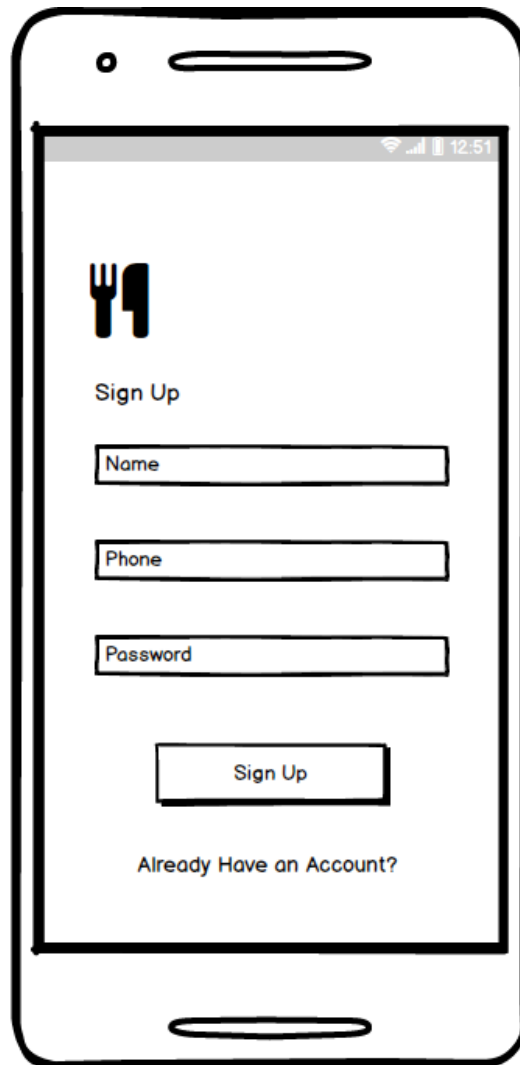


Figure 10 Wireframe of Signup

IV. Home Screen (User)

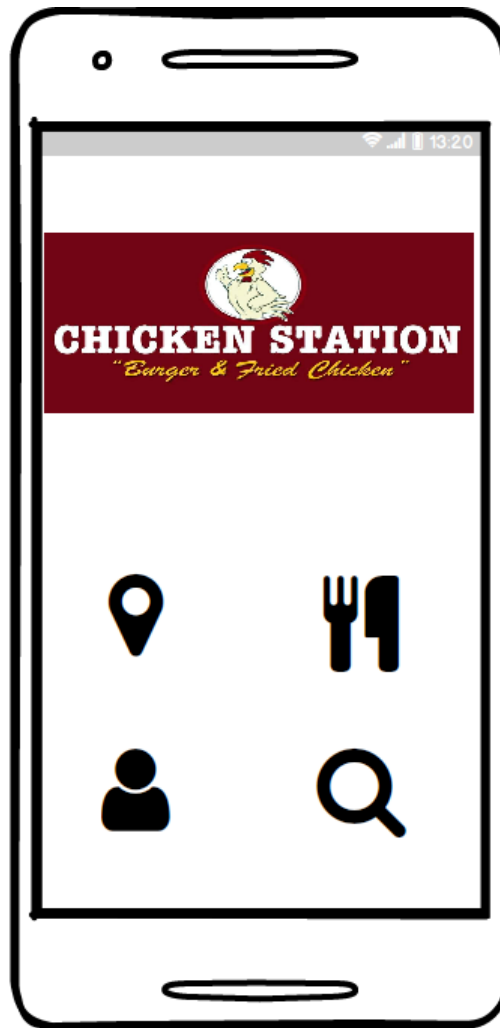


Figure 11 Wireframe of Home Screen

V. Category Screen (User)

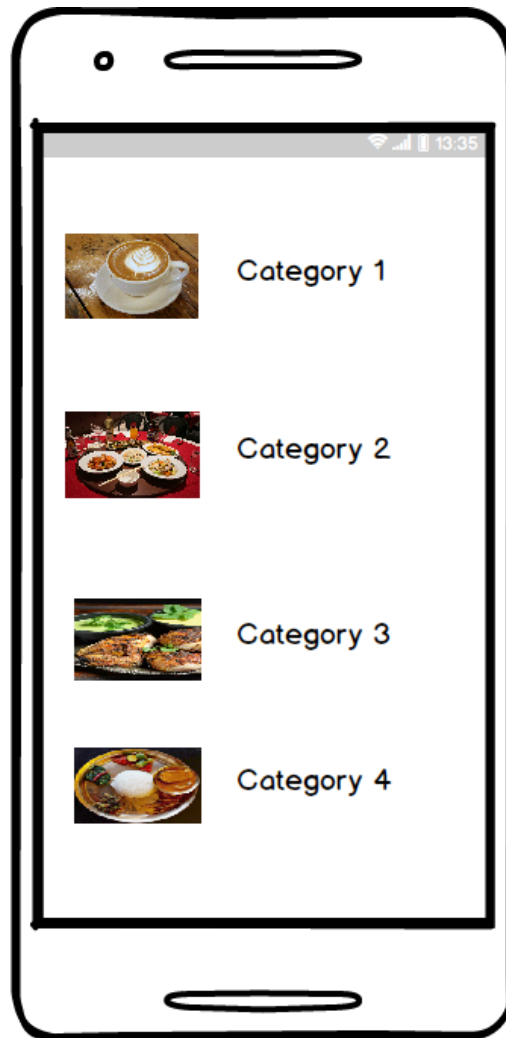


Figure 12 Wireframe of Restaurant category

VI. Map Screen User(User)\

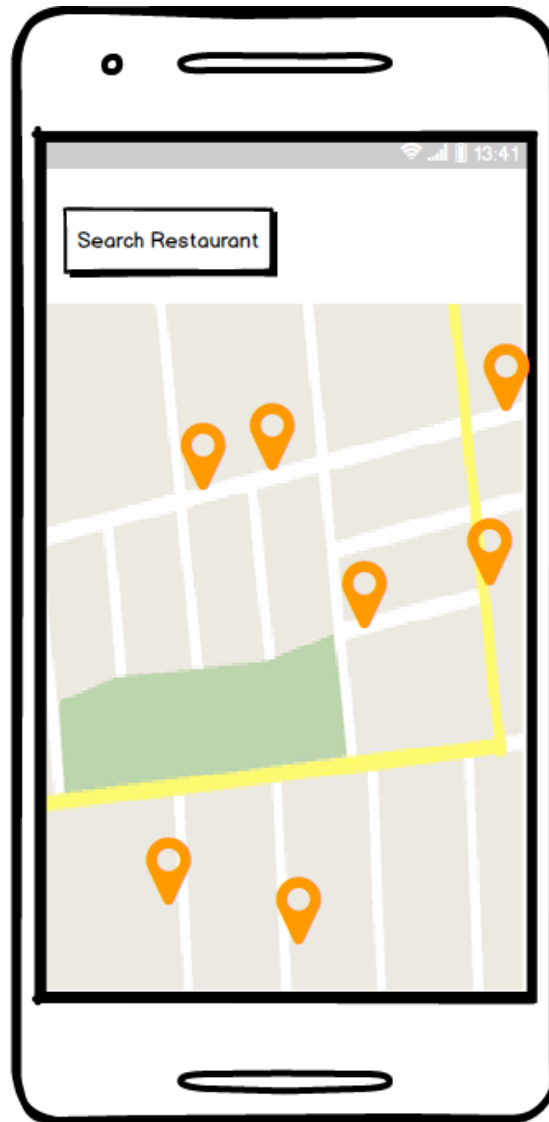


Figure 13 Wireframe of Map Screen

VII. Profile Screen (User)



Figure 14 Wireframe of Profile Screen

VIII. Restaurant Detail (User)



Figure 15 Wireframe of Restaurant Details

IX. Add Restaurant (Admin)

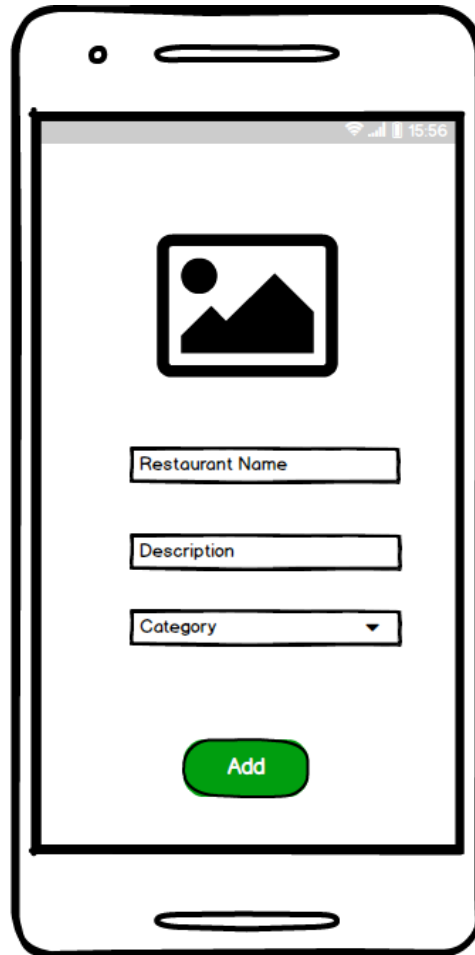


Figure 16 Wireframe of Admin Add Restaurant Screen

X. Delete Restaurant (Admin)

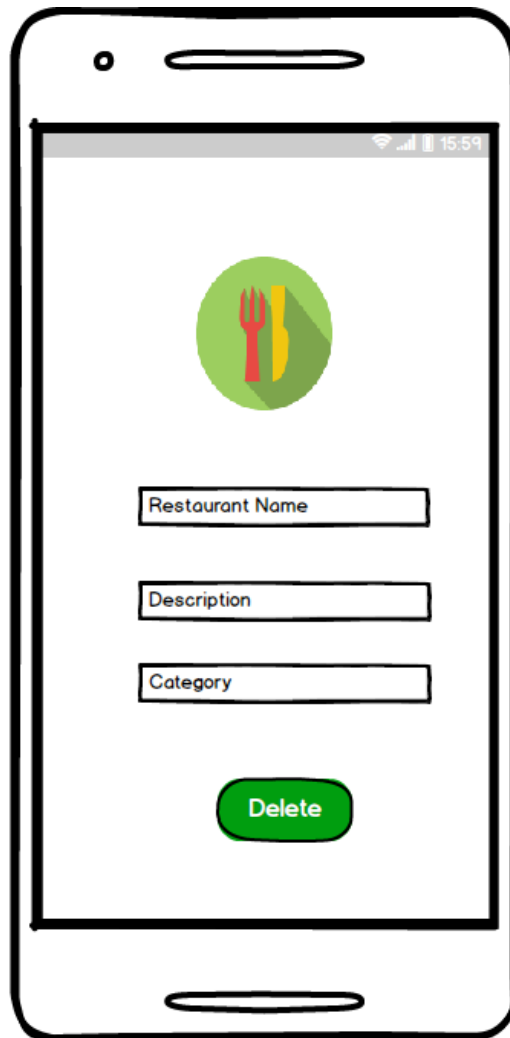


Figure 17 Wireframe of Delete Restaurant Screen

3.2.2 UML Diagrams

UML diagrams are integral part of software development. UML diagrams are based on UML (Unified Modeling Language) with the purpose of visually representing along with its main actor, roles, actions, artefacts in order to understand the system better. These diagrams are used to portray different aspects and features of a system. The visual representation helps better understand about the system and the errors and flaws in the system in the initial stage of development (Ceta, 2018).

There are several types of UML diagrams and each of these diagrams has their own purpose. But as a whole these diagrams analyze and portray the structure of a system or process and describe the behavior of the system. Three UML diagrams were design as part of the development methodology (Ceta, 2018).

Three of the UML diagrams are:

- Use Case Diagram
- Sequence Diagram
- Activity Diagram

3.2.2.1 Use Case Diagram

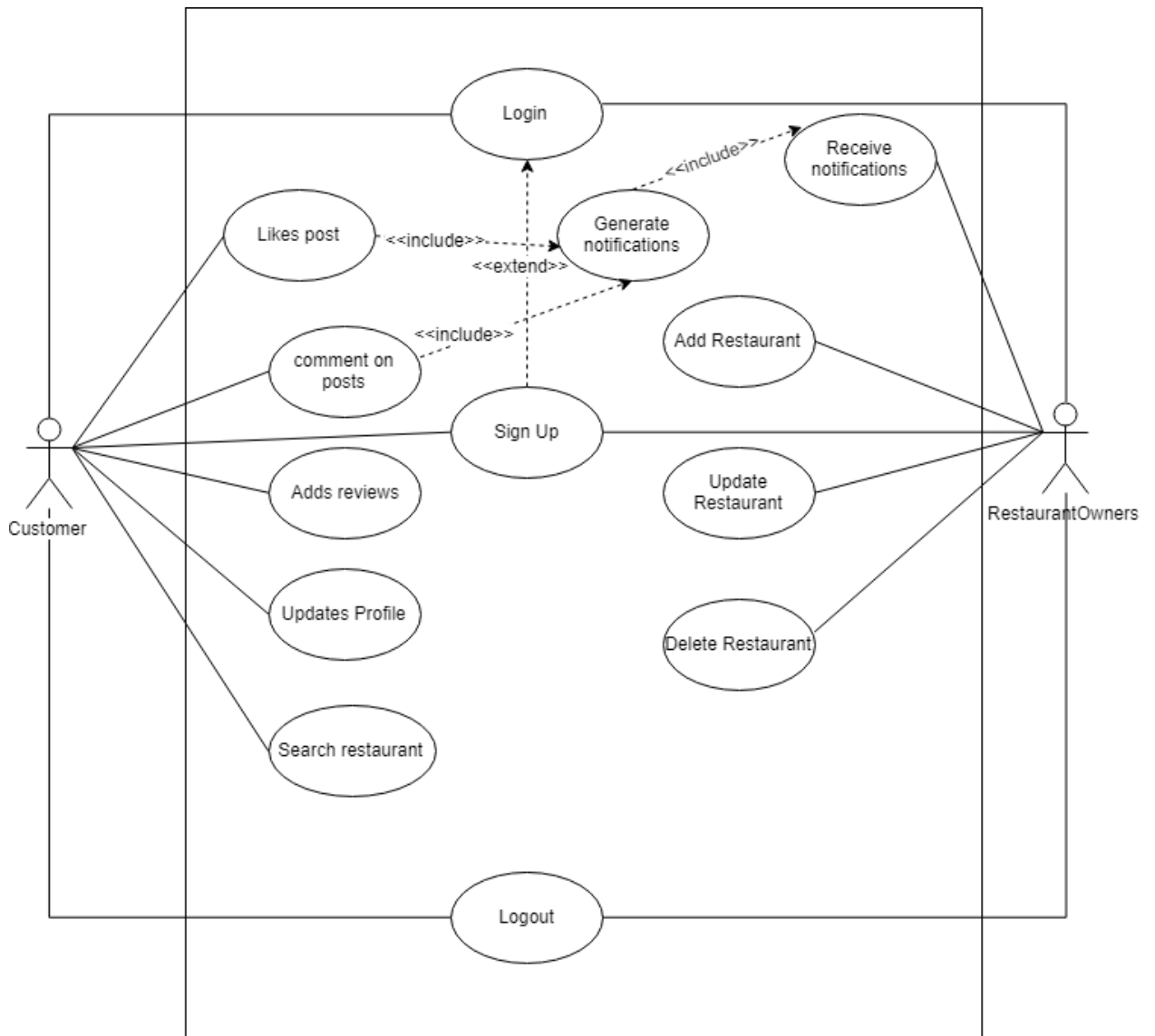


Figure 18 Use Case Diagram of the Project

The above figure shows the Use case diagram of the whole project. The table below shows the event flows occurring in above use case diagram.

Use case name	Description (Main Flow of Events)
Login	<ul style="list-style-type: none"> ➤ Customer login into the home screen having valid credentials. ➤ Restaurant Owners login into their dashboard having valid credentials
Signup	<ul style="list-style-type: none"> ➤ Customer signs up into the system filling in the form. ➤ Restaurant .
Likes post	<ul style="list-style-type: none"> ➤ Customers can like restaurant posts uploaded by restaurant owner
Comment on Post	<ul style="list-style-type: none"> ➤ Customers can add comments on restaurant posts uploaded by restaurant owner
Add reviews	<ul style="list-style-type: none"> ➤ Customer adds review on various aspects of restaurant.
Update Profile	<ul style="list-style-type: none"> ➤ Customer updates his/her profile
Search Restaurant	<ul style="list-style-type: none"> ➤ Customer searches for restaurant
Add Restaurant	<ul style="list-style-type: none"> ➤ Restaurant Owner adds restaurants from Admin app
Update Restaurant	<ul style="list-style-type: none"> ➤ Restaurant Owner updates restaurants from Admin app

Delete restaurant	➤ Restaurant Owner deletes restaurants from Admin app
Receive notifications	➤ Restaurant Owner receives no in Adificationmin app

Figure 19 Event flow of use case

3.2.2.2 Sequence Diagram

The sequence diagram below is drawn for Admin (Restaurant Owner)

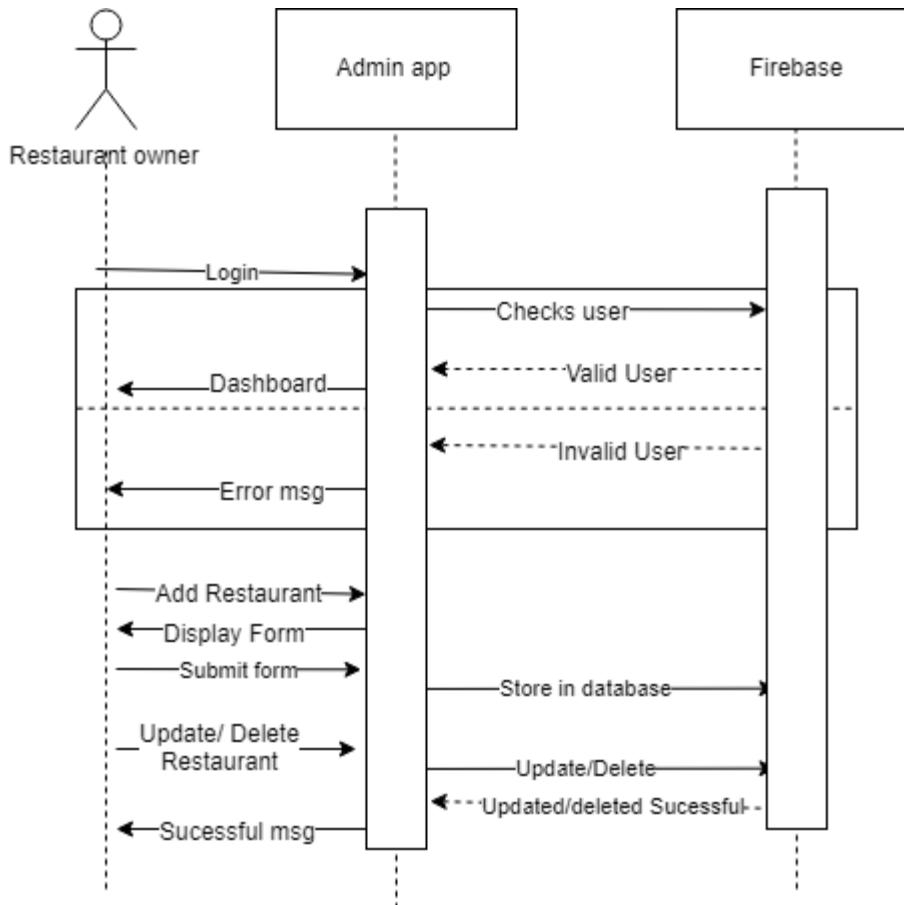


Figure 20 Sequence Diagram of Restaurant Owner

The sequence diagram below is drawn for Customer (Restaurant Cusyomer)

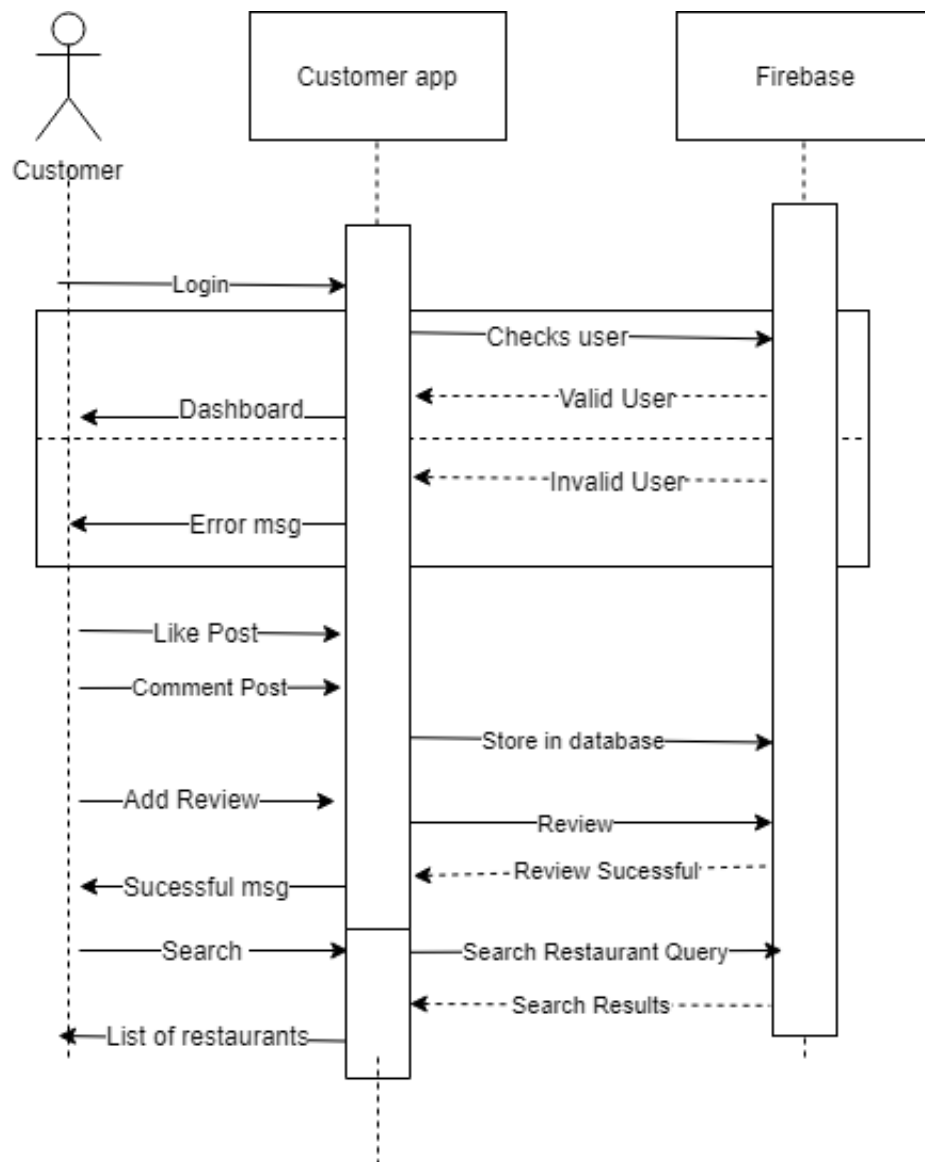


Figure 21 Sequence diagram of Customer App

3.2.2.3 Activity Diagram

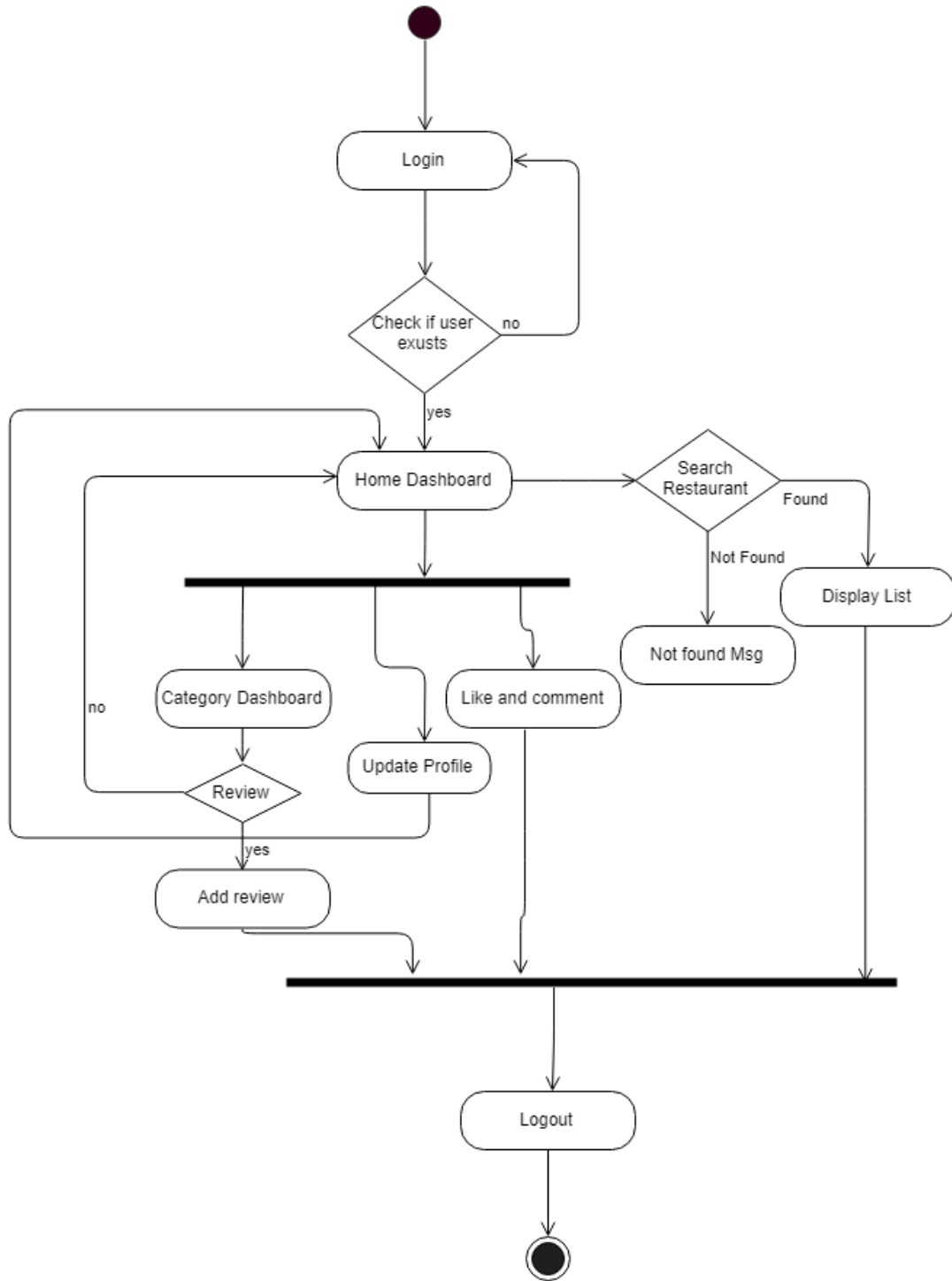


Figure 22 Activity diagram of a Customer

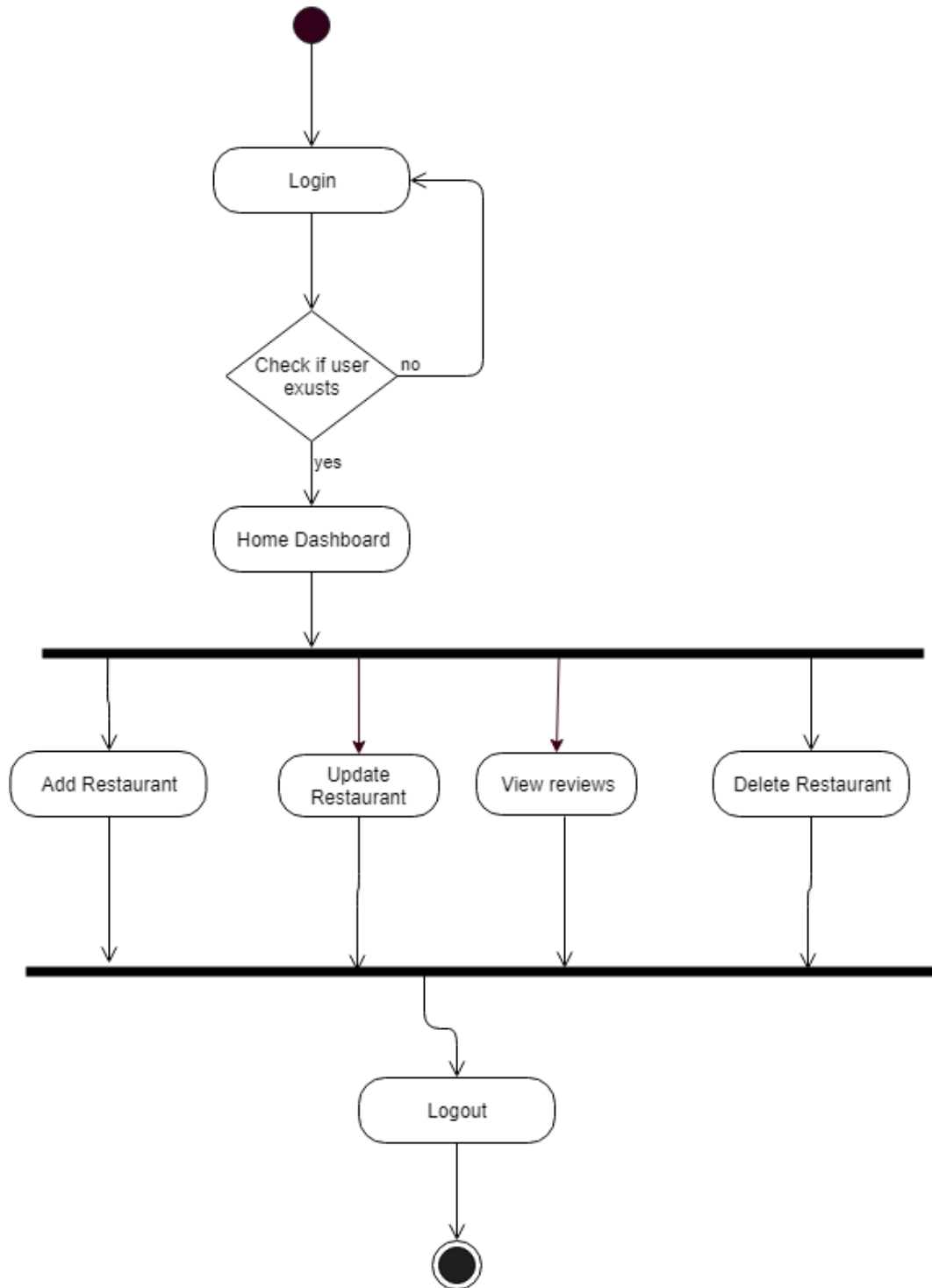


Figure 23 Activity diagram of a Restaurant Owner

3.3 Development Methodology

System development methodologies are the framework that is used to develop the structure plan, and control the process of developing a system. There are many methodologies used for software development, some of them are:

- i. Agile Software development
- ii. Scrum
- iii. Spiral
- iv. Waterfall
- v. Unified Software Development Process (USDP)
- vi. Rapid Application Development (RAD)
- vii. Joint Application Development (JAD)

Waterfall methodology is not feasible in practical context as iteration process is not possible and implementation is very difficult. So out of all the available methodology, from meeting with the supervisor it came down to USDP, Spiral and Prototype.

3.3.1 Considered methodology

3.3.1.1 *Spiral Model*

Spiral Model is a combination of a waterfall model and iterative model. Each phase in this model starts with design goals and ends with client review progress. This model starts with small set of requirement and goes through each development phase for each set of requirements (Guru99, 2016).

Advantages:

- Additional functionality or changes can be done at a later stage.
- Cost estimation becomes easy as the prototype building is done in small fragments.
- Continuous or repeated development helps in risk management.
- Development is fast and features are added in a systematic way.

Disadvantages:

- Risk of not meeting the schedule or budget
- Good for large project which has risk management expertise.
- For its smooth operation spiral model protocol needs to be followed strictly
- More documentation due to intermediate phase.
- It is not advisable for small project as it is expensive.

3.3.1.2 *Prototype methodology*

The prototype methodology is the software development process which allows developers to create prototype of the solution to demonstrate its functionality to the clients and make necessary modifications before developing the actual app. Client will better understand the model because a working prototype is delivered to him/her before the original system. This helps to analyse the requirement of the desired system (Try QA, 2013).

Advantages:

- Clients will have clear understanding and complete 'feel' of the functionality of the system.
- It helps in requirement gathering and requirement analysis.
- Clients field they are involved in SDLC.

Disadvantages:

- Too much involvement of client is not always favoured by some software developer.
- Too much modification in the project is not good.
- Cost of the project is expensive as a lot of prototype model is made.

Among all these methodologies, USDP methodology was chosen as development methodology since it is individual project and is object oriented.

3.3.2 Selected methodology

Unified Software Development Process (USDP) is a UML based, use case driven architecture, centric, iterative, incremental development process. USDP also called Rational Unified Process (RUP) attempts to capture many of modern software development practices. USDP is used as the development methodology for the project development. It is component based that uses Unified Modelling Language (UML) for design and documentation. The use case diagram helps to sight the behaviour of the system and binds the core of workflow together. Requirement Analysis, designing, implementation and testing are all the core workflows. There are four phase of the USDP methodology (Davis, 2009).

PHASES OF USDP

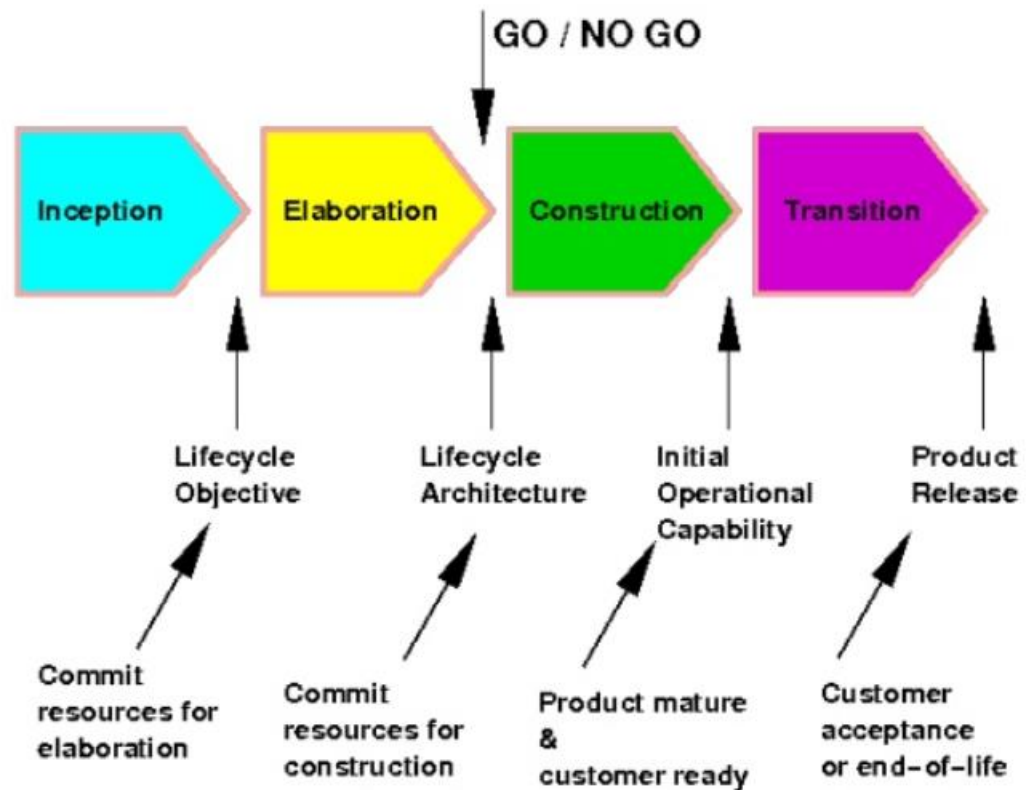


Figure 24 Phases of USDP methodology (Abbas, 2012)

3.3.2.1 Inception

The aim of the inception phase is to determine whether the proposed android application is technologically, financially feasible or not. The scope of the system is determined in the phase. Possible risk factors in the current system requirement are analyzed in this phase and the business case is developed along with the cost estimation of the project. Before going to the next phase, the life cycle of the project is inspected (Scott, 2001).

3.3.2.2 Elaboration

In this phase the problem domains are analysed and architecture is built. The stability of the architecture, project plans is insured. By the end of the phase a basic architecture is produced the working specification of the system is delivered. The risks are identified and major risks considered are analysed and addressed so that contingency can be taken in time. The result of the elaboration is the Use Case Diagram (Scott, 2001).

3.3.2.3 Construction

The primary goal of this phase to build the application capable of operating successfully based on the baseline architecture. In this phase all the remaining features and components are developed into a product and made ready for testing under realistic conditions. This is the largest and the most time consuming part of the project and at the end a working application will be available (The University of Edingburg, 2004).

3.3.2.4 Transition

The primary goal of this phase is to roll out the fully functional application to the user. The main focus during this phase is to correct the defects and modify the system so as to correct undefined problems during previous phases. At the end of the phase the application is delivered (Scott, 2001).

3.4 Testing and Evaluation

After the completion of the development of the project, testing has to be carried out to check proper functionality of the app. The test is instantiated under different circumstances and for each activity created for the system. The test that is to be performed is called black box testing. For the testing Restaurant2Eat box testing was carried out. The main purpose of the Black Box is to check whether the software is working as per expected in requirement document & whether it is meeting the user expectations or not.

Black Box Testing:

a) Signup Activity

Test case No:	1		
Test case Objective	To test whether the application successfully allow registration for a new user (customer).		
Test Date/Time	Date: 04/05/2019 Time: 1:00 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	i. name: kumar password:124456 phone: 9843312762	Signup successful	Signup successful (screenshot shown below)
	ii. name: "" password:1234567 phone: 9843312761	Signup unsuccessful	Signup unsuccessful (screenshot shown below)
Test Results	The above result indicates that signup/registration of user in the application works well		

Table 2 Test case Signup customer

Screenshot of test 1:

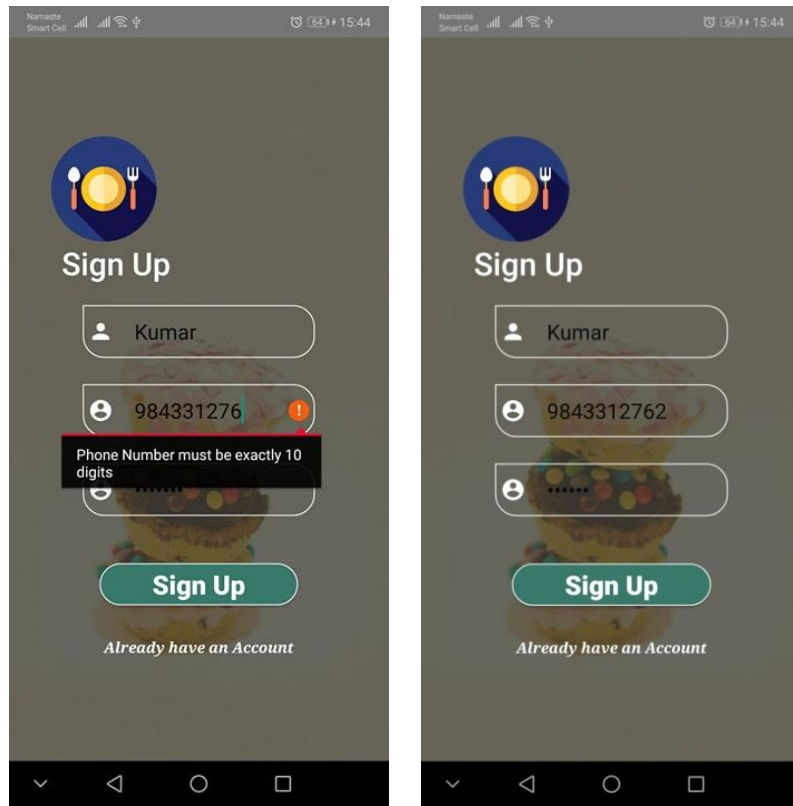


Figure 25 User registration and validation

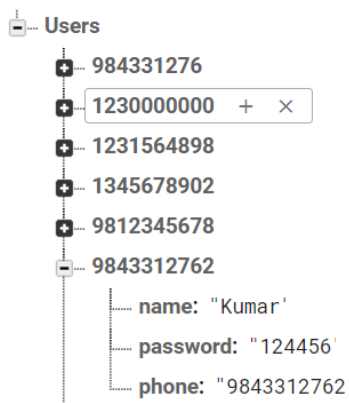


Figure 26 Firebase updated after successful signup

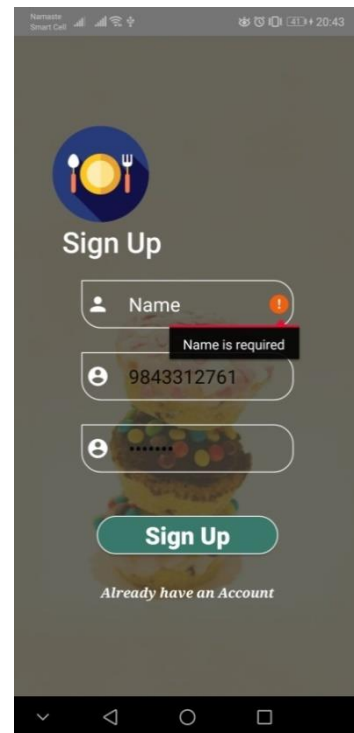


Figure 27 Testing as No field must be left empty

b) Login

Test case No:	2		
Test case Objective	To test whether the application successfully allow login for registered user (customer).		
Test Date/Time	Date: 04/05/2019 Time: 1:30 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	i. phone: 9843312762 password:124456	Login successful	Login successful (screenshot shown below)
	ii. phone: 9843312761 password:123456	Login unsuccessful	Login unsuccessful (screenshot shown below)
Test Results	The above result indicates that login of user in the application works well		

Table 3 Test case Login Customer

Screenshot of test 2

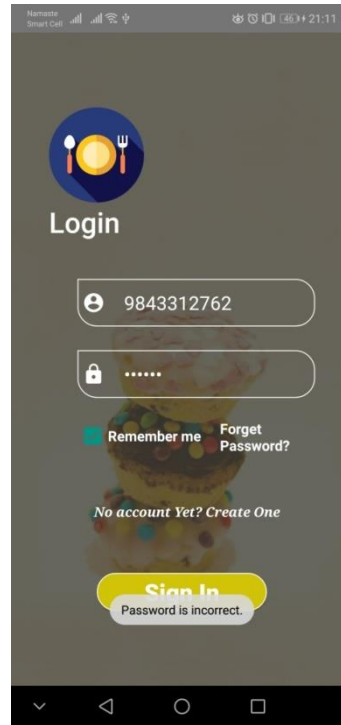
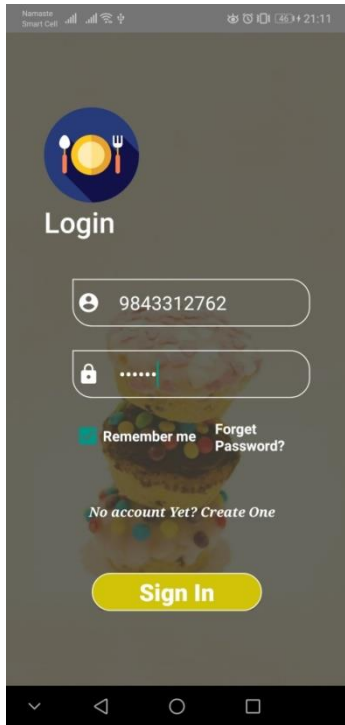


Figure 29 Incorrect password and Phone doesn't allows successful login

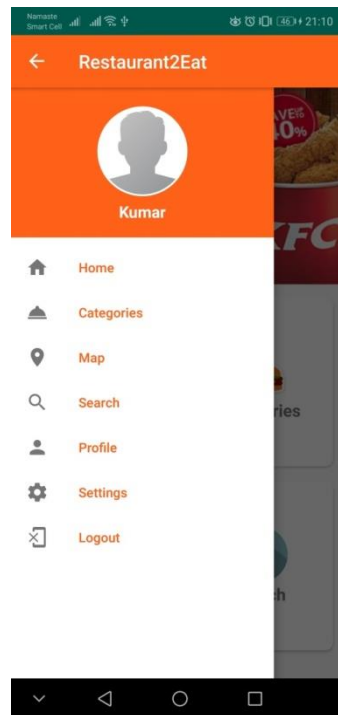
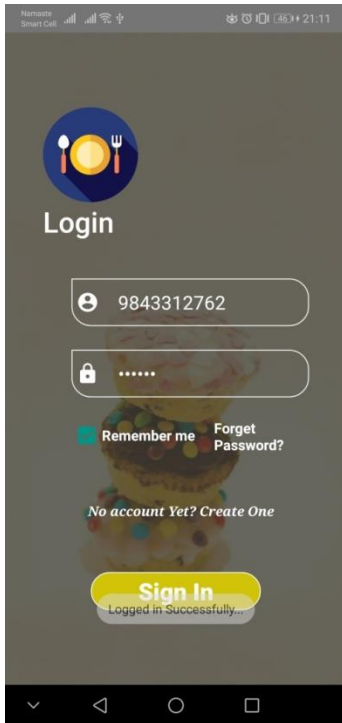


Figure 28 Correct password and Phone allows successful login

c) Sign up (Restaurant Owner)

Test case No:	3		
Test case Objective	To test whether the application successfully allow registration for a new user (restaurant owner).		
Test Date/Time	Date: 04/05/2019 Time: 2:30 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	i. name: Sagar password: abcde phone: 9823772500 ii. name: Sagar password: abcdef phone: 9823772500	Signup successful(Minimum length of password is 6) Signup successful	Signup successful(Minimum length of password is 6) Signup successful(screenshot shown below)
Test Results	The above result indicates that signup/registration of user in the application works well		

Table 4 Test case Signup Restaurant Owner

Screenshot of test 3

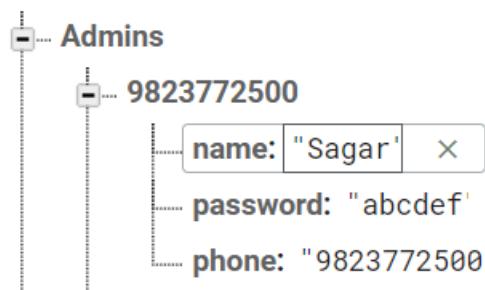


Figure 27 Firebase updated after successful signup

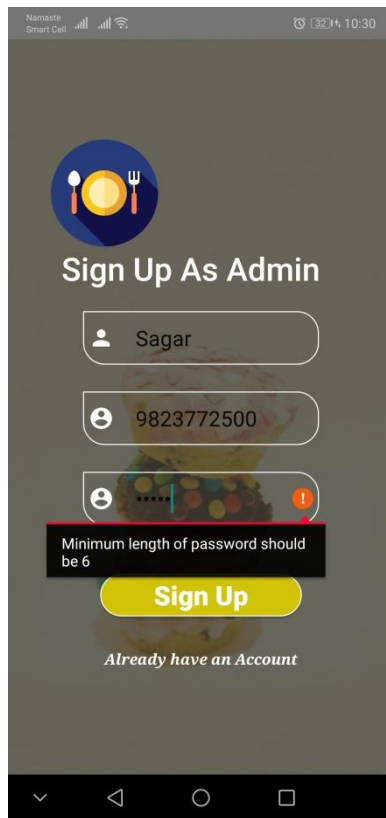


Figure 29 Account Creating unsuccessful as credential not matched

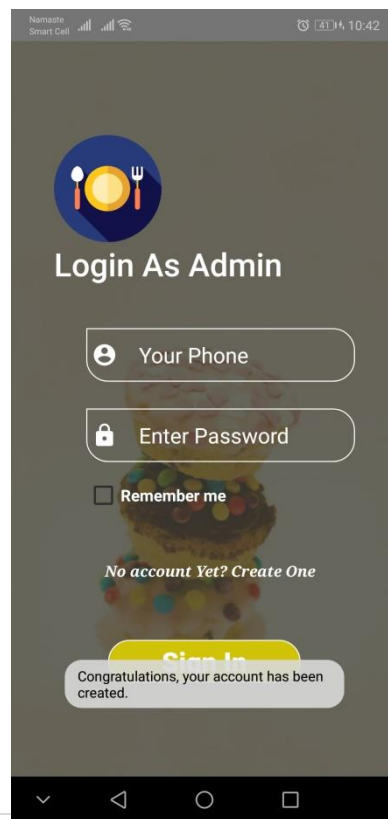
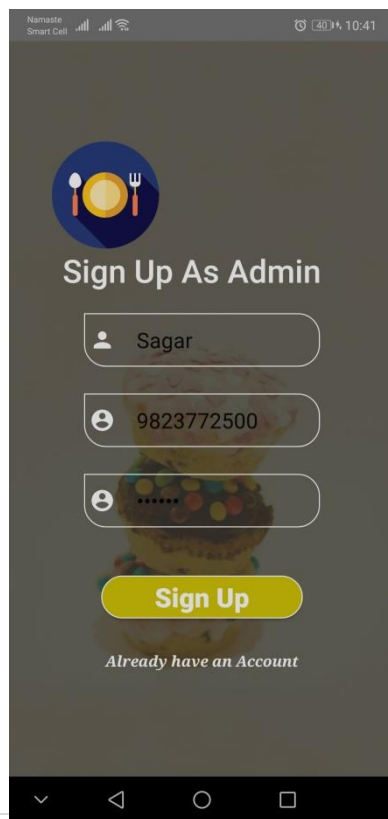


Figure 30 Account Creating unsuccessful as credential matched

d) Login (Restaurant Owner)

Test case No:	4		
Test case Objective	To test whether the application successfully allow login for registered user (Restaurant owner).		
Test Date/Time	Date: 04/05/2019 Time: 3:00 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	<ul style="list-style-type: none"> i. phone: 9823772500 password: abcde ii. phone: 9823772500 password: abcdef 	<ul style="list-style-type: none"> Login Unsuccessful(Incorrect Password) Login successful 	<ul style="list-style-type: none"> Login Unsuccessful(Incorrect Password) Login successful
Test Results	The above result indicates that login of user in the application works well		

Table 5 Test case Login Restaurant owner

Screenshot of test 4:

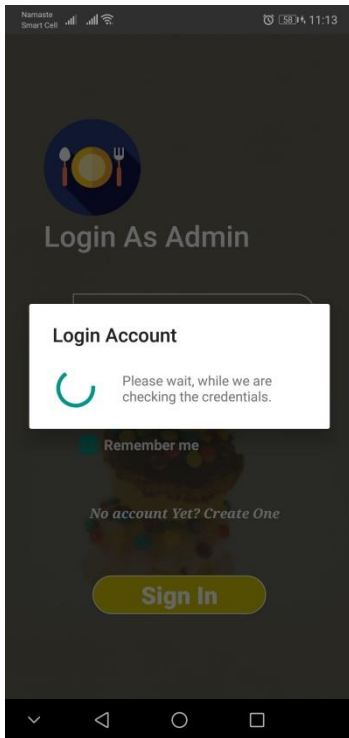


Figure 31 Checking Credentials

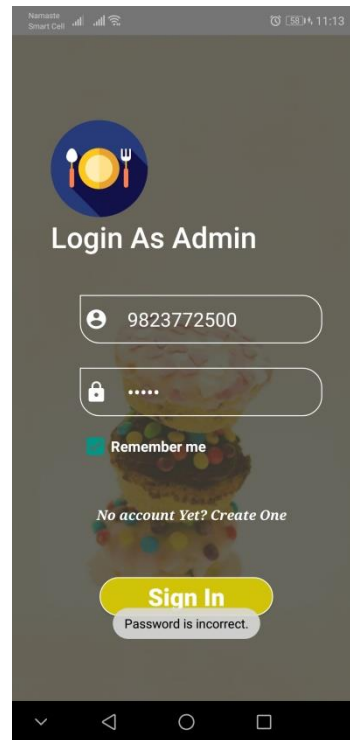


Figure 32 Unsuccessful Message

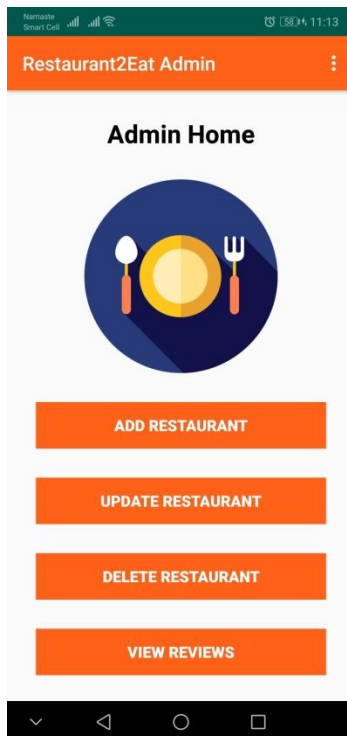


Figure 33 Login Successful (Home screen of Restaurant Owner)

e) Add restaurant

Test case No:	5		
Test case Objective	To test whether adding restaurant is successful		
Test Date/Time	Date: 04/05/2019 Time: 4:00 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	<ul style="list-style-type: none">i. "Burger House" "Fast Food" "Located in Thamel, Burger house is best fast food restaurant for your lunch"ii. Burger house and fried chicken" "Fast Food" ""(null)	<p>Adding successful</p> <p>Adding unsuccessful as no description is provided</p>	<p>Adding Successful</p> <p>Adding unsuccessful as no description is provided</p>
Test Results	The above result indicates that adding new restaurant in the application works well.		

Table 6 Test case Adding restaurant

Screenshot of test 5:

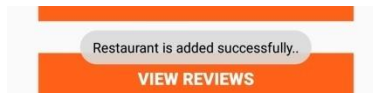
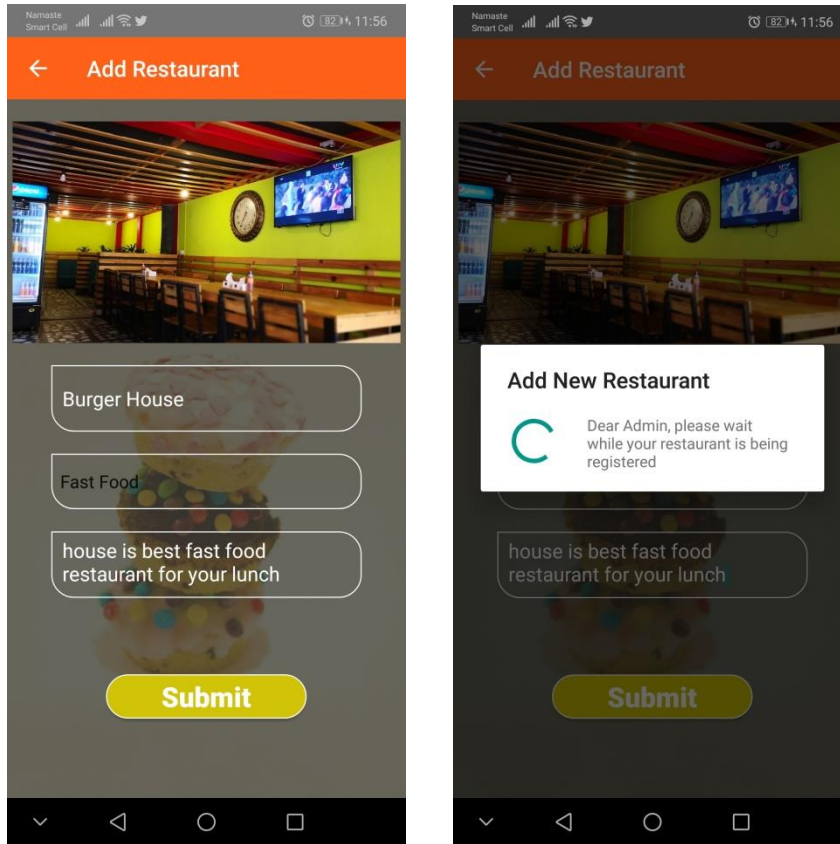


Figure 34 Adding restaurant

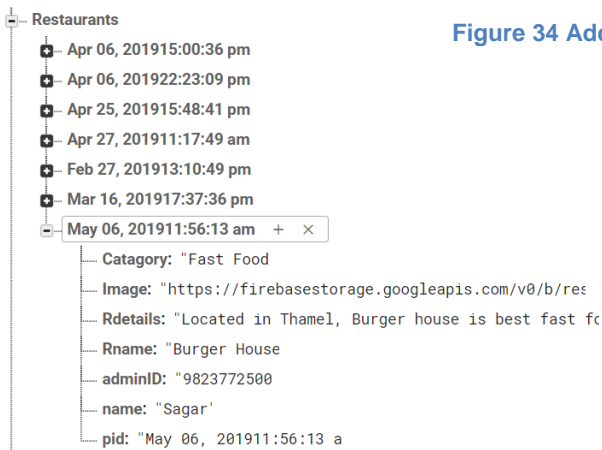


Figure 35 Firebase after successful addition of restaurant

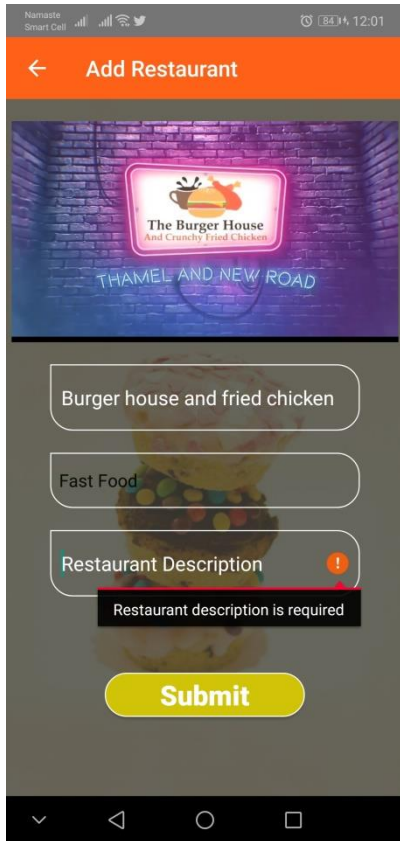


Figure 36 Validation check no field must be left empty

f) Check if Restaurant is displayed in customer app

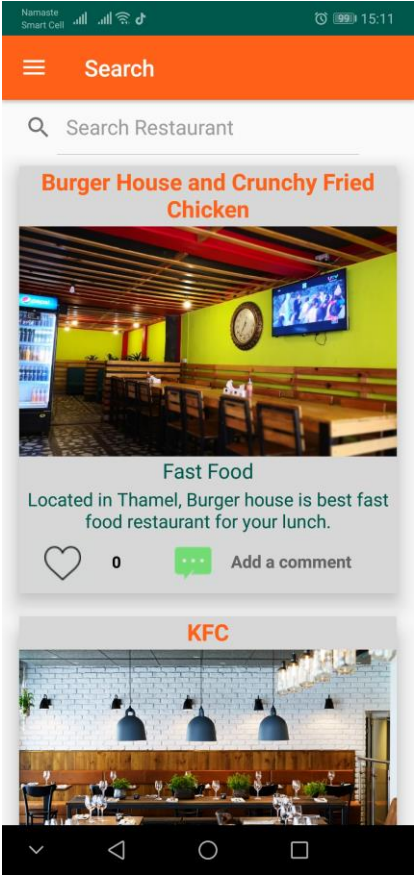
Test case No:	6
Test case Objective	To test if the uploaded restaurant on restaurant owner app is successfully displayed on customer app.
Test Date/Time	Date: 04/05/2019 Time: 5:00 p.m.
Test Results	 <p>The screenshot shows a mobile application interface with a search bar at the top. Below the search bar, two restaurant listings are visible. The first listing is for 'Burger House and Crunchy Fried Chicken', featuring a photo of the restaurant's interior, the text 'Fast Food', and a description: 'Located in Thamel, Burger house is best fast food restaurant for your lunch.' Below this listing is a heart icon with a '0' and an 'Add a comment' button. The second listing is for 'KFC', featuring a photo of the restaurant's interior. The app's status bar at the top shows 'Namaste Smart Cell', signal strength, Wi-Fi, and the time '15:11'.</p>

Figure 37 Added restaurant displayed on customers app

Table 7 Test case to check if posts are displayed correctly

g) Update Restaurant in Owners app

Test case No:	7		
Test case Objective	To test if the restaurant owner can update his restaurant once he/she has added		
Test Date/Time	Date: 05/05/2019 Time: 3:30 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	“Burger House and Crunchy Fried Chicken”	Change Success	Change Success
Test Results	The above result indicates that update of restaurant in this application works well		

Table 8 To check if the update works properly

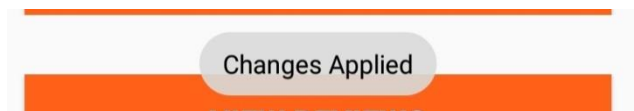
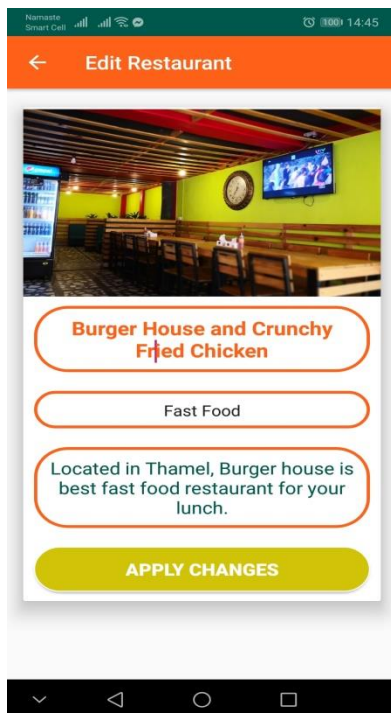


Figure 38 Updating the Added Field

Category: "Fast Food"
 Image: "https://firebasestorage.googleapis.com/v0/b/res:
 Rdetails: "Located in Thamel, Burger house is best fast fc
 Rname: "Burger House and Crunchy Fried Chicken"
 adminID: "9823772500"
 name: "Sagar"
 pid: "May 06, 2019 11:56:13 a"

Figure 39 Firebase after the field has been updated

h) Delete restaurant

Test case No:	8
Test case Objective	To test if the restaurant owner can delete the restaurant
Test Date/Time	Date: 05/05/2019 Time: 4:30 p.m.
Test screenshot:	
Test Results	The above result indicates that owner can delete the app successfully

Table 9 Test case to check if the restaurant is deleted successfully

i) Update profile

Test case No:	9		
Test case Objective	To test whether the user (customer) can update his /her profile		
Test Date/Time	Date: 05/05/2019 Time: 5:00 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	address: "Baneshwor" name: "Kumar Adhikar"	Update Successful	Update Successful (Screenshot shown below)
Test Results	The above result indicates that updating profile works well the application.		

Table 10 Test Cast to update user profile

```
9843312762
address: "Baneshwor"
image: "https://firebasestorage.googleapis.com/v0/b/res
name: "Kumar Adhikar"
password: "124456"
phone: "9843312762"
```

Figure 40 Firebase After updating profile

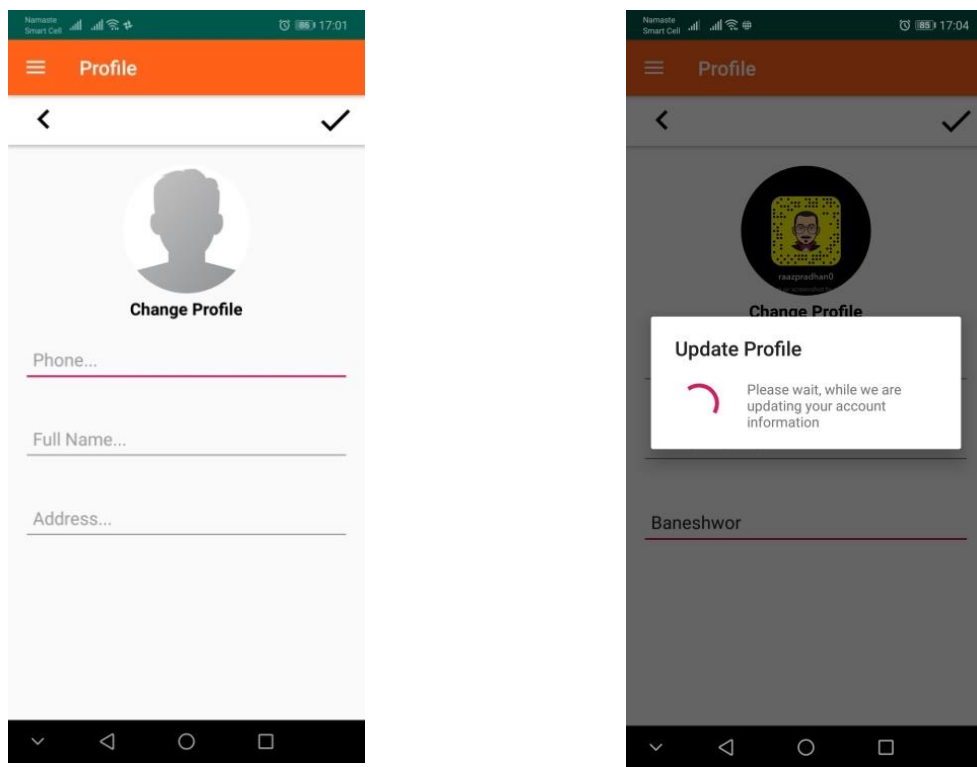


Figure 41 Updating Profile

j) Comment Feature

Test case No:	10		
Test case Object	To test if adding comments is displayed on the comment section		
Test Date/Time	Date: 05/05/2019 Time: 6:00 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	Comment: "Test Comment"	Comment is displayed	Comment is displayed
Test Results	The above result indicates that comment in the user application works well.		

Table 11 Test case to test if the comment features work

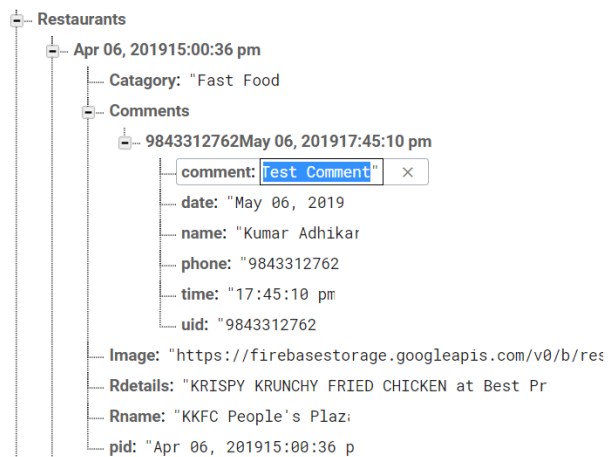


Figure 42 Firebase after comment has been updated

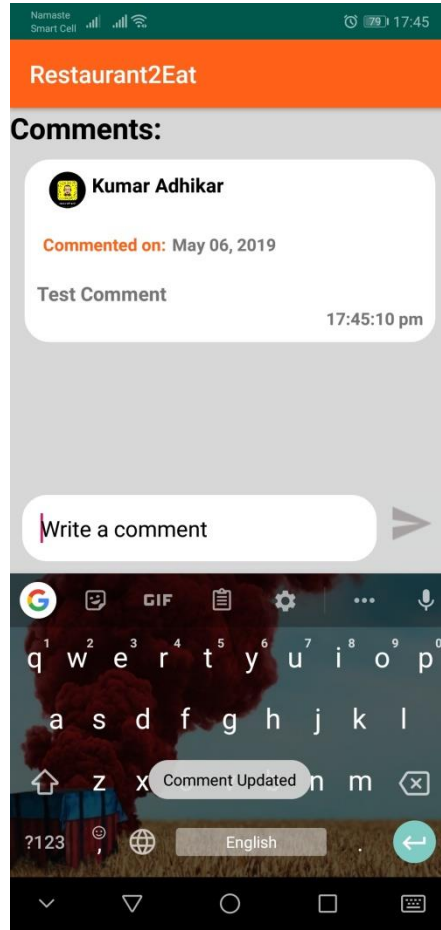
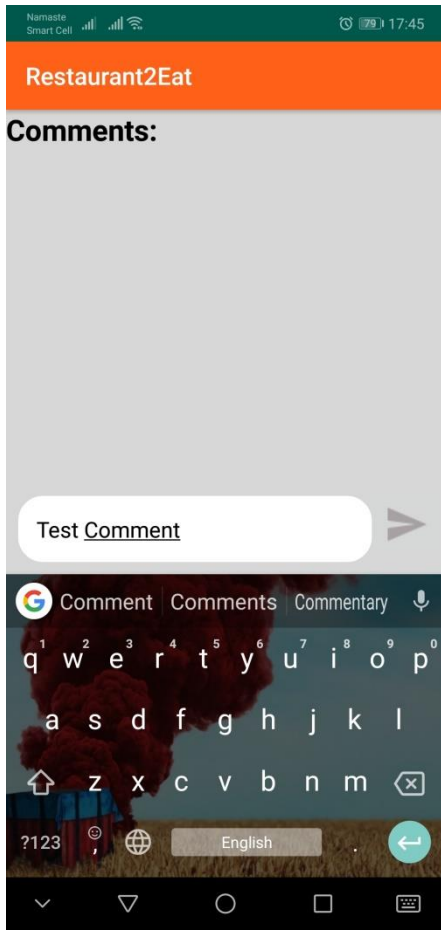


Figure 43 Test Comment on restaurant

k) Like Feature

Test case No:	11
Test case Objective	To test if the like functionality works
Test Date/Time	Date: 05/05/2019 Time: 6:20 p.m.
Test Results	The above below indicates like functionality works properly

Table 12 Test Case if the like functionality works

Test Screenshot:

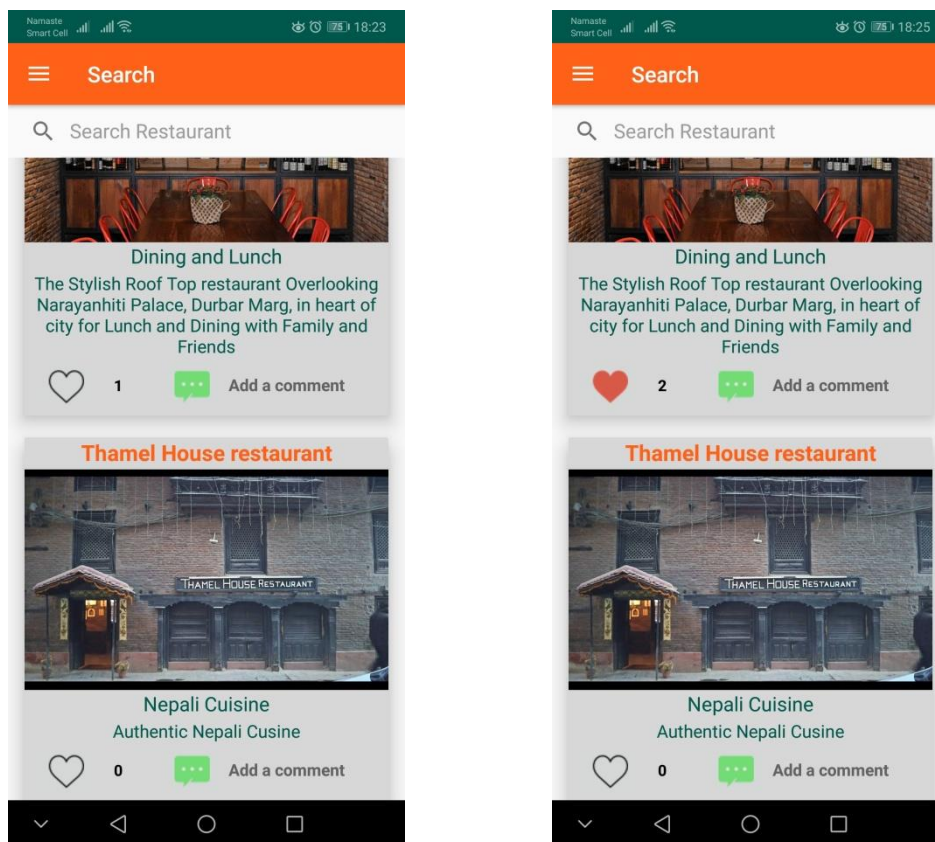


Figure 44 Before and After Liking

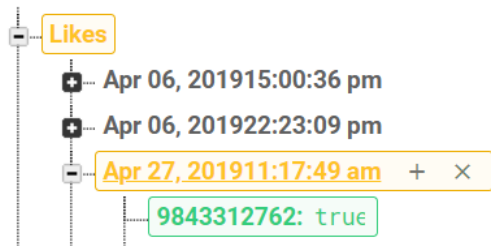


Figure 45 Firebase after post has been liked

I) Review Feature

Test case No:	12		
Test case Objective	To test if the review is saved into the database		
Test Date/Time	Date: 05/05/2019 Time: 6:30 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	Review: "Test Review"	"Review Update Successful"	"Review Update Successful"
Test Results	The above result indicates that review function user application works well		

Table 13 Test case to check Review Function

Screenshot:

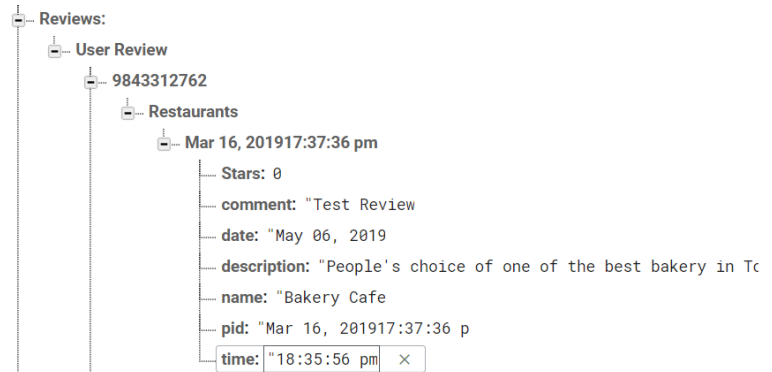
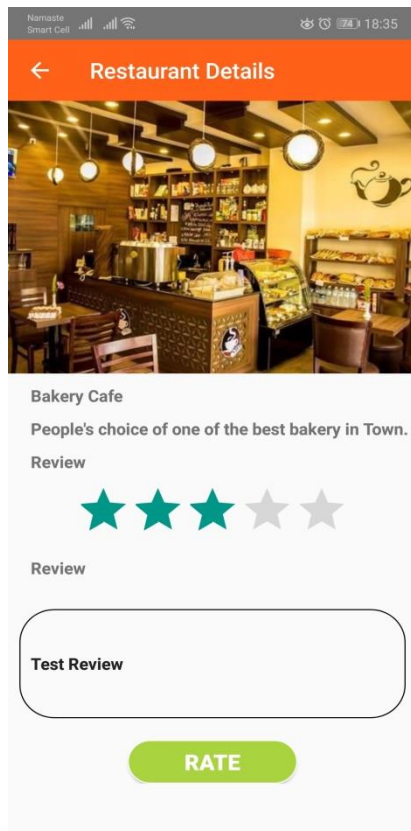


Figure 46 Review in app and Firebase after the review is posted

m) Search Feature

Test case No:	13		
Test case Objective	To test if the search feature works properly		
Test Date/Time	Date: 05/05/2019 Time: 6:45 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	Search key: "T"	Result must be displayed	Result is displayed
Test Results	The above result indicates Search feature in the application works well		

Table 14 Test Case to check the search functionality

Screenshot:

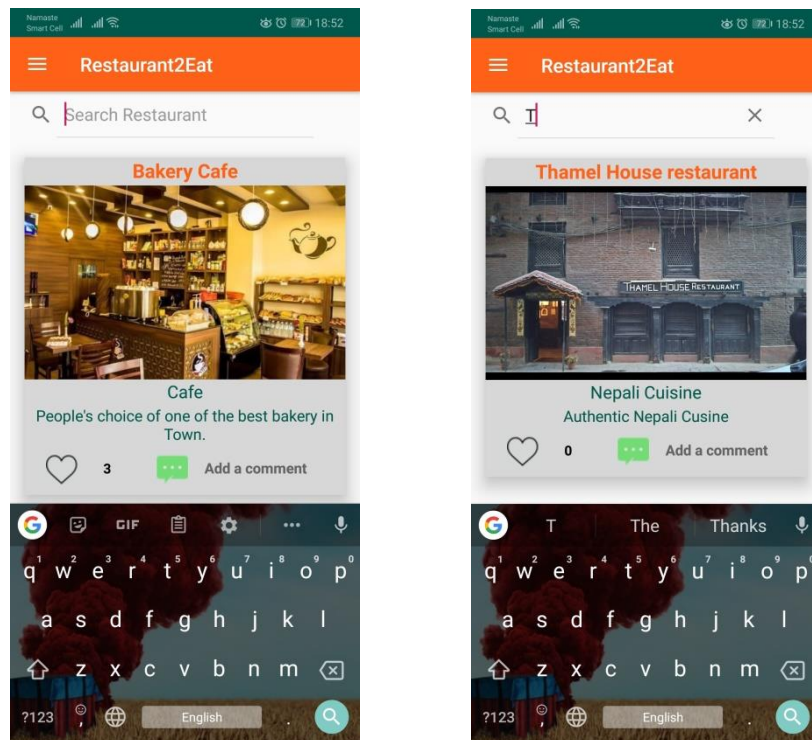


Figure 47 Search Feature

n) Display Comment in owner's application

Test case No:	14		
Test case Objective	To test if the comments are displayed to the restaurant Admin		
Test Date/Time	Date: 05/05/2019 Time: 7:20 p.m.		
Test Data:	Test Data	Expected Result	Actual Result
	"Good Food, salad and goog place" comment in User App	Must be displayed in admin app	Is displayed in admin app
Test Results	The above result indicates that comments are shown to restaurant owner in owner's application so this feature works well.		

[Table 15 Test case Comment update on admin app](#)

Screenshot:

Comment from Customer:

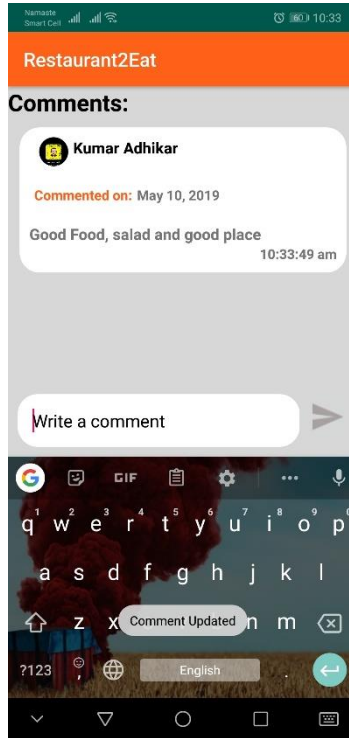


Figure 48 Comment from User's app

Comment on Owner's app:

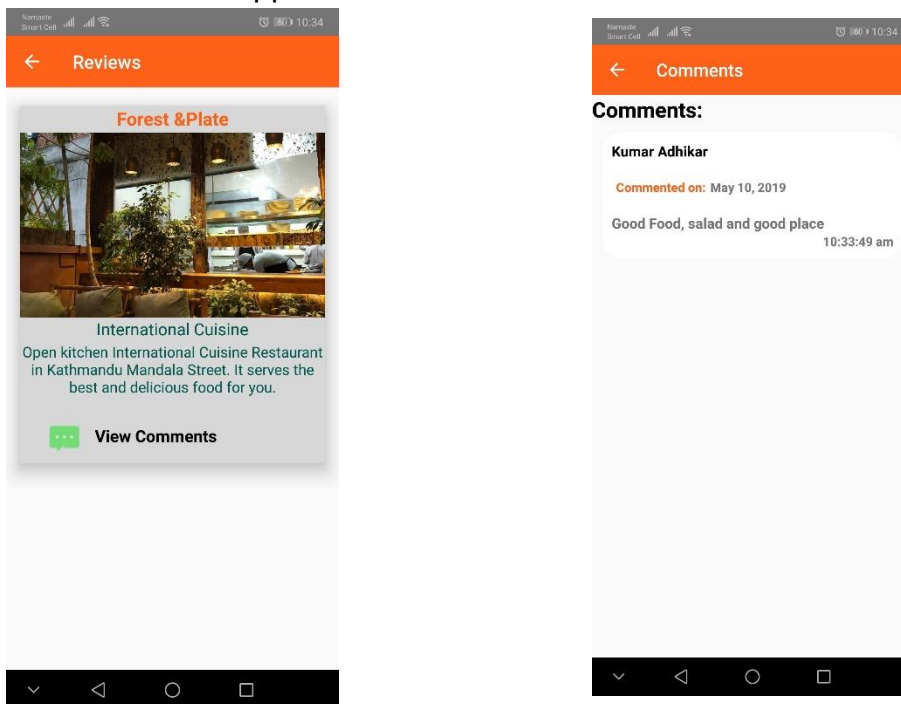


Figure 49 Comments displayed on owner's app

o) Search restaurant on Map

Test case No:	15		
Test case Objective	To test if search restaurant feature on the Map		
Test Date/Time	Date: 06/05/2019 Time: 9:00 a.m.		
Test Data:	Test Data	Expected Result	Actual Result
	Clicked "Search Restaurant" Button	Restaurant List is displayed on map	Restaurant list is displayed on the map
Test Results	The above result indicates search restaurant feature on customer's app works well.		

Table 16 Test case to search for nearby restaurant

Screenshots:

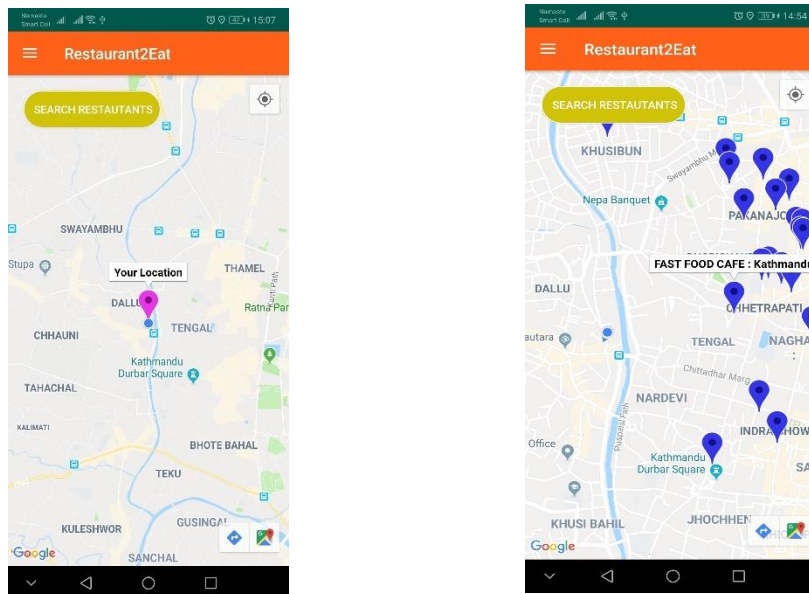


Figure 50 Searching nearby restaurants

4 Analysis

Analysis is the essential part for report writing. It helps to know what is described in the report, what is to understand and what the plan were management of resources and quality of sources found during background research, design and development of the project. Not only this, the project's critical analysis not only focused on its strengths and opportunities but also weakness and threats. This type of Critical Analysis is called SWOT analysis.

For the fact development of an application that checks almost all the requirement of user for long term is very difficult. Users' requirement keeps on changing and feedback is necessary. The feedbacks are analyze then implemented if needed. The project is currently developed for small scale and only few users will use it. The scope of the project is large as its popularity will grow. Currently security might be an issue so payment, booking and ordering system is not implemented as of lately. These features can be used in future after security of the system is well managed.

The survey that was taken before the development of the project had some positive feedbacks for the project. The real-time feedbacks were necessary for the project's successful completion and development.

4.1 Critical Analysis

The project is targeted for small scale initially, it has no budget as it is college project and the app is just a prototype of what could be a bigger and better restaurant finding application like Zomato and yelp. All the tasks are carried out by an individual. So, testing and development was carried out by an individual. Hence, the results are improper as testing at some cases lead the developer not to look for error as debugging is time consuming. Despite the time constrain most of the features purposed during the proposal has been implemented but Artificial Intelligence as part of the project couldn't be implemented.

The reasons for not being able to implement Artificial Intelligence (Sentimental Analysis) in the project are as follows:

- I. Retrieving API key from Bluemix was difficult.
- II. Since API wasn't free the payment was not possible as it is a college project and budget was null.

There are certain strength, weakness, opportunity and threats of this project. They have been listed below:

- I. Strength
 - User Friendly UI so anyone can interact with it easily.
 - Easy interaction with the component on the app
 - Registering, updating and deleting restaurant is easy and fast
 - Like social network, where user can interact with each other.
 - System can be use any time there is no any
- II. Weakness
 - Regular Update of the application may take time.
 - Security can be an issue as currently signup method is in its initial phase.
- III. Opportunity
 - It's a new technology and people would want to test it and use it which can come into its advantage because of its uniqueness and people tend to use apps for at least for testing purpose.
 - The application can be expended nationwide if the popularity grows.

IV. Threats

- Privacy concerns may be an issue as customers data can be misused or leaked
- There is no physical office so customer service is not available affecting the users experience with the app.

5 Conclusion and Future recommendations

5.1 Summary of key findings

To sum up, throughout the development of the application (Restaurant2Eat), various key components were introduced. First of all one of the major problem were discussed. One of the major problems was finding ideal restaurant at new location. The problem is common among most of the respondents of the survey and this made the app feasible. The solution to the problem was searching for right restaurant at nearest location using a mobile application accessing current location of the user. Restaurant2Eat is an android based application as a solution, therefore elements of android software stack were found. It worked as most of the application Like Zomato, UberEats, Yelp Restaurant, to search restaurant and also add comments and reviews on them. The project was based on android, so Android studio was used for it development along with its APIs. Other tools and techniques that included Firebase database as the database of the project, Java as the programming language on android. Tools used for the projects were simply; Google maps APIs, Github, Balsamiq for wireframes, Microsoft Visio to draw UML diagrams as well. In the process of research of similar applications, Foodmandu, Zomato and Yelp were somehow similar to the application that was being developed. These apps had their own unique feature that made them stand out of the crowd. The business model and idea is somewhat similar. The only drawback were that the system like Zomato were not supported in Nepal and it would be unique idea in the context of Nepal to be able to develop similar application to the Zomato but initially in a smaller scale. The development methodology for this project is USDP. Key advantages, disadvantages and the major phases like; inception, elaboration, construction, transition were introduced. Similarly, which tools and techniques to use for efficient development like structured programming, top-down developments were found.

The research and development of the project has brought amazing experience and has helped to understand user's expectations and need, market demand and

current scenario before starting any project. It has helped to improve coding skills as well as debugging skills. Debugging skills is really important as a part of coding as finding bugs and solving them is one of the important skill for a programmer. Likewise, this has helped to know importance of report for any project is also the skills and research needed for professional report writing.

5.2 Future Recommendation

As mentioned in the report itself, the project has wide scope in the current scenario. Foremost, the application can further be extended for online food ordering along with online payment. Not only that, people can also tag the dishes for future aspects. They can invite their friends if there is any special occasion like birthday, gathering through the application. It can be upgraded to book the table on the restaurant. Likewise, very importantly this project can include 'Distance Matrix APIs' to track the location of the desired restaurant on real-time which then returns information based on the recommended route between the current user's location and restaurant marked by the user.

The other features that can be enhanced and added are:

- Email and phone number conformation upon the registration of new account
- Sending verification to the registered number before login.
- Notification to the users when new restaurants are added.
- Profile of restaurant owner as well.

6 References

- Abbas, Z. (2012, October 7). Retrieved May 17, 2018, from SlideShare:
<https://www.slideshare.net/zoimustafa/rup-model>
- Agrawal, T. (2015). Retrieved May 6, 2018, from El_Pro-Cus:
<https://www.elprocus.com/what-is-android-introduction-features-applications/>
- Allen, J. (2014, August 27). *The 10 Best Dining and Restaurant Apps*. Retrieved April 30, 2019, from Paste magazine:
<https://www.pastemagazine.com/blogs/lists/2014/08/the-10-best-dining-and-restaurant-apps.html>
- Balsamiq wireframes. (2016). *Balsamiq wireframes*. Retrieved May 2, 2019, from Balsamiq wireframes: <https://balsamiq.com/wireframes/>
- Bhat, A. (2015). Retrieved 2019, from QuestionPro:
<https://www.questionpro.com/blog/what-is-a-questionnaire/>
- Bhattarai, A. S. (2017, April 26). Kathmandu to Foodmandu, A Touch Away! *Living*.
- Callaham, J. (2018, July 3). *The history of Android OS: its name, origin and more*. Retrieved April 30, 2019, from Android Authority:
<https://www.androidauthority.com/history-android-os-name-789433/x>
- Ceta, N. (2018, June 24). *All You Need to Know About UML Diagrams: Types and 5+ Examples*. Retrieved May 2, 2019, from Tallyfy: <https://tallyfy.com/uml-diagram/>
- Davis, G. (2009, May 8). Retrieved May 13, 2019, from SlideShare:
https://www.slideshare.net/guy_davis/unified-process
- Developers Android. (2018). *Android Studio*. Retrieved May 1, 2019, from Android Developer:

https://developer.android.com/studio/intro/?gclid=Cj0KCCQjwh6XmBRDRARIsAKNlnDEN-4zSY-8xCk3lBdORFpi7QzqsflfVD0JPbxVbG6GRrdlZbd_gVvoaAuDqEALw_wcB

Dhaliwal, J. (2015). *Delivery of Online Food Order*. Zomato.

Diwan, A., Gawade, M., Patil, P., & Thigle, S. (2016). *Restaurant Locator and Booking – Yummy!* .

Esplin, C. (2016, October 24). *How To Firebase*. Retrieved May 1, 2019, from Medium : <https://howtofirebase.com/what-is-firebase-fcb8614ba442>

experienceux. (2019). *What is wireframing?* Retrieved 2019, from experienceux: <https://www.experienceux.co.uk/faqs/what-is-wireframing/>

Fabrizio, G. D., Gupta, N., & Mani, P. (2010). *Have2eat: a Restaurant Finder with Review*. ResearchGate.

Google. (2016). *Cloud Storage*. Retrieved may 1, 2019, from Firebase: <https://firebase.google.com/docs/storage>

Guru99. (2016). *What is Spiral Model? When to Use? Advantages & Disadvantages*. Retrieved May 2, 2019, from Guru99: <https://www.guru99.com/what-is-spiral-model-when-to-use-advantages-disadvantages.html>

Hess, K. (2013, July 11). Three billion devices run Java. Yeah, but do they like it?

JMango 360. (2018). *Mobile Apps Vs Mobile Websites Statistics*. Retrieved April 30, 2019, from JMango 360: <https://jmango360.com/wiki-pages-trends/mobile-app-vs-mobile-website-statistics/>

Kushwaha, A., & Kushwaha, V. (2011). *Location Based Services using Android Mobile Operating System*. International Journal of Advances in Engineering & Technology.

LovelyCoding . (2018). *RESTURANT LOCATOR*. Retrieved May 4, 2018, from LovelyCoding : <http://services.lovelycoding.org/resturant-locator/>

LovelyCoding. (2018). *RESTURANT LOCATOR*. Retrieved November 30, 2018, from LovelyCoding: <http://services.lovelycoding.org/resturant-locator/>

Lucidchart. (2016). *All About Microsoft Visio® for Diagrams*. Retrieved May 2, 2019, from Lucidchart: <https://www.lucidchart.com/pages/what-is-microsoft-visio>

Madison Holbrok. (2018). *Yelp: Case Study*. Madison Holbrok.

Open Handset Alliance. (2011). *Open Handset Alliance*. Retrieved April 30, 2019, from Open Handset Alliance: https://www.openhandsetalliance.com/android_overview.html

Oza, H. (2017, March 28). *The Importance Of Mobile Applications In Everyday Life!* Retrieved April 20, 2019, from Hyperlink InfoSystem: <https://www.hyperlinkinfosystem.com/blog/the-importance-of-mobile-applications-in-everyday-life>

Programwiz. (2017). *Learn Java Programming*. Retrieved May 1, 2019, from Programwiz: <https://www.programiz.com/java-programming>

Quora. (2018). Retrieved April 30, 2019, from Quora: <https://www.quora.com/Can-we-order-food-online-in-Kathmandu-Nepal>

Rouse, M. (2018). *Android Studio*. Retrieved May 1, 2019, from TechTarget: <https://searchmobilecomputing.techtarget.com/definition/Android-Studio>

Rouse, M. (2018). *DEFINITION GITHUB*. Retrieved May 1, 2019, from Techtarget:
<https://searchitoperations.techtarget.com/definition/GitHub>

Rouse, M. (2019). Retrieved May 1, 2019, from whatis techtarge:
[whatis.https://whatis.techtarget.com/definition/Google-Maps](https://whatis.techtarget.com/definition/Google-Maps)

Schmidt, C. (2016, June 2016). Retrieved May 6, 2018, from AndroidPit:
<https://www.androidpit.com/what-is-android>

Scott, K. (2001, December 28). Retrieved May 14, 2018, from InformIT:
<http://www.informit.com/articles/article.aspx?p=24671&seqNum=7>

Sinicki, A. (2017, December 24). *I want to develop Android Apps — What languages should I learn?* Retrieved May 1, 2019, from Android Authority:
<https://www.androidauthority.com/develop-android-apps-languages-learn-391008/>

SPLessons. (2015). Retrieved May 17, 2018, from SPLessons:
<http://www.spleasons.com/lesson/android-architecture/>

Srinivasan, S. (2018, march 28). The Economic Times. *Zomato hits gold with food delivery, annual revenue run rate at Rs 650 cr .*

Statista. (2018). *Global market share held by the leading smartphone operating systems in sales to end users from 1st quarter 2009 to 2nd quarter 2018*. Retrieved April 20, 2019, from Statista - The Statstatic Portal:
<https://www.statista.com/statistics/266136/global-market-share-held-by-smartphone-operating-systems/>

Stone, S. (2018, May 4). *Top 20 Tools for Android Development*. Retrieved May 1, 2019, from altexsoft: <https://www.altexsoft.com/blog/engineering/top-20-tools-for-android-development/>

Techopedia Inc. (2017). Retrieved 2019 20, April, from Techopedia:
<https://www.techopedia.com/definition/2953/mobile-application-mobile-app>

The University of Edingburg. (2004). Retrieved May 2018, 14, from
<http://www.inf.ed.ac.uk/teaching/courses/cs2/LectureNotes/CS2Ah/SoftEng/se03.pdf>

Try QA. (2013). *What is Prototype model- advantages, disadvantages and when to use it?* Retrieved May 2, 2019, from Try QA: <http://tryqa.com/what-is-prototype-model-advantages-disadvantages-and-when-to-use-it/>

Yelp. (2019). *About Us*. Retrieved May 1, 2019, from Yelp: <https://www.yelp.com/about>

Zozulya, S. (2017, September 22). *How to create a restaurant finder app like Zomato or Yelp*. Retrieved May 1, 2019, from stfalcom.com:
<https://stfalcon.com/en/blog/post/create-a-restaurant-finder-app-like-zomato-or-yelp>

Appendix

Due to word limitations all the necessary documents (topics) for the report that could not be included in the main report. These documents are really helpful but are not part of the main report but they play a major role in proper completion of the report.

Work breakdown Structure

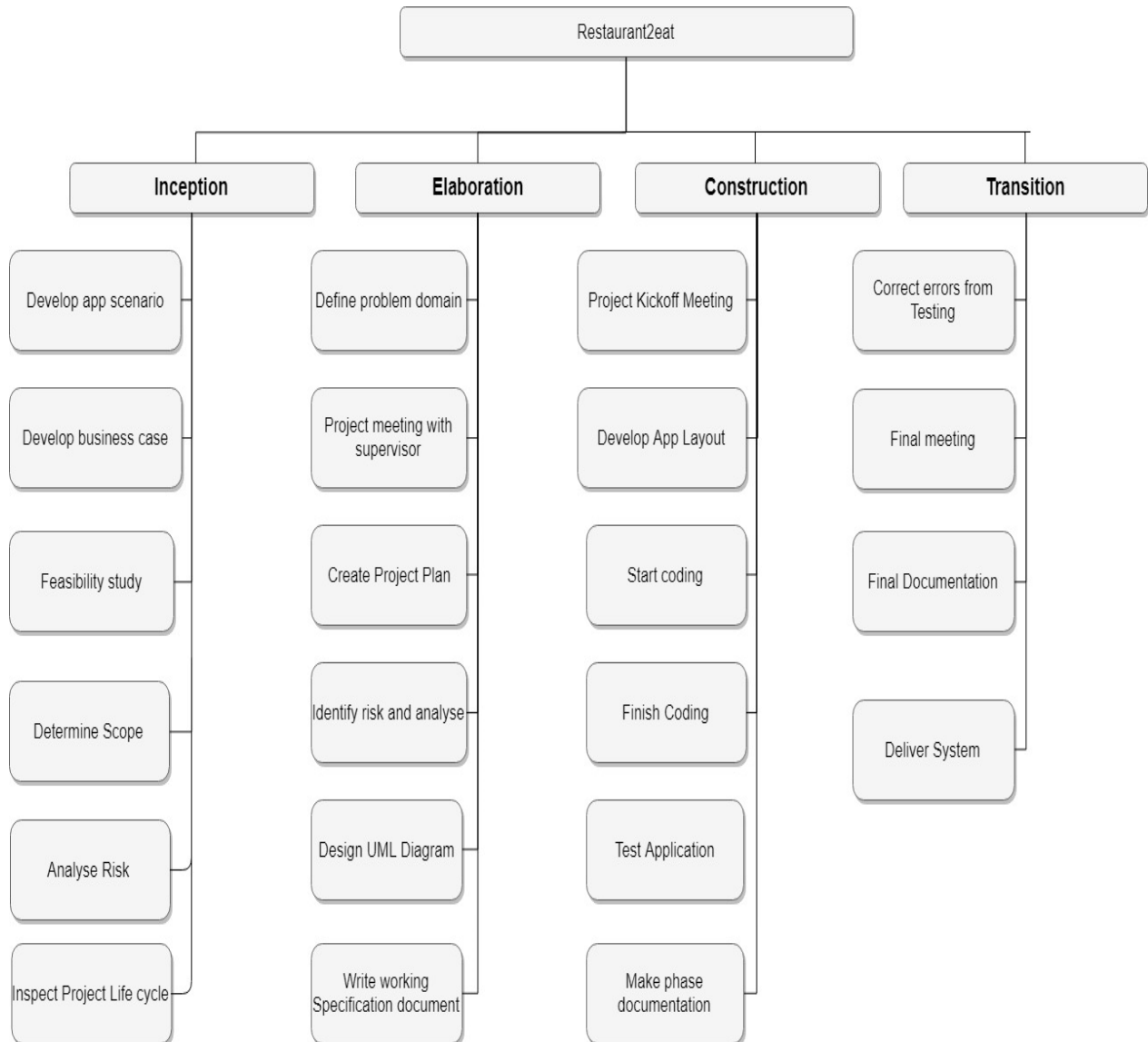


Figure 51 High Level Work Breakdown Structure

Gantt chart of the whole project

Initial Gantt chart of the project (Projected)

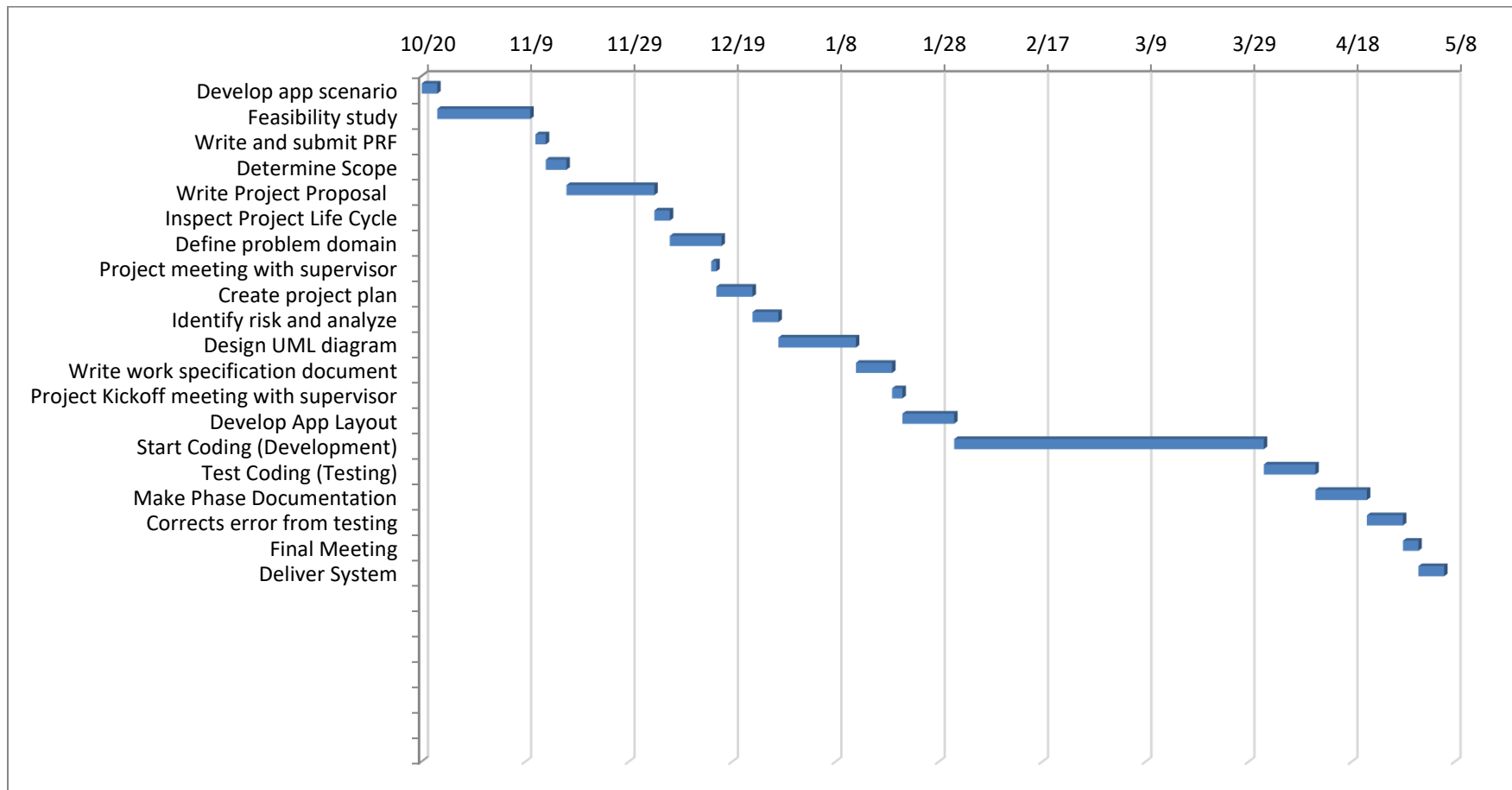


Figure 52 Initial Gantt chart of the project

Final Gantt Chart of the Project

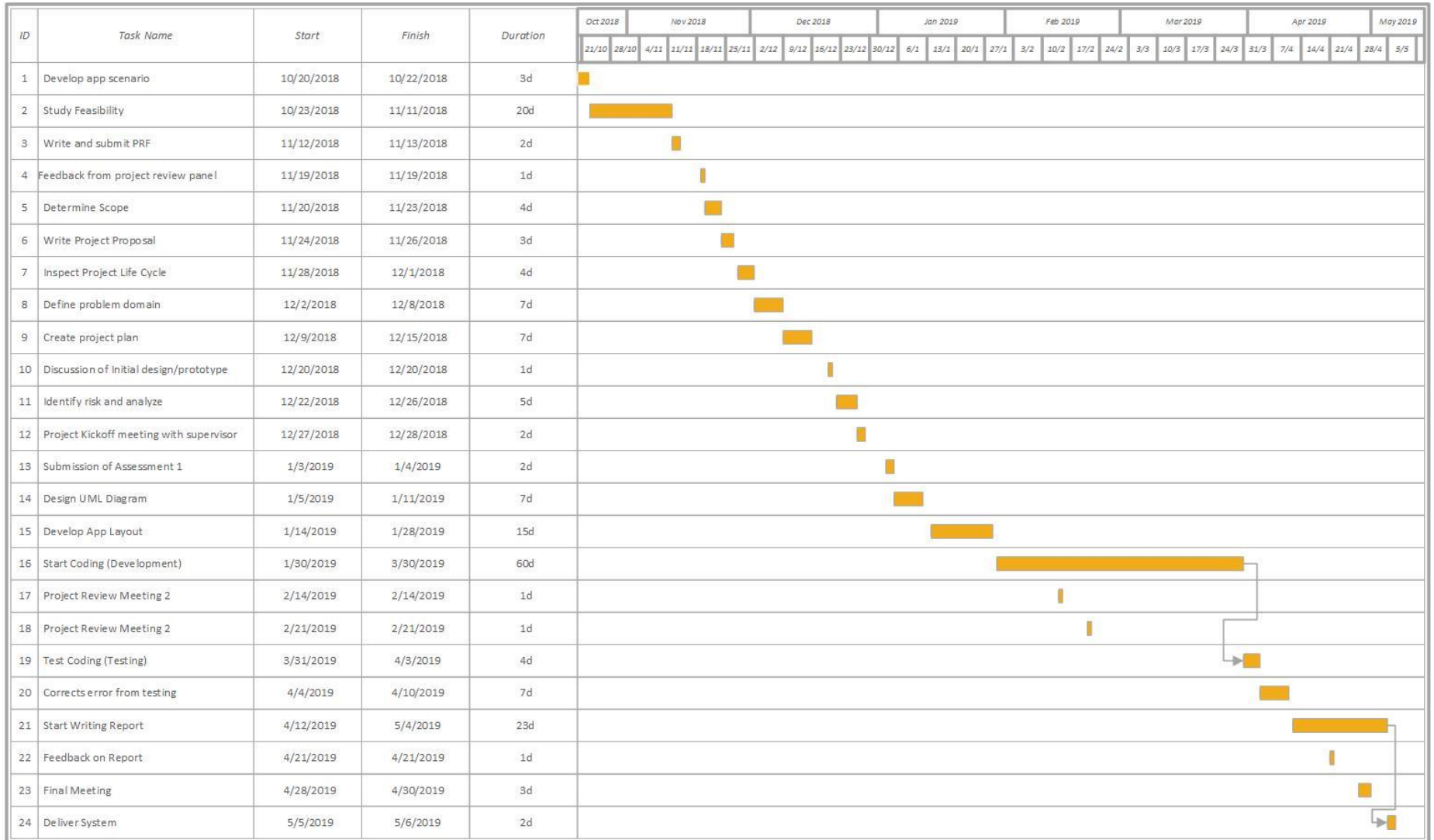


Figure 53 Final Gantt chart of the Project

Remaining Questionnaire

Do you like eating in canteens?

32 responses

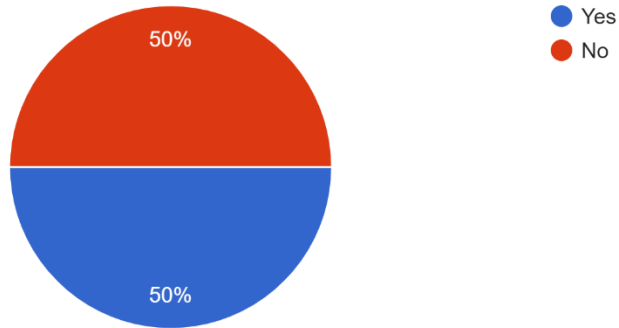


Figure 54 Survey response on people eating in Canteen

What difficulties do you face while searching for restaurants?

32 responses

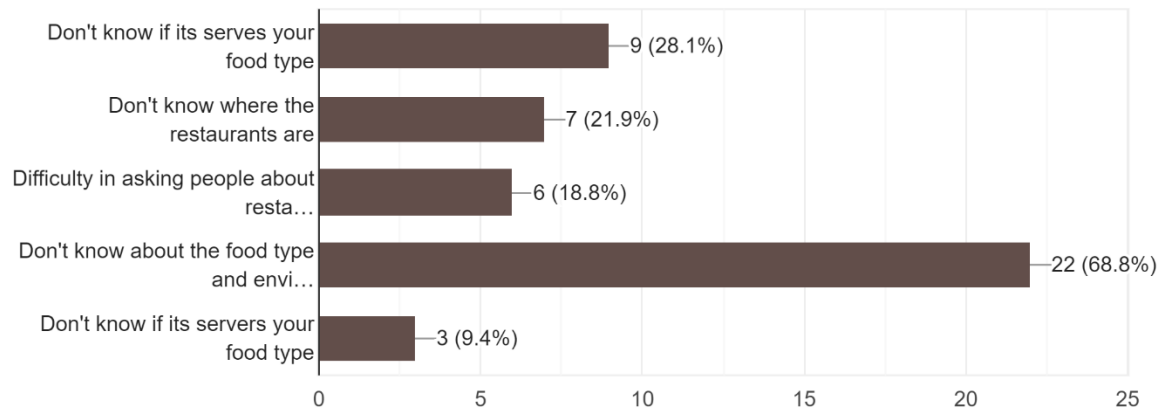


Figure 55 Difficulties faced to find restaurant at new place

Have you ever searched for Restaurant online?

32 responses

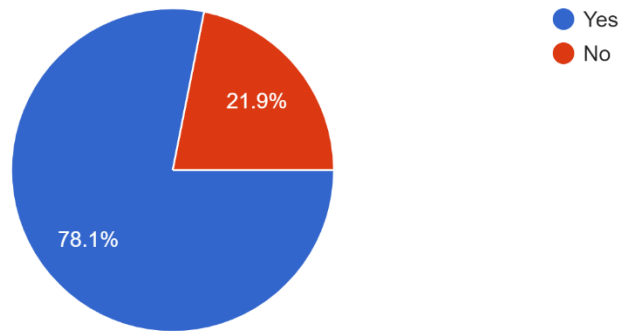


Figure 56 Pie chart to show people who have searched restaurant online

How often do you search for restaurant online?

32 responses

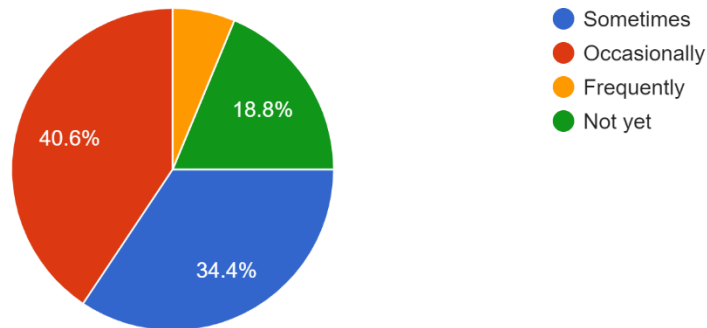


Figure 57 Pie chart showing people searching restaurant online

Would it be nice if you could add reviews so that other people could view your reviews to choose the restaurant?

32 responses

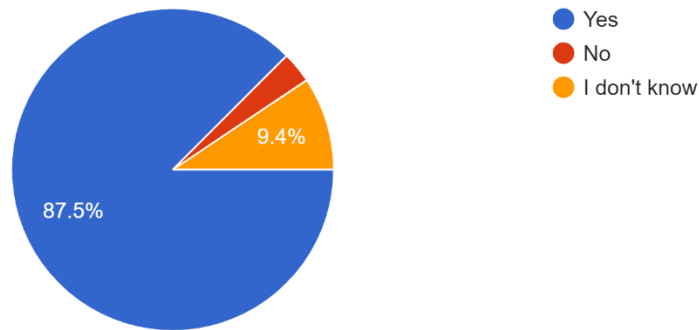


Figure 58 Pie chart showing people agreeing on adding review system

What do you think of sentimental analysis that would convert your opinion of the restaurant to star rating of the restaurant?

32 responses

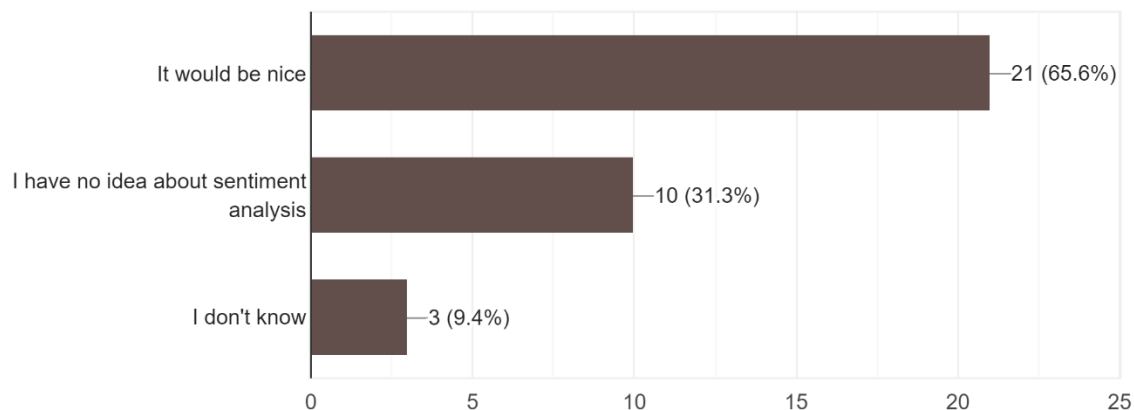


Figure 59 Survey results on if Sentimental Analysis would be good in the application

Github repository log

User Apps

```
$ git log
commit c60527c3caf4d80c5c82bd238e4abf5bf2f6a3ce (HEAD -> master)
Author: Raj <raazpradhan0@gmail.com>
Date: Fri May 10 22:23:43 2019 +0545
```

Commit v5

```
commit 877dce9605430b3f4598fac26c9d5bfb12615ebf (origin/master)
Author: Raj <raazpradhan0@gmail.com>
Date: Fri Apr 26 23:34:35 2019 +0545
```

Commit v4

```
commit ca86e8616c630c378672a83f9253ee229fb086d4
Author: Raj <raazpradhan0@gmail.com>
Date: Tue Apr 23 11:09:20 2019 +0545
```

Commit v3

```
commit fbfa428d50db44618f5ef972ede3ff0c16b69f0c
Author: unknown <raazpradhan0@gmail.com>
Date: Tue Mar 26 11:51:00 2019 +0545
```

Initial commit

Owners app

```
$ git log
commit 4b035352954084966d74697c61afc6ed85097dbc (HEAD -> master, origin/master)
Author: Raj <raazpradhan0@gmail.com>
Date: Fri May 10 22:17:31 2019 +0545
```

Initial commit