A PRELIMINARY REPORT ON

PERSONALIZED FOOD DELIVERY APP

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE
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FOR THE AWARD OF THE DEGREE

OF

BACHELOR OF ENGINEERING (COMPUTER ENGINEERING)

SUBMITTED BY

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2018 -2019

CERTIFICATE

This is to certify that the project report entitles

" PERSONALIZED FOOD DELIVERY APP"

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ABSTRACT

Use of food ordering apps is increasing day by day. With a variety of offers available people are getting used to order food online on a daily basis. The food ordering apps currently available mostly provide hotel food, consumption of such food on a daily basis is not at all healthy. Therefore we intend to introduce an app which not only provides healthy food but also gives recommendations about what the user should and should not eat. The app would process the feedback given by the user and the data about the user taken during registration to give a recommendation about what package best suits the user. This app will include packages of various cuisine on a subscription basis (of seven days). This would also reduce the time that the user spends on the app to choose the food.

Apart from this, we also propose more efficient routing which uses the resources in such a way that it reduces the overall cost of delivering the food. Apps currently in the market allot one delivery boy per order. Whereas our app would efficiently guide the delivery boy to do more deliveries in a single go. So all in all our app would provide a better routing for efficient use of resources and also would provide good and healthy food.

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ABBREVIATION	ILLUSTRATION
OTP	One Time Password
POS	Point Of Sale

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1. Introduction

1.1 Motivation

The growing use of food ordering apps has made people used to eating hotel food. This has led to consumption of hotel food on a daily basis which is not good for the health of users. Also due to increase availability of jobs has led to increased rate of working class which is a good thing but because of this people have become busy and barely get any time to cook. So homemade online food service is the need of the hour. Also people need to be more cautious about their dietary needs. Seeing this we intend to propose an app which not only provides healthy food but also guides the user about the dietary needs.

HIGENIC FOOD **UNHIGENIC FOOD**

The users need to be aware about the kind food they need to eat. Many times people are unaware about the ingredients and this may cause problems. Guiding the user about what food is best suited for them is the main goal here. Apart from this, the way the delivery is managed by the apps in the market is not so cost efficient. Therefore creating a route in such a way so that multiple deliveries could be managed is one of the things these apps lack. Creating such a route is also taken into consideration here.

1.2 Problem Definition

Nowadays many people order food online because their lives are getting busier plus its more easy because, who would want to cook if the food was just few fingertips away ? There are various apps which provide online food delivery. But the most of these apps provide hotel food. Consumption of such food on a daily basis can be harmful therefore a food app that delivers homemade healthy food is the need of the hour. Also people need to take care about what they are eating not all healthy food can always be good for everyone. Therefore an app which not only provides healthy food online but also gives recommendations to the user about what is good and what is not good for them could be a real saviour.

Apart from this, the apps currently in the market don't efficiently use the resources and finding out a way in which less use of the resources is done is more productivity is obtained could really be helpful. We intend to create an app which uses machine learning and OSRM API for overcoming the issues and problem stated above.

2. LITERATURE SURVEY

2.1 Online Food Ordering System

Improving customer satisfaction can increase the customers' loyalty to a product or service provider. One way to improve it is by having a food ordering system which enables customers to purchase the products without physically visiting the shop, namely by phone or by website, and then have the product delivered to the customer's address safely and in good condition. Some food franchises in Indonesia have implemented this type of system, such as Kentucky Fried Chicken, McDonald's, and Pizza Hut.In delivery service, one of the main problems is to find the shortest path between customers' addresses in order to deliver the product in reasonably short time, to save fuel usage and to optimize the utilization of the vehicles and delivery personnel.The optimization requirement is usually represented on the delivery staff job vacancy announcement that often requires the applicants to know the streets or shortcuts in particular area or city. The routing problem that is related to the condition of food delivery service is called Traveling Salesman Problem (TSP). In TSP, the seller starts moving from his/her hometown and is required to visit several cities exactly one time before going back to his/her hometown with minimum total distance. All cities are connected to each other. In this research, the author develops a system that can optimize the delivery routing process by implementing one of the solutions to TSP, which is heuristics algorithm. In addition, the system also utilizes the Global Positioning System (GPS) technology and mapping solution software, Google Maps. **[1]**

2.2 Various Online Food Delivery Apps

1. A Food Ordering System with Delivery Routing Optimization Using Global Positioning System (GPS) Technology and Google Maps by Roy Deddy Hasiholan Tobing **[1]** based on :

- Android based Application
- Web based App
- Heuristic Routing Algorithm

2. Android Application for Local Food Ordering System by

Android Application for Local Food Ordering System by Shubham Takalkar, Devendra Phatak, Kumar Abhinav, Salman Hadi, R. H. Borhade **[2]** based on :

- Area Recognition (GPS)
- Android based app

3. Automated Food Ordering System with Real-Time Customer Feedback **[3]** based on:

- The android application on android mobiles of customers to make orders.
- The server and web applications on the restaurant-owner's laptop to customize menu and keep track of customer records.
- The central database for restaurant-owner to store updated menu information and order details.
- Wireless infrastructure to support networked communication.

4. Design and Implementation of an Android Application using WiFi-enabled Devices for the Food Servicing Industry **[4]** by Alberto Bañacia, Marc Dindo Fernando, Arnel Requillo Jr., and Nelson Rubi Jr. EE/ECE Department, University of San Carlos Cebu City, Philippines

2.3 Observations :

While doing the literature survey, the following observations were made:

- The delivery service business process of several food franchises in Pune. These observed business processes are the based to develop the proposed food ordering system in this research.
- Study on Android.
- Study on OSRM API
- Study on Machine Learning

2.4 Methodology :

While doing the research it was observed that most of the existing apps possess the required features that an online food delivery system should consist but they lack a few advanced features like recommendation. Also the routing algorithms are not as efficient as they should be. The key aspects of our proposed system are as follow :

- Use of Machine Learning for Recommendation
- Use of OSRM API for efficient routing

2.5 Machine Learning Model :

For system should to give recommendation to the user about what food they should eat, the system should consist of a model that can be trained on some data and then give recommendation based on the knowledge it has learned. We gathered information about the dietary requirements and food preferences of people from different age groups. Following is a set of few of those records :

Timestamp	Food Types (You can select more than one)	Taste Preferences	Height(cms)	Weight(kgs)	Allergies	Any specific Likes?	Diabetes?	Locality
2018/10/05 2:32:03 PM GMT+5:30	Egg;Non Vegetarian;Seafood	Spicy	175	70		Chinese;Maharashtran;Punjabi;Lebanese;Western	No	NIBM/Kondhwa
2018/10/07 3:01:12 PM GMT+5:30	Vegetarian	Medium-Spicy	180	60		Punjabi	No	Other
2018/10/07 3:02:22 PM GMT+5:30	Vegetarian;Egg;Non Vegetarian;Seafood;Vegan	Medium-Spicy	165	52		Maharashtran	No	Other
2018/10/07 3:02:50 PM GMT+5:30	Vegetarian	Medium-Spicy	175	76		Maharashtran	No	Other
2018/10/07 3:03:31 PM GMT+5:30	Vegetarian	Spicy	155	85		Punjabi	No	Other

Table 1: Records collected during the survey for food preferences of people

Around 200 entries were collected and we intend to gather more data. This data consists of various attributes which well define the food preferences of people from various walks of life. As observed, most of the data is categorical. Therefore one of the classifiers only would be best suited for training the Model. By studying various classification algorithms, CART (Classification And Regression) was chosen for training the model. The major reason for choosing CART was that it does pruning while training the model, i.e it continuously keeps pruning the tree inorder to reduce the size of the tree. Also it handles continuous data as well.

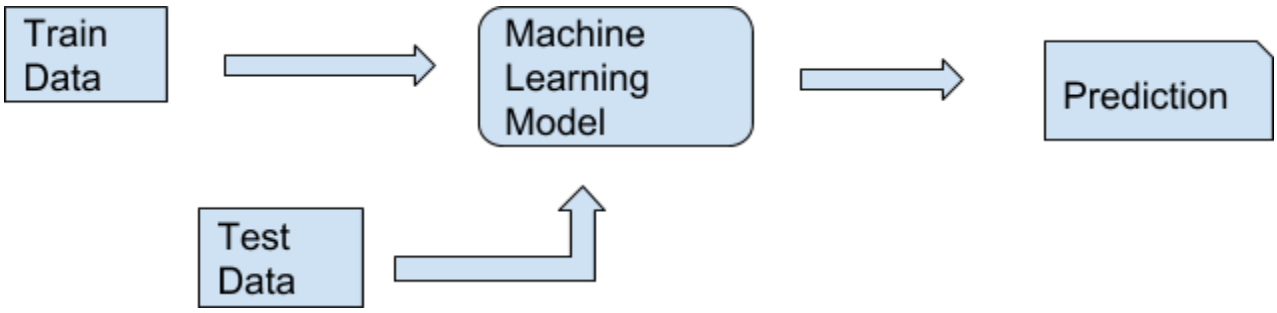


Fig 1 : Machine learning Model

2.6 Software Development Life Cycle :

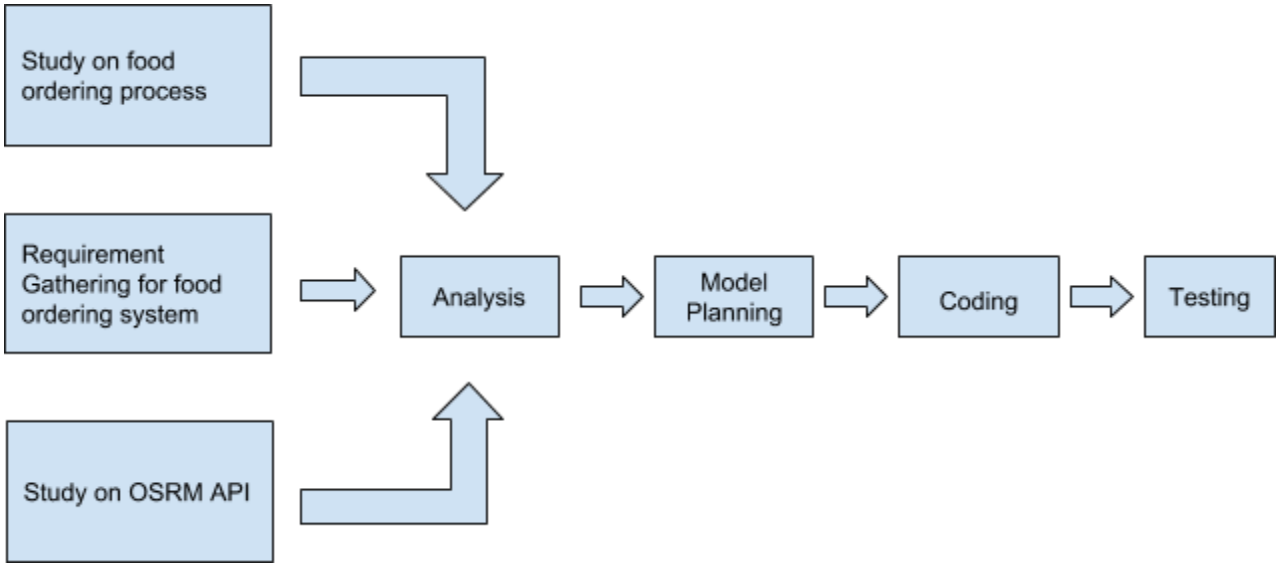


Fig 2 : SDLC

2.7 OSRM API for Route Optimization

OSRM stands for Open Source Routing Machine, it is a modern C++ routing engine for shortest path in road networks, it works on open street map data.

The following services are available via HTTP API, C++ library interface and NodeJs wrapper:

- Nearest - Snaps coordinates to the street network and returns the nearest matches
- Route - Finds the fastest route between coordinates
- Table - Computes the duration or distances of the fastest route between all pairs of supplied coordinates
- Match - Snaps noisy GPS traces to the road network in the most plausible way
- Trip - Solves the Traveling Salesman Problem using a greedy heuristic
- Tile - Generates Mapbox Vector Tiles with internal routing metadata

2.8 Docker :

Docker is a computer program that performs operating-system-level virtualization, also known as containerization.It was first released in 2013 and is developed by Docker, Inc. Docker is used to run software packages called containers. Containers are isolated from each other and bundle their own application, tools, libraries and configuration files; they can communicate with each other through well-defined channels. All containers are run by a single operating system kernel and are thus more lightweight than virtual machines. Containers are created from "images" that specify their precise contents. Images are often created by combining and modifying standard images downloaded from public repositories.

There are two preprocessing pipelines available :

- Contraction Hierarchies (CH)
- Multi-Level Dijkstra (MLD)

2.9 OSRM w.r.t our system :

Since OSRM only provides shortest route for a given set of points from start to end with intermediate points using distance matrix and tables and respective algorithms (MLD and CH) whereas the problem statement is to provide routing for multiple pickup multiple delivery points with the varied cook location and customer locations the OSRM api will be used as a base to work on the required solution.

Route optimization for :

- Multiple Drivers: More than one vehicle , Optimum split of stops across all available vehicle
- Vehicle capacity : Capacity constraints to be considered
- Multiple type of points: Pickup(cooks) and Delivery (Customers)

2.10 Analysis :

The food ordering system can be divided into the following main components :

- Android Application
- OSRM based Routing
- Machine Learning based Model (for prediction of food choice for user)

3. SOFTWARE REQUIREMENTS SPECIFICATION

3.1 Introduction

3.1.1 Project Scope :

This system will help to manage & run the online food ordering business systematically . In this system, we will provide an App that can be used by the customers to order food. Customers can also give feedback through this app. So that vendor can evaluate the whole system.

This will ultimately lead to providing good quality food to the customers and create an opportunity to appoint more chefs to provide home-made hygienic food .Customers can also make payments through debit or credit cards using POS which will be integrated within the management system. Initially the food delivery service is limited within the Pune city (Specific Areas).

3.1.2 User Classes and Characteristics :

The following are the main user classes with their characteristics :

1.Customers :

The customers are the registered users who will order the food. They should be able to choose a package of their own choice which will include 7-days menu. The customers should be able to create a package of their own from the available list of items. The customers should also be able to give feedback.

2. Cooks :

The cooks should be able to see how many customers have opted their weekly package so that they can keep a track on their inventory. The should be able to update and notify the users in case of any last moment changes.

3. Admin :

The admin should be given privileges to change and update the menu and also manage the cooks and the contents of the packages.

Logistics :

These are basically the delivery staff which will delivery the food.The should be able to deliver the food by the guidance of the best optimal route generated by the system.

3.1.3 Assumptions and Dependencies :

- The system will use third party service for payment
- The system will use third party service for delivery of food
- Only the cooks who were trained by the employer can register as cooks in the system
- The system has geographical limitation up-to one city

3.2 Functional Requirements

3.2.1 Route Optimization

3.2.1.1 Description and Priority :

It will give the best optimized path for picking up the order and delivering it

Priority - HIGH

Stimulus/Response Sequences

Delivery man uses this path to pickup and deliver food

Customer will get the food delivered to him/her and will in-turn give feedback.

Functional Requirements

The number of nodes(cooks & customers) need to be defined firstly

Then depending upon the number of available drivers the nodes should be divided per driver and he should get the optimized path w.r.t those nodes only.

REQ-1: Determine the customers and cooks

REQ-2: Determine the packages

3.2.2 Recommendation of Personalized package based on the preferences:

Description and Priority:

Based on the data received from the registration form and daily feedback the customers will be recommended a personalized package based on his/her likes/dislikes and dietary needs

Priority – HIGH

Stimulus/Response Sequences :

Customer can then choose between the available packages and the recommended one

Functional Requirements:

The customer needs to give feedback and give relevant information during registration

This data can be used to suggest a package according to the customers need.

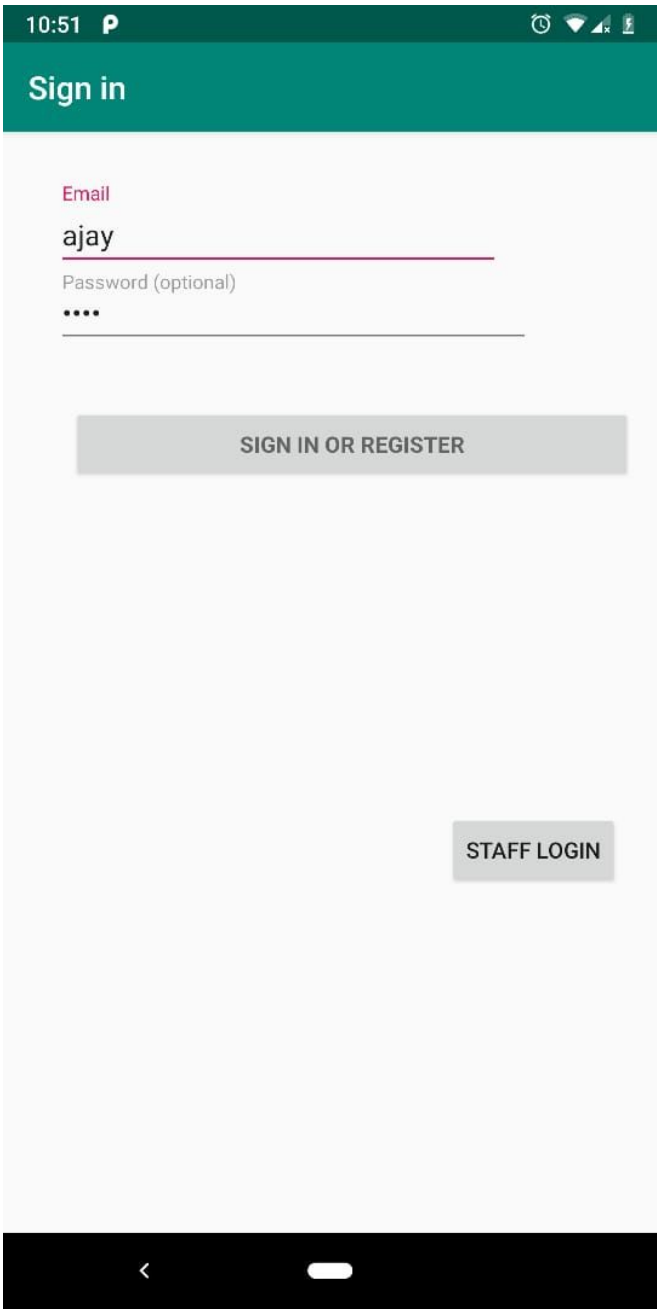
REQ-1: Customers should determine personal information correctly during registration

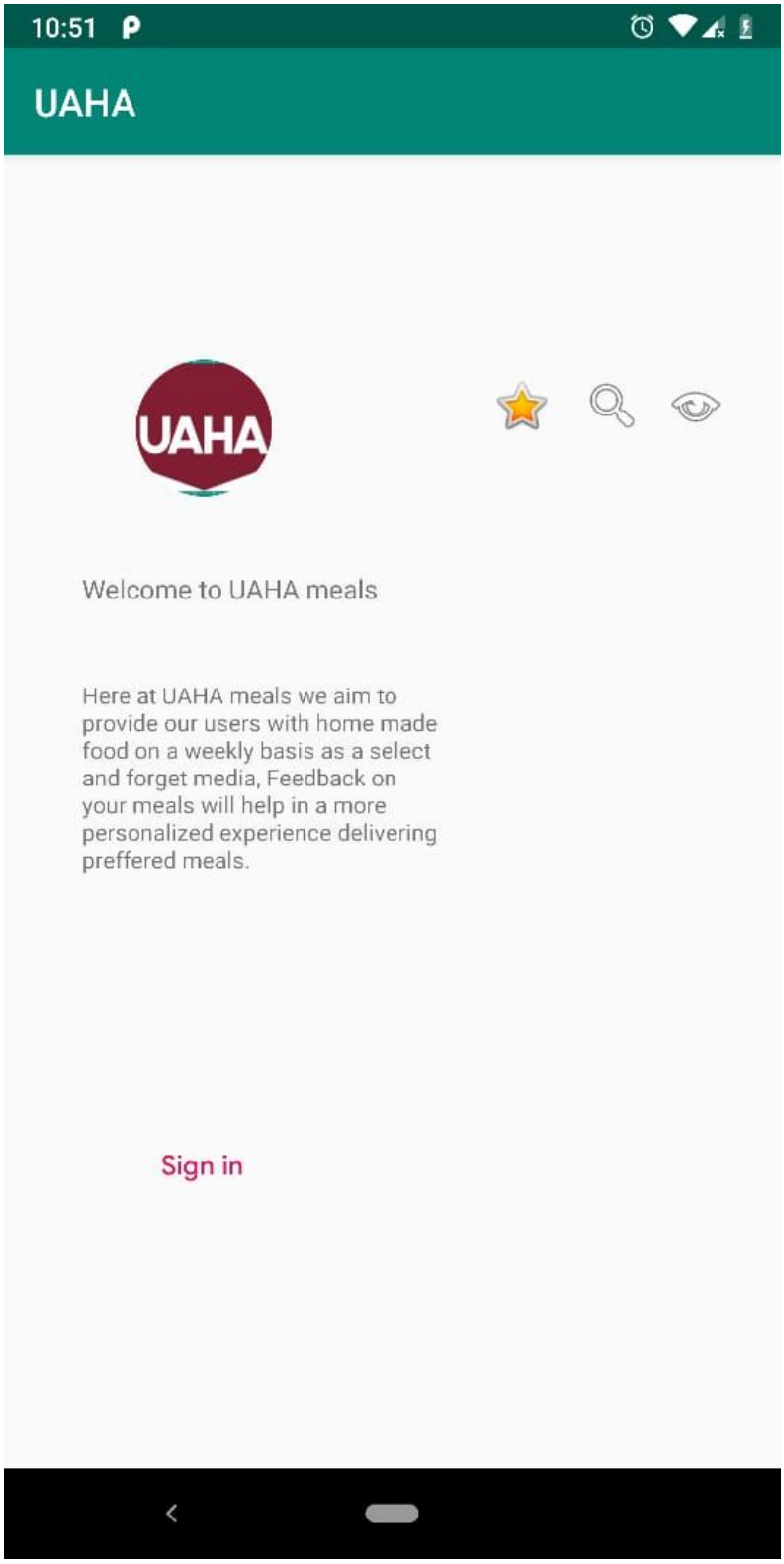
REQ-2: Customers should give daily feedback

3.3 External Interface Requirements

3.3.1 User Interfaces :

** SCREENSHOTS**




10:51
UAHA
UAHA
Welcome to UAHA meals
Here at UAHA meals we aim to provide our users with home made food on a weekly basis as a select and forget media, Feedback on your meals will help in a more personalized experience delivering preffered meals.
Sign in

3.3.2 Hardware Interface :

- Android smartphone
- Min RAM 1 GB
- Min internal memory 16 GB

3.3.3 Software Requirements :

- Android with version 7.0 and above

3.3.4 Communication Requirements :

- Internet Access
- GPS

3.4 Non-functional Requirements :

3.4.1 Performance Requirements :

The system should be SMART

S-Specific

M-Measurable

A- Achievable

R- Realistic

T- Timely

Response time- Should be consistent (ideally a latency of less than a second is acceptable)

Workload - The system should handle many concurrent users at a time

Scalability – The system should be able to incorporate the changes made in the packages and also handle the increase in no of users.

Platform Considerations- Android

3.4.2 Safety Requirements :

App only works over internet

Do not use if the internet is not working properly as the app might not perform as desired in very low bandwidth

Keep GPS on so that users Location could be detected

3.4.3 Security Requirements :

The app would require personal details like address, phone number and ask the user to do verification via mobile otp.

Read Terms and conditions

3.4.4 Software Quality Attributes :

Scalable : The system can handle increase in no of users

Portable : The system can be used through an app

Robust : The system can handle any erroneous

Adaptive : Adapts to the requirements of the user and changing nature of packages

Ease of use : User-friendly design

3.5 System Requirements :

3.5.1 Database Requirements :

At backend the data would be stored on firebase. The same would be used for querying while doing database operations.

3.5.2 Software Requirements (Platform choice):

The system is to developed using android studio for front end and firebase for backend as well as server.

3.5.3 Hardware Requirements :

No special requirements

FLOW OF THE SYSTEM

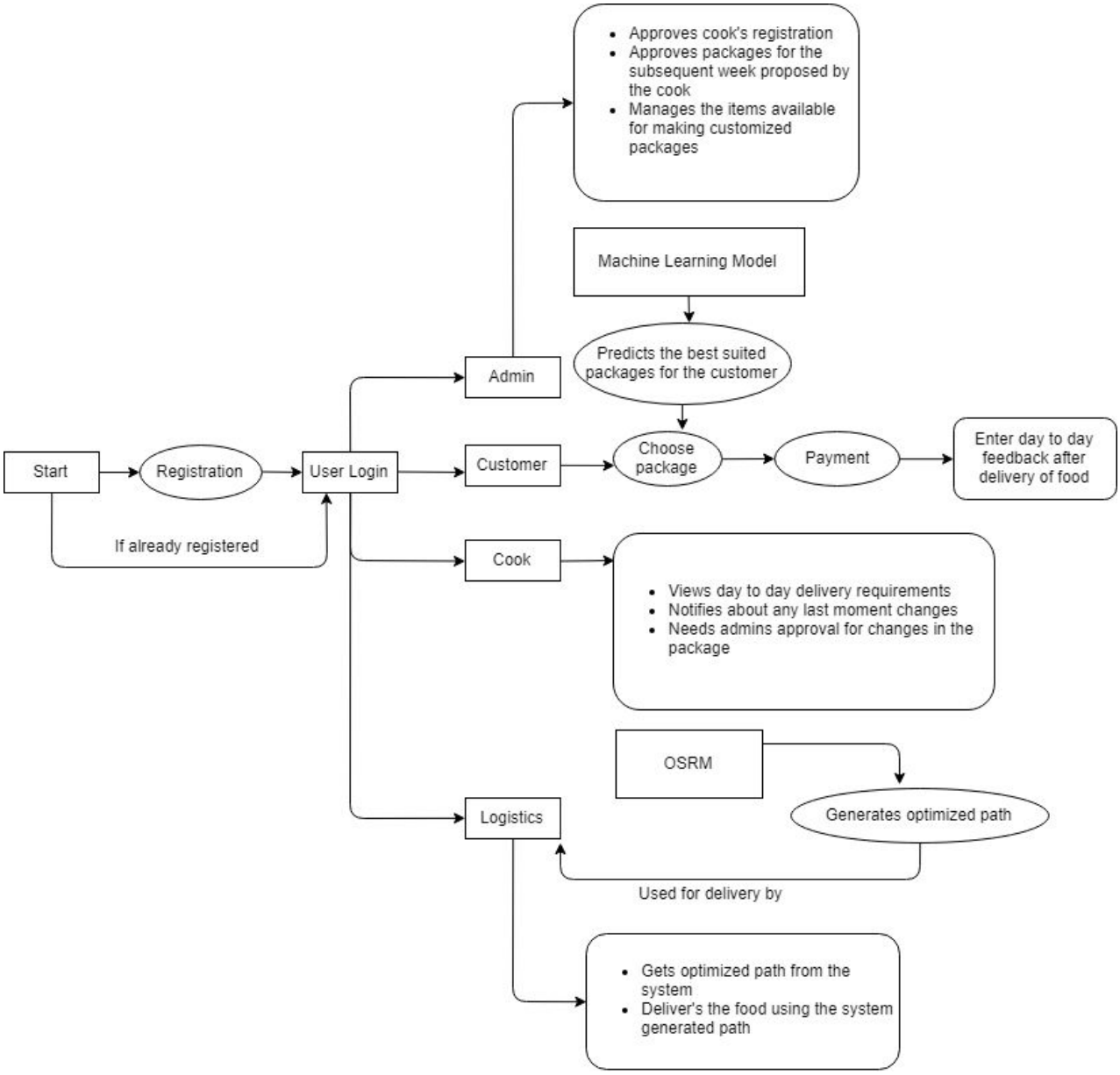
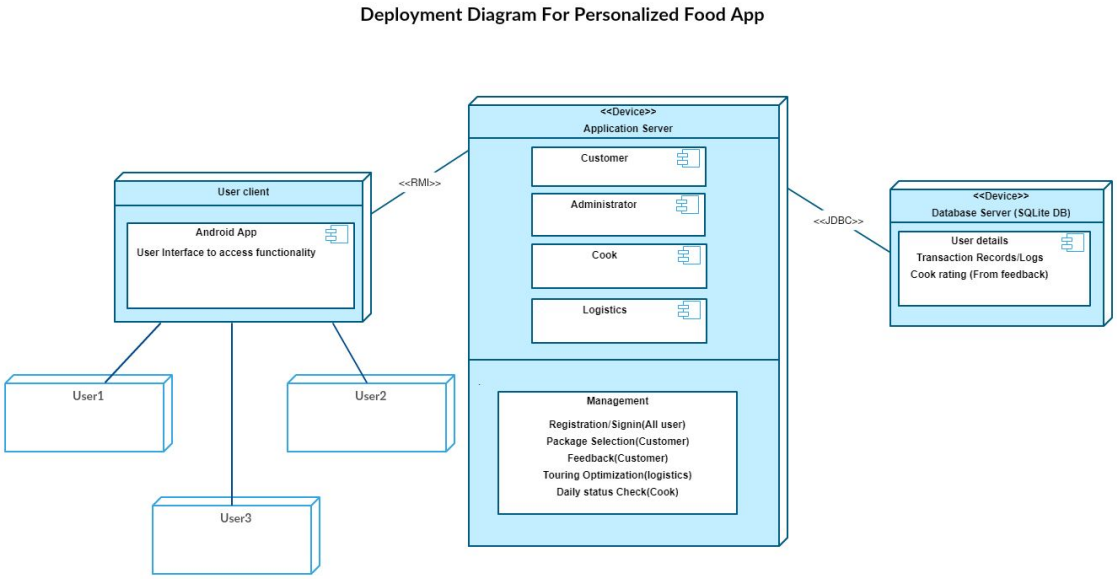


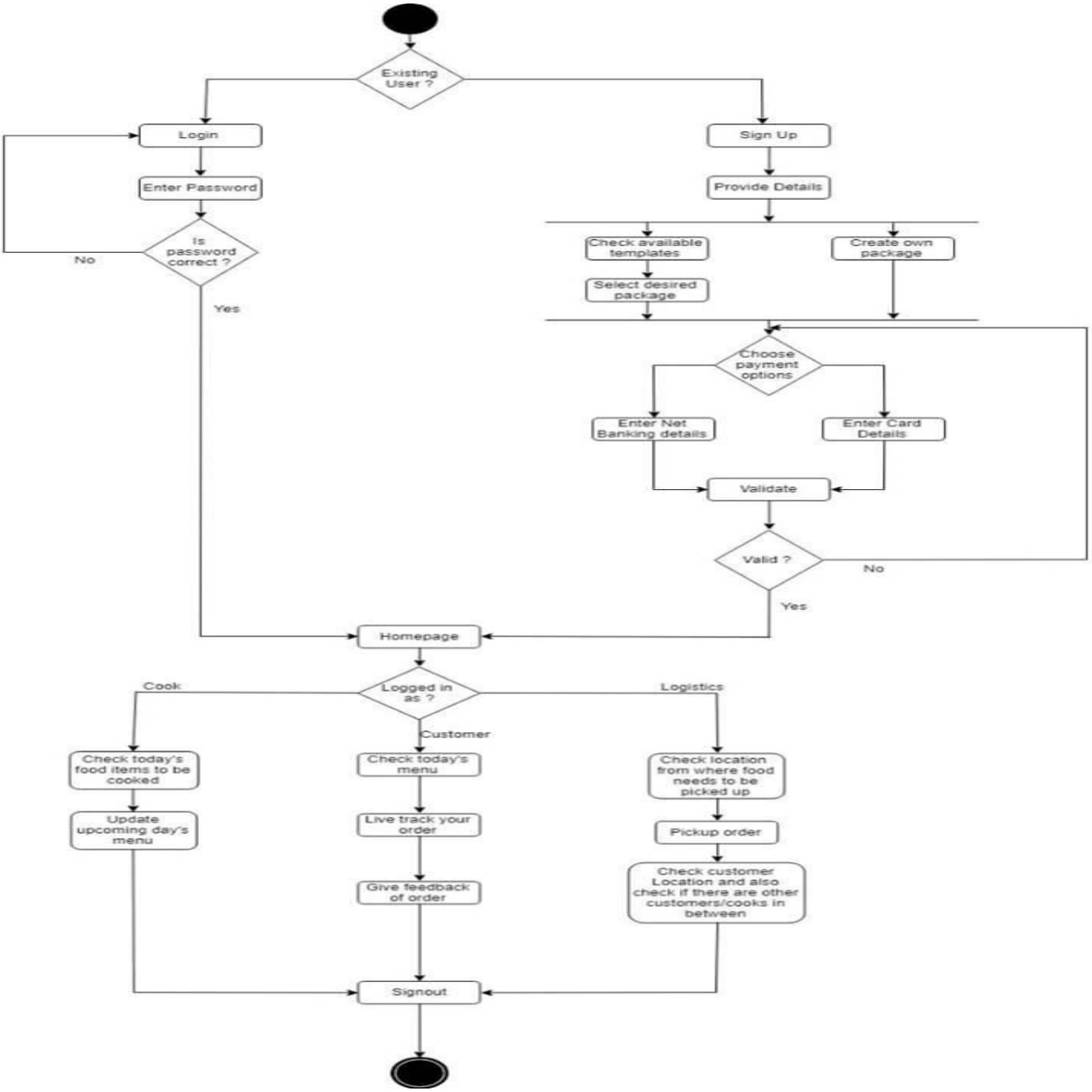
Fig : Flow of the system

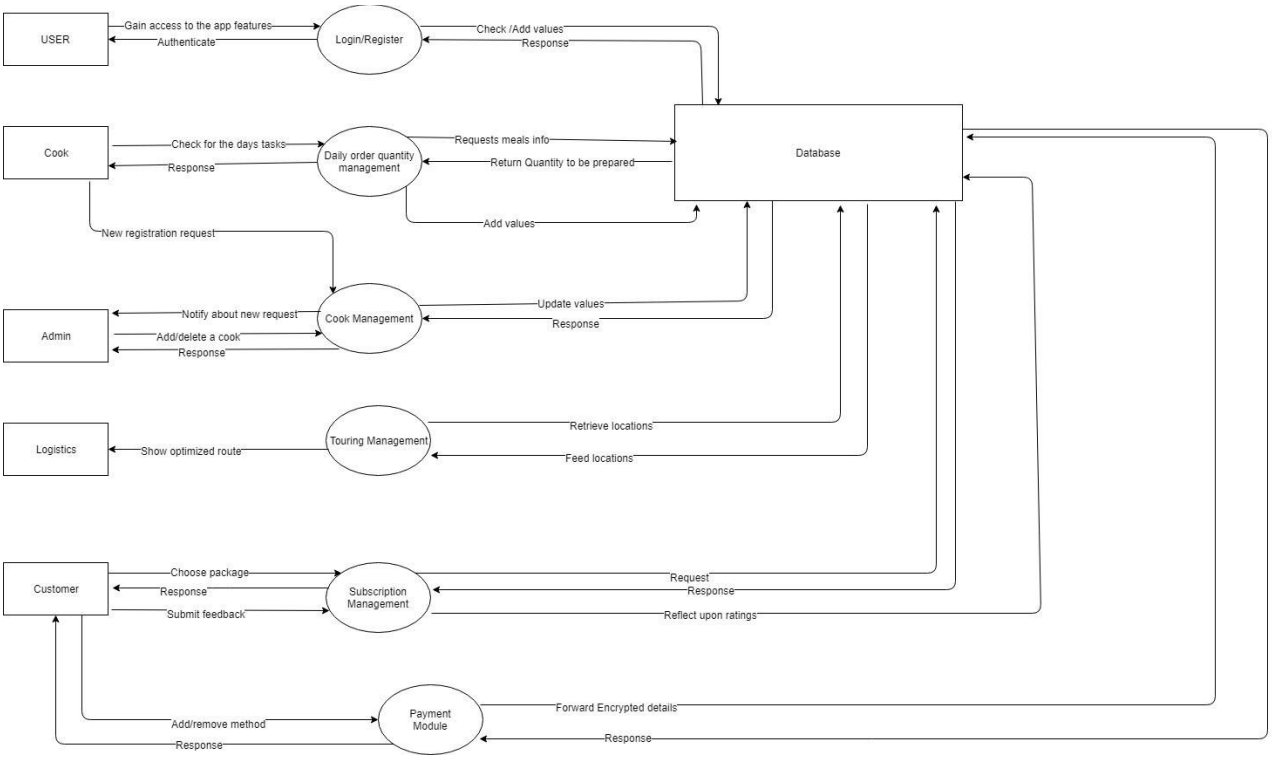
4 SYSTEM DESIGN

4.1 System Architecture

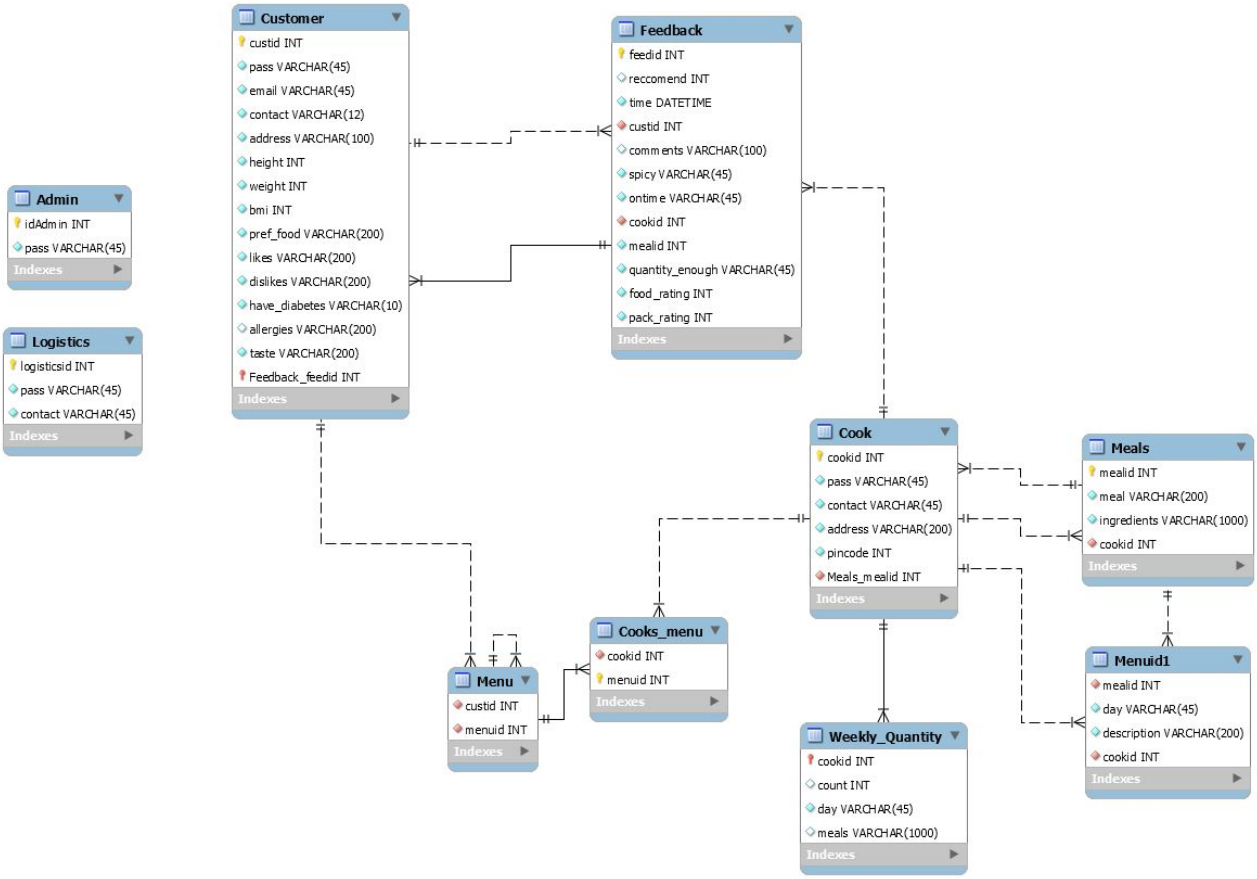


4.2 Data flow Diagrams

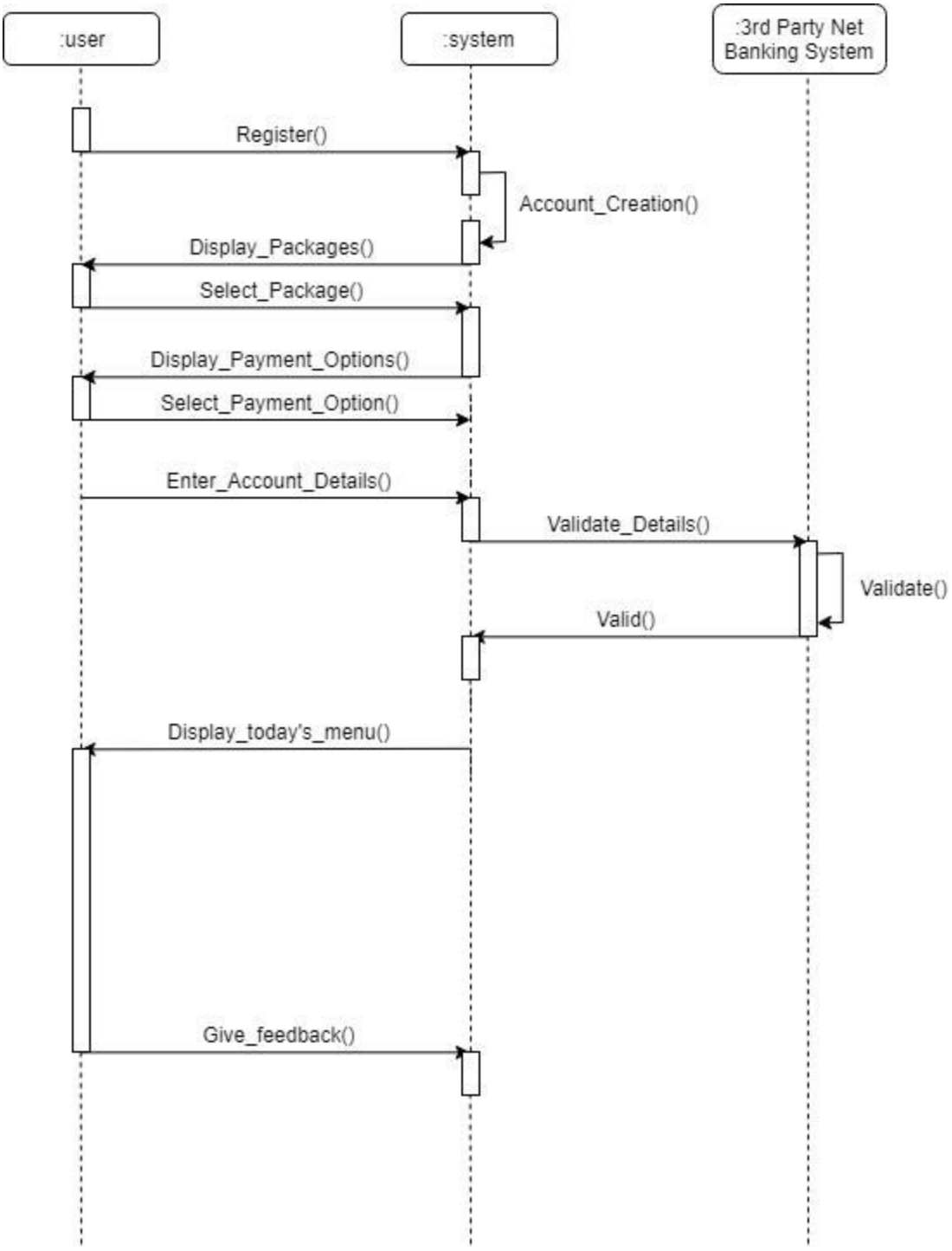



USER
Gain access to the app features
Authenticate
Login/Register
Check /Add values
Response
Database
Cook
Check for the days tasks
Response
Daily order quantity management
Requests meals info
Return Quantity to be prepared
Add values
New registration request
Admin
Notify about new request
Add/delete a cook
Response
Cook Management
Update values
Response
Logistics
Show optimized route
Touring Management
Retrieve locations
Feed locations
Customer
Choose package
Response
Submit feedback
Subscription Management
Request
Response
Reflect upon ratings
Add/remove method
Response
Payment Module
Forward Encrypted details
Response

4.3 Entity Relationship Diagram



4.4 Sequence Diagram



4.5 Use Case Diagram

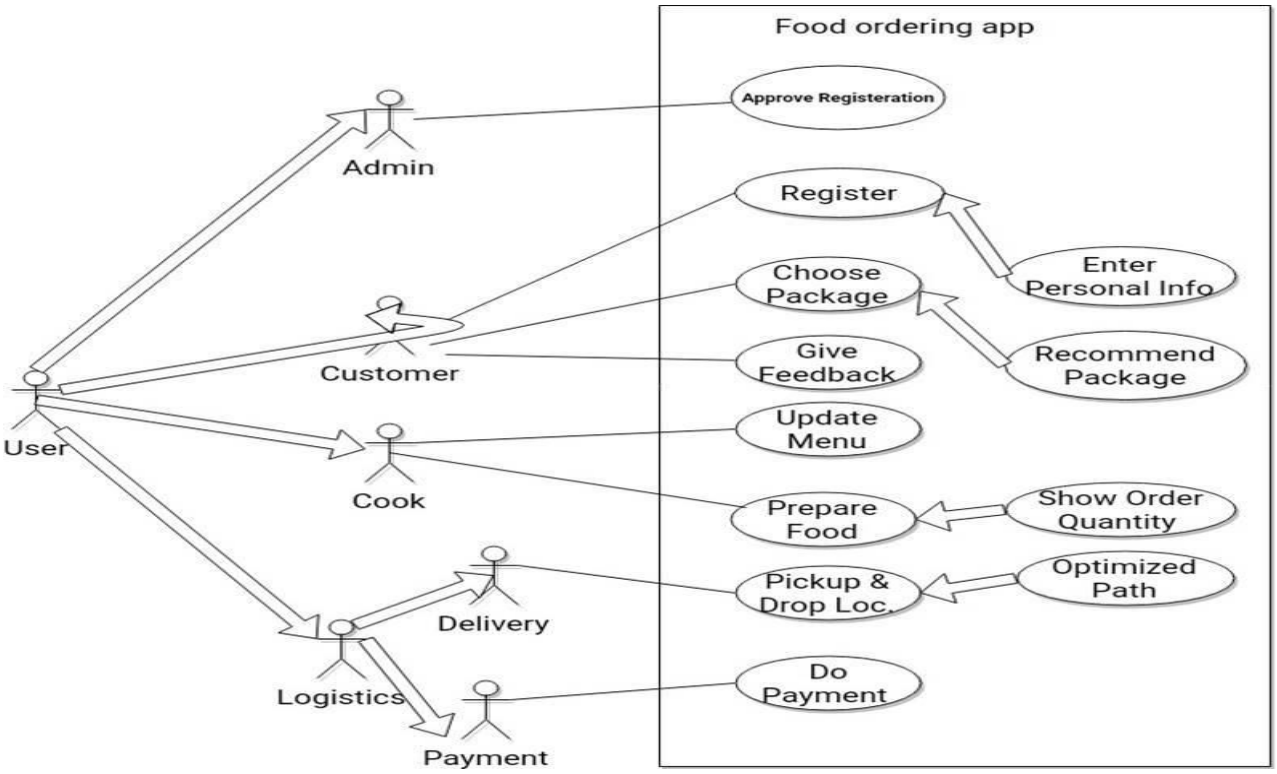
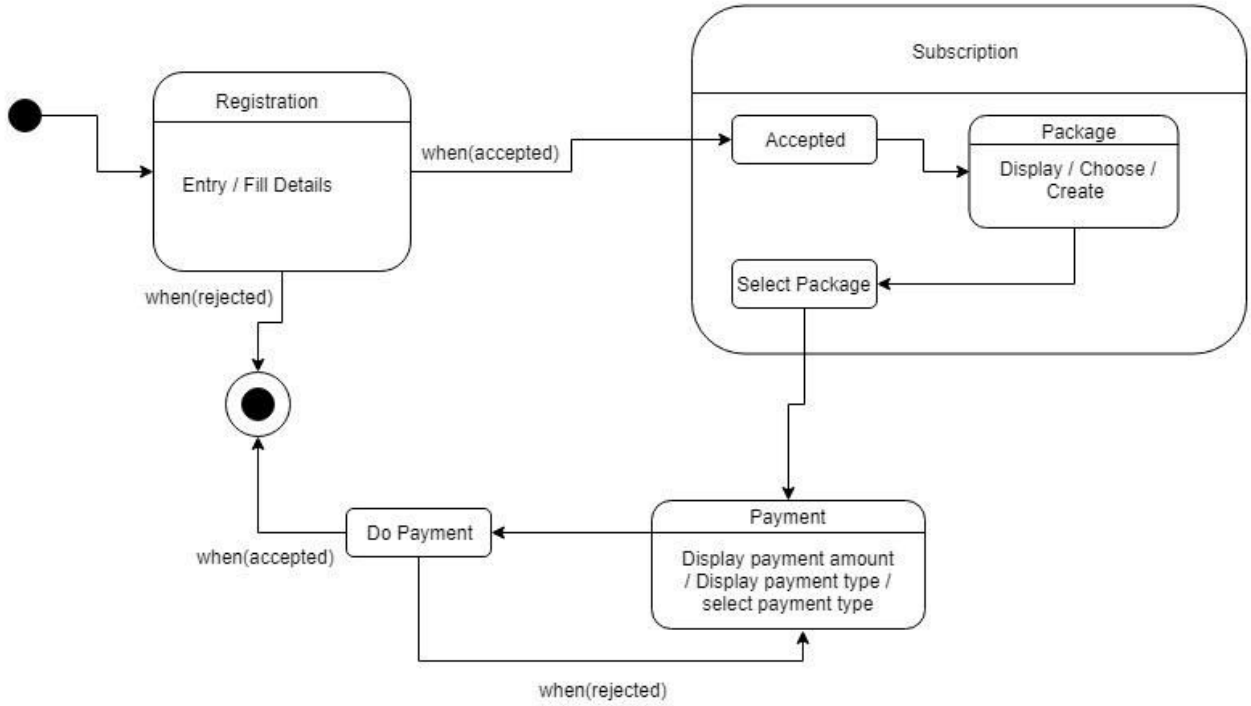
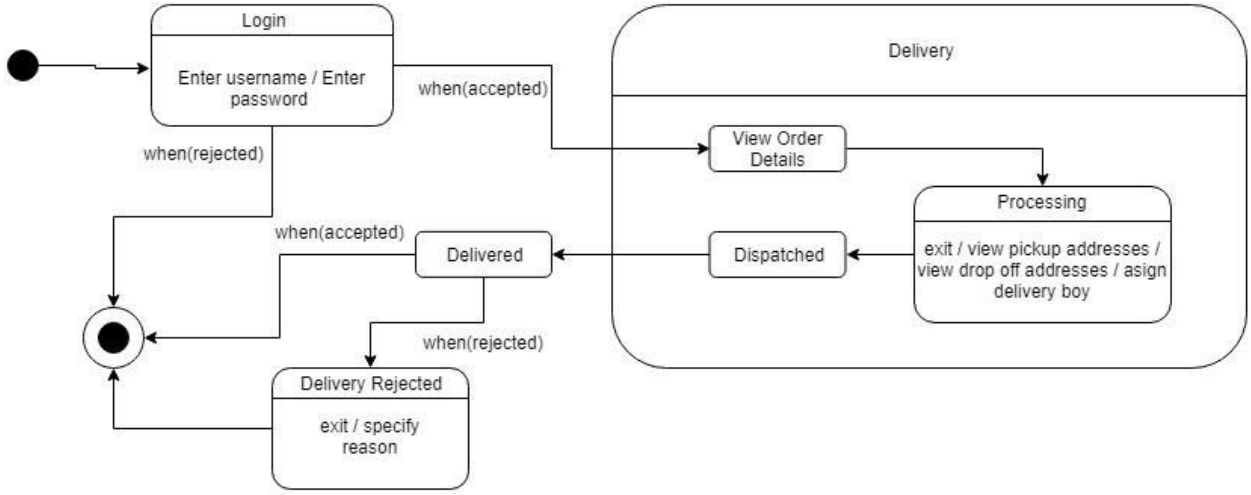
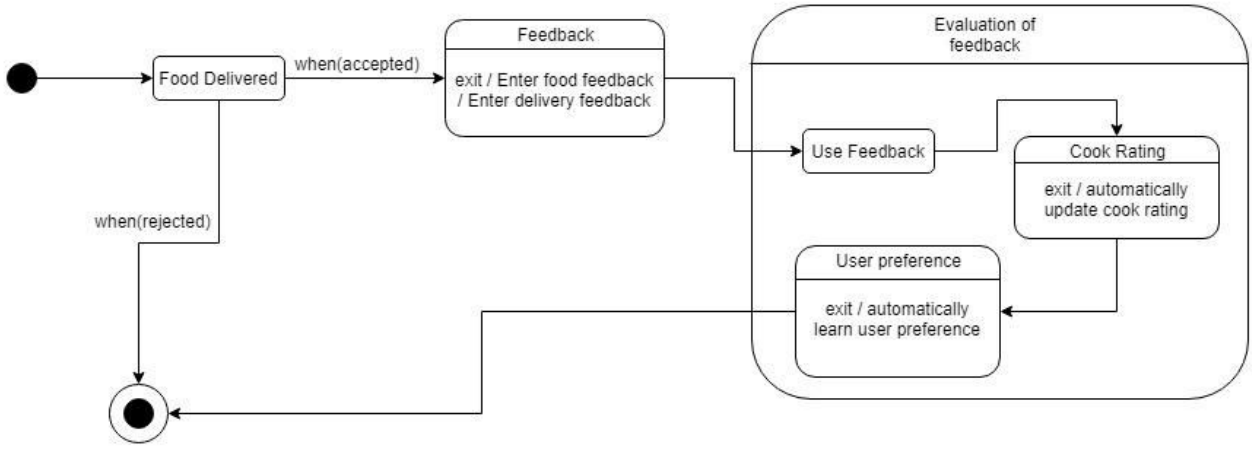


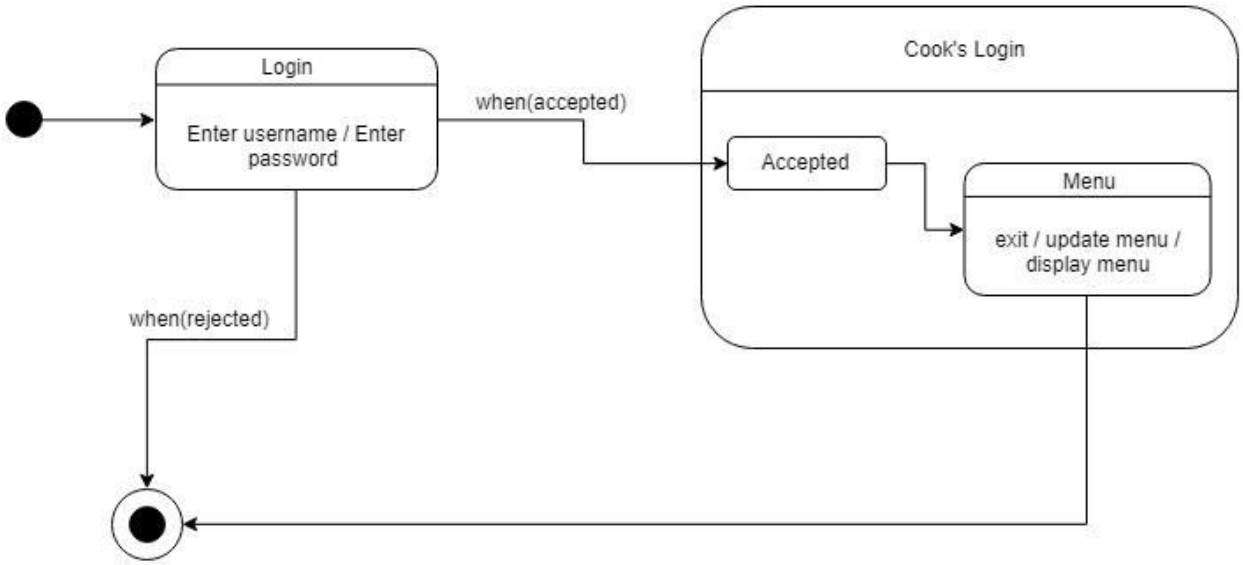
Fig : Use Case Diagram

4.6 State Transition Diagrams






Food Delivered
when(accepted)
Feedback
exit / Enter food feedback
/ Enter delivery feedback
Evaluation of
feedback
Use Feedback
Cook Rating
exit / automatically
update cook rating
User preference
exit / automatically
learn user preference
when(rejected)


Login
Enter username / Enter
password
when(accepted)
Cook's Login
Accepted
Menu
exit / update menu /
display menu
when(rejected)

5 Other Specification

5.1 Advantages:

Unlike other conventional food delivery apps this app will provide multi pickup and multiple drops for logistics team

The subscription a select and forget system where the user need not constantly browse but the feedback provided will customize food app according to the preference of the customer at the backend

5.2 Limitations:

The system will use third party service for payment
The system will use third party service for delivery of food
Only the cooks who were trained by the employer can register as cooks in the system
The system has geographical limitation up-to one city

6 Conclusion and future work

People who order food online on a daily basis are fed up of eating hotel food. Thus, we present a food ordering system that will provide a platform for people to order hygienic home cooked food online, as there are very less sources of getting home cooked food online. Therefore, this system would prove to be a promising one. This system also ensures good quality of service and customer satisfaction. Therefore, the proposed food ordering
system has the potential to attract customers and also adds to the efficiency of maintaining customers ordering and billing sections.

Appendix: Glossary

POS : Point of sale
OTP : One Time Password

Plagiarism Report :

References

A Food Ordering System with Delivery Routing Optimization Using Global Positioning System (GPS) Technology and Google Maps- Roy Deddy Hasiholan Tobing

Android Application for Local Food Ordering System Shubham Takalkar, Devendra Phatak, Kumar Abhinav, Salman Hadi, R. H. Borhade Information Technology Engineering Department, Smt. Kashibai Navale College Of Engineering, Pune. Savitribai Phule Pune University

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Design and Implementation of an Android Application using wifi-enabled Devices for the Food

Servicing Industryby Alberto Bañacia, Marc Dindo Fernando, Arnel Requillo Jr., and Nelson Rubi

Jr. EE/ECE Department, University of San Carlos Cebu City, Philippines