



Department of Computer Engineering

# **Software Product Line Engineering Project**

## **Phase 1 Report**

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This report is submitted to the Department of Computer Engineering of Bilkent University in partial fulfillment of the requirements of the Software Product Line Engineering course CS415.

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# 1. Introduction

The main motivation of the software product line engineering is to provide customized products at reasonable costs [1]. Since the order management system has considerable amount of reusable parts, it is chosen for this project, and software product line engineering strategies will be applied throughout the semester. Reusable parts will be explained in 2.1 Common Features.

The order management system will be implemented for the mobile commerce companies so that their target user can get service through the application. The order management system is planned to be used as a basis for 3 online shopping applications that are: Meal order application like Yemeksepeti, Online Pharmacy application, Service Order application like armut.com

In this report, the proposed variants will be explained. Results of kano methodology, feature model of those variant, use cases diagrams, and class diagram can be found in the rest of the report. Moreover, the most functional pages of those variants can be found in the last part of the report.

## 2. Features

### 2.1 Common Features

- **Service Limit** : All of the proposed applications has a minimum service limitation that is determined for each service.
- **Rating and Review System** : Customers can rate the service that they got and they can write review about it.
- **Display Service History** : All user types (customers and service providers) can display the previous services that they got or they provided.
- **Customer Support**: All user types can get customer support using online chat bots or call. The chats are not saved so users cannot display chat history.

### 2.2 Variable Features

- **Collect point to get discount** : In FeedMe the customer can collect points when they order the meal. They can get discount for the upcoming orders.

- **Location based display :** When the customers search for the specific service, the system displays the possible service providers according to the customers location first. In FeedMe, customers can get service from the restaurants that are close to the given address. In HealthyLife and MaturePear, listed servicers is not based on user's location.
- **Social feed :** In FeedMe, customers can add their friends, and they stay updated about their friend's activities. In MaturePear and HealthyLife, there is no social feed functionality.
- **Having Leaderboard:** In FeedMe, the system provides a leaderboard that compares your points with your friends and globally. In MaturePear and HealthyLife, there is no social feed functionality.
- **Payment Method :** In FeedMe and MaturePear, users can pay with credit card or cash. They can also pay online with their credit card. In HealthyLife, users can only pay online with their credit card and they can use PayPal.
- **Pricing :** FeedMe customer usage is free. However, FeedMe charges the restaurants with extra fees. MaturePear free. However, MaturePear charges the service providers with extra fees. Pricing for customer usage in HealthyLife is based on a subscription type.
- **Online Chatting:** Users can chat directly with the service providers in MaturePear. They can use online chatting to discuss the details of the expected service and to negotiate the price. All the discussions are saved into the system so the user can access that chats and they can display their chat history.
- **Get Notification:** In premium customer account of HealthyLife, users can get notification when their order is on stock. They are notified about campaigns, and special deals.
- **Stock availability:** Users can check the stock availability in HealthLife. However, users are not informed about the stocks in FeedMe. This is also not a feature for MaturePear.

## 2.3 Customized Features

- **7/24 Online Support:** HealthyLife provides Premium online live support to their premium subscribers.

## **3. Proposed Variants**

### **3.1 FeedMe**

FeedMe provides two different types of login operation for two kinds of users: customer login and restaurant login which determine the way that users can interact with the system. Customer login will be used by people who want to order food. Simply, users registered as a customer can search restaurants menus based on their locations using provided filters and can order food with online payment via their credit cards. Also, users are able to choose cash payment method. Moreover, users can earn points based on their orders so that they can use these points to get discount. Another unique function that this system provides is an online social platform in which users can interact with other users, see others' actions and take a part in leaderboard alongside with their friends.

On the other hand, restaurants can use restaurant login and can upload their restaurants information such as its location, its menu, its campaigns etc.

### **3.2 MaturePear**

MaturePear provides two different types of login operation for two kinds of users: customer login and service provider login which determine the way that users can interact with the system. First of all, with customer login, users can search for a specific type of services such as cleaning, renovation, transportation, repair etc. Also, they are able to communicate with service provider since providers will share their contact information on the website. Additionally, they can view their previous services provided by our system. However, with service order application, users cannot make a payment via cash. Just online payments with PayPal system are accepted.

Furthermore, through using service provider login, providers can share their information by creating a customized website for their own work. On this website, they can upload their previous works, photos, reviews, references and CVs. MaturePear will show a list of providers to users and by clicking on the name of the provider, users can reach their customized websites.

### 3.3 HealthyLife

HealthyLife provides two different types of login operation for two kinds of users: customer login and pharmacy login which determine the way that users can interact with the system. First of all, with customer login, users can search for a specific medicine and can order it by using an online payment with their credit cards. This application does not accept the cash payment. Also, users are able to see stock availability of their medicines on different pharmacies. In addition to this feature, users will be provided a price comparison screen based on the prices of their medicines on different pharmacies.

Furthermore, the application has two different account types for customers: free and premium. With free account, users are able to perform actions mentioned above. With premium account, the system will provide additional features to users such as sending e-mail notification to users when their medicine is on stock and sending warning messages via email address before users' medicines are over. Moreover, users with premium account will be notified several campaigns based on their previous orders.

On the other hand, pharmacies can use pharmacy login and can share their medicine stock information and their campaigns with users.

# 4. Feature Model

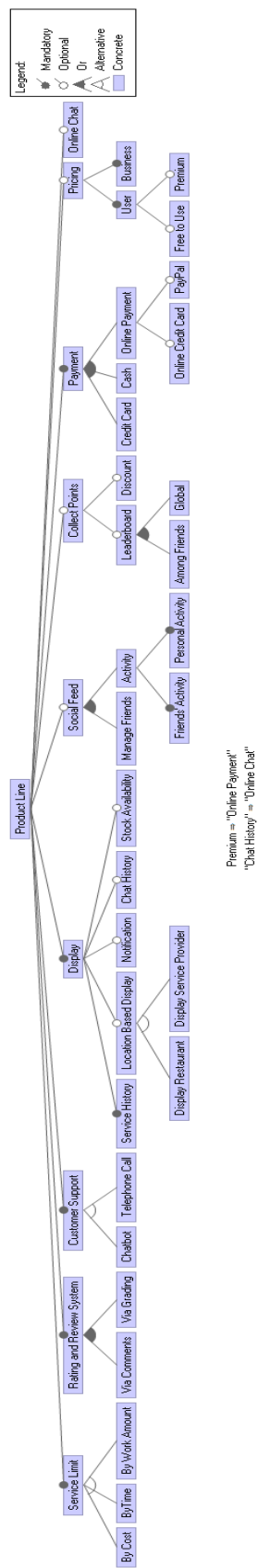


Figure 1: Feature Model of Order Management System

## 5. Kano Methodology

Kano Model is developed in order to satisfy customer needs and yield high customer satisfaction. Questionnaire is prepared and tested on 5 members of the group to get different responses which provide different perspective. By applying results of the kano model that involves different answers, high-quality products can be served. The functionalities and dysfunctionalities are determined by 5 choices which are “Like”, “Expected”, “Do not care”, “Can live with it”, “Dislike”. According to the results, classifications are made. The results of Kano Models are below.

Meal Order Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
User collects points when he orders meal	4	1				Satisfier
User does not collect point when he orders meal			1	1	3	
User can get discount that requires some points	5					Satisfier
User cannot get discount that requires some points			1	1	3	
App provides lottery that requires some points to join	4		1			Delighter
App does not provide lottery that requires some points to join			4	1		
User loses his points when they are not used for a month					5	Undesired
User does not lose points when they are not used for a month	5					
Listed services can be displayed according to user's location	5					Satisfier
Listed services cannot be displayed according to user's location				1	4	
User can add a person as a friend	3	1	1			Satisfier
User cannot add a person as a friend			2		3	
App provides leaderboard shows points of your friends	3	1	1			Satisfier
App does not provide leaderboard shows points of your friends	1		1		3	
User can share leaderboard on social media	1		4			Indifferent
User cannot share leaderboard on social media			4		1	
App can provide weekly leaderboard	1	1	3			Indifferent
App cannot provide weekly leaderboard			4		1	
App can provide monthly leaderboard	1	1	3			Indifferent
App cannot provide monthly leaderboard			3		2	
App can provide annual leaderboard	1	1	3			Indifferent
App cannot provide annual leaderboard			3		2	
User can be informed about the stock availability	4	1				Satisfier



User cannot be informed about the stock availability			1	1	3	Delighter
User can see his friends' activities	3	1	1			
User cannot see his friends' activities				3	2	
User can demand addition of new ingredients to products	1	1	3			Indifferent
User cannot demand addition of new ingredient to products				3	2	
User can decide arrival date of the service	4	1				Satisfier
User cannot decide arrival date of the service					5	
User can check stock availability	4	1				Satisfier
User cannot check stock availability					5	

**Figure 2:** First questionnaire and classification results

Meal Order Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
User can pay with cash	2	3				Basic
User cannot pay with cash				1	4	
User can pay with credit card	2	3				Basic
User cannot pay with credit card				1	4	
User can pay online with his credit card	2	3				Basic
User cannot pay online with his credit card				1	4	
User can pay by using PayPal	1		4			Indifferent
User cannot pay by using PayPal			3	1	1	
App can send verification message to pay for security issues	4		1			Delighter
App cannot send verification message to pay for security issues				4	1	
Customer can use app free	5					Satisfier
Customer cannot use app free				1	4	
Restaurant can use app free	4		1			Delighter
Restaurant cannot use app free				4	1	
Customer can rate the service	3	2				Satisfier
Customer cannot rate the service				2	3	
Customer can write review about the service	2	3				Basic
Customer cannot write review about the service				1	4	
Customer can get history of service he got	3	2				Satisfier
Customer cannot get history of service he got				2	3	
Service provider can get history of service he provided	3	2				Satisfier

Service provider cannot get history of service he provided				1	4	
App limits services with minimum cost according to location				3	2	Undesired
App does not limit services with min cost according to location	4	1				
User can get customer support	2	3				Basic
User cannot get customer support					5	
App can remove service provider with false, invalid, etc. info	2	3				Basic
App cannot remove service provider with false, invalid, etc.info				1	4	
User can report service provider with false, invalid, etc. info	2	3				Basic
User cannot report service provider with false, invalid, etc. info				1	4	

**Figure 3:** Second questionnaire and classification results

Service Order Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
Listed services can be displayed according to user's location	3	2				Delighter
Listed services cannot be displayed according to user's location				3	2	
User can chat directly with the service provider	2	3				Basic
User cannot chat directly with the service provider				2	3	
User can negotiate price of the service via online chat	3	1	1			Delighter
User cannot negotiate price of the service via online chat				4	1	
User can advise service provider via social media	4		1			Delighter
User cannot advice service provider via social media			2	3		
User can get unlimited number of services	5					Satisfier
User cannot get unlimited number of services				1	4	
User can sue service provider by using app	4	1				Delighter
User cannot sue service provider by using app				4	1	
App can provide lawyer to customers	4	1				Delighter
App cannot provide lawyer to customers				4	1	
App can provide lawyer to service providers	4	1				Delighter
App cannot provide lawyer to service providers				3	2	

**Figure 4:** Third questionnaire and classification results

Service Order Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
User can pay with cash	1	4				Basic
User cannot pay with cash				1	4	
User can pay with credit card	2	3				Basic
User cannot pay with credit card				2	3	
User can pay online with his credit card	3	2				Delighter
User cannot pay online with his credit card				3	2	
User can pay by using PayPal	3	1	1			Delighter
User cannot pay by using PayPal			1	3	1	
App can send verification message to pay for security issues	5					Delighter
App cannot send verification message to pay for security issues			1	3	1	
Customer can use app free	5					Satisfier
Customer cannot use app free				1	4	
Service provider can use app free	5					Delighter
Service provider cannot use app free				4	1	
Customer can rate the service	3	2				Satisfier
Customer cannot rate the service					5	
Customer can write review about the service	3	2				Satisfier
Customer cannot write review about the service					5	
Customer can get history of service he got	1	4				Basic
Customer cannot get history of service he got				1	4	
Service provider can get history of service he provided	4	1				Delighter
Service provider cannot get history of service he provided			4		1	
App limits services with minimum cost according to location			1	3	1	Undesired
App does not limit services with min cost according to location	4	1				
User can get customer support	4	1				Delighter
User cannot get customer support				4	1	
App can remove service provider with false, invalid, etc. info	2	3				Basic
App cannot remove service provider with false, invalid, etc.info				1	4	
User can report service provider with false, invalid, etc. info	2	3				Basic
User cannot report service provider with false, invalid, etc. info				1	4	

**Figure 5:** Fourth questionnaire and classification results

Online Pharmacy Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
Listed services can be displayed according to user's location		1	4			Indifferent
Listed services cannot be displayed according to user's location			4	1		
User can decide arrival date of the service	3	1	1			Delighter
User cannot decide arrival date of the service				3	2	
Any user can get notification when his order is on stock	4		1			Delighter
A user may not get notification when his order is on stock				4	1	
Only premium users can get notification about stock				4	1	Indifferent
None of users get notification about stock				3	2	
User can check stock availability	4	1				Satisfier
User cannot check stock availability					5	
App can provide email notifications	4	1				Delighter
App cannot provide email notifications				4	1	
App can provide notification via message	4	1				Delighter
App cannot provide notification via message				4	1	
App can provide medicine for animals	4		1			Delighter
App cannot provide medicine for animals			1	3	1	
Any user can get medicine for animals	4	1				Delighter
A user may not get medicine for animals			1	3	1	
App can provide locations of close hospitals	5					Delighter
App cannot provide locations of close hospitals			1	3	1	
App can provide contact info of hospitals for emergency	5					Delighter
App cannot provide contact info of hospitals for emergency			1	3	1	

**Figure 6:** Fifth questionnaire and classification results

Online Pharmacy Application						
Questions	Like	Expected	Do not care	Can live with it	Dislike	Classification
User can pay with cash	4		1			Delighter
User cannot pay with cash			4	1		
User can pay with credit card		4	1			Basic
User cannot pay with credit card			1	1	3	
User can pay online with his credit card	1	4				Basic
User cannot pay online with his credit card				2	3	
User can pay by using PayPal	4		1			Delighter
User cannot pay by using PayPal			1	3	1	
App can send verification message to pay for security issues	4	1				Delighter
App cannot send verification message to pay for security issues				4	1	
Customer can use app free	5					Delighter
Customer cannot use app free				3	2	
Customer can use app based on a subscription type		4	1			Basic
Customer cannot use app based on a subscription type			1		4	
Customer can rate the service	1	4				Basic
Customer cannot rate the service				1	4	
Customer can write review about the service	1	4				Basic
Customer cannot write review about the service				1	4	
Customer can get history of service he got		5				Basic
Customer cannot get history of service he got				1	4	
Service provider can get history of service he provided	2	3				Indifferent

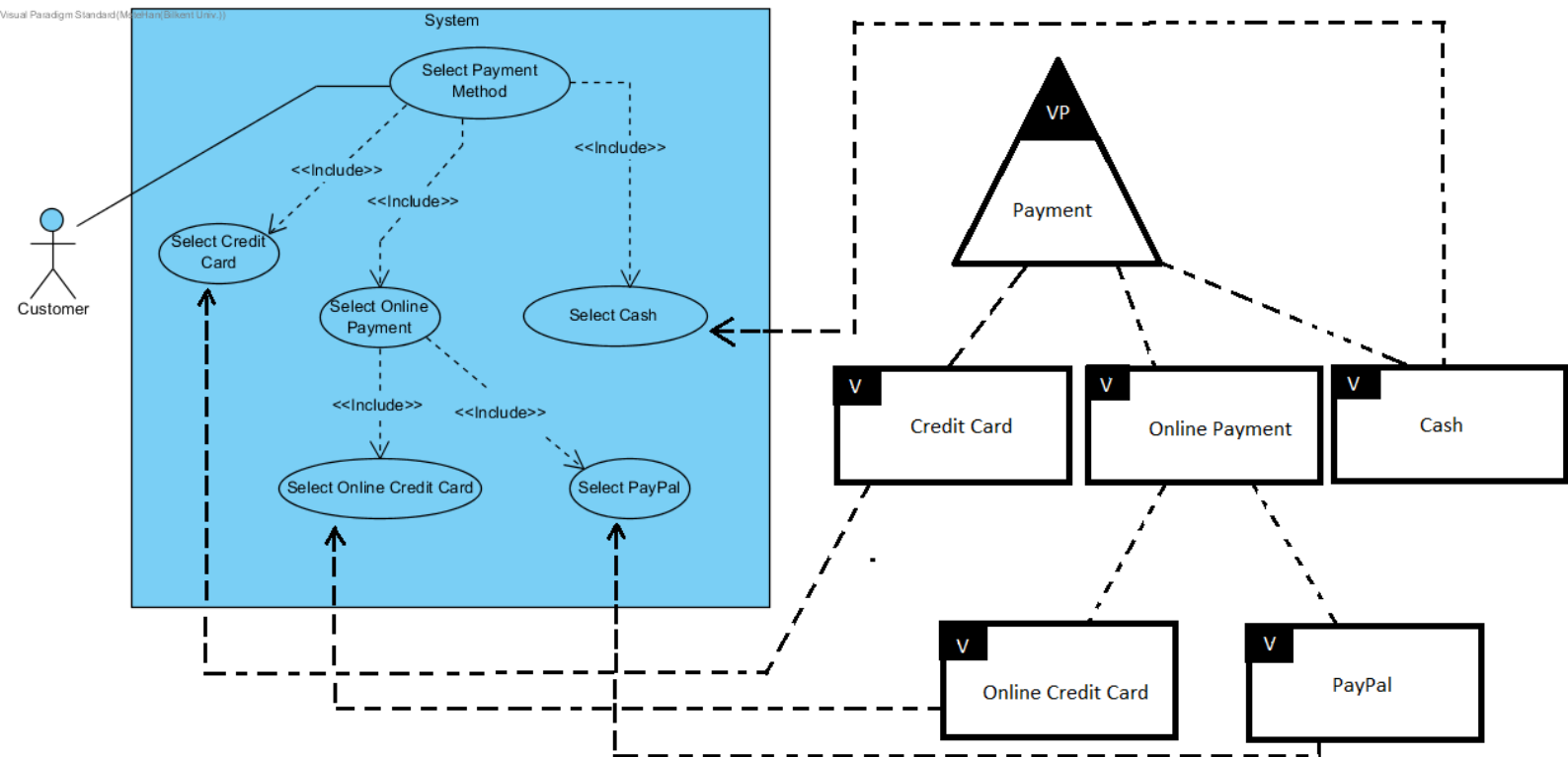
Service provider cannot get history of service he provided				3	2	
App limits services with minimum cost according to location			1	1	3	Undesired
App does not limit services with min cost according to location	2	3				
User can get customer support	3	2				Satisfier
User cannot get customer support				1	4	
App can remove service provider with false, invalid, etc. info	2	3				Basic
App cannot remove service provider with false, invalid, etc.info				1	4	
User can report service provider with false, invalid, etc. info	2	3				Basic
User cannot report service provider with false, invalid, etc. info				1	4	

**Figure 7 :** Sixth questionnaire and classification results

## 6. High Level Architecture

### 6.1 Use Case Model

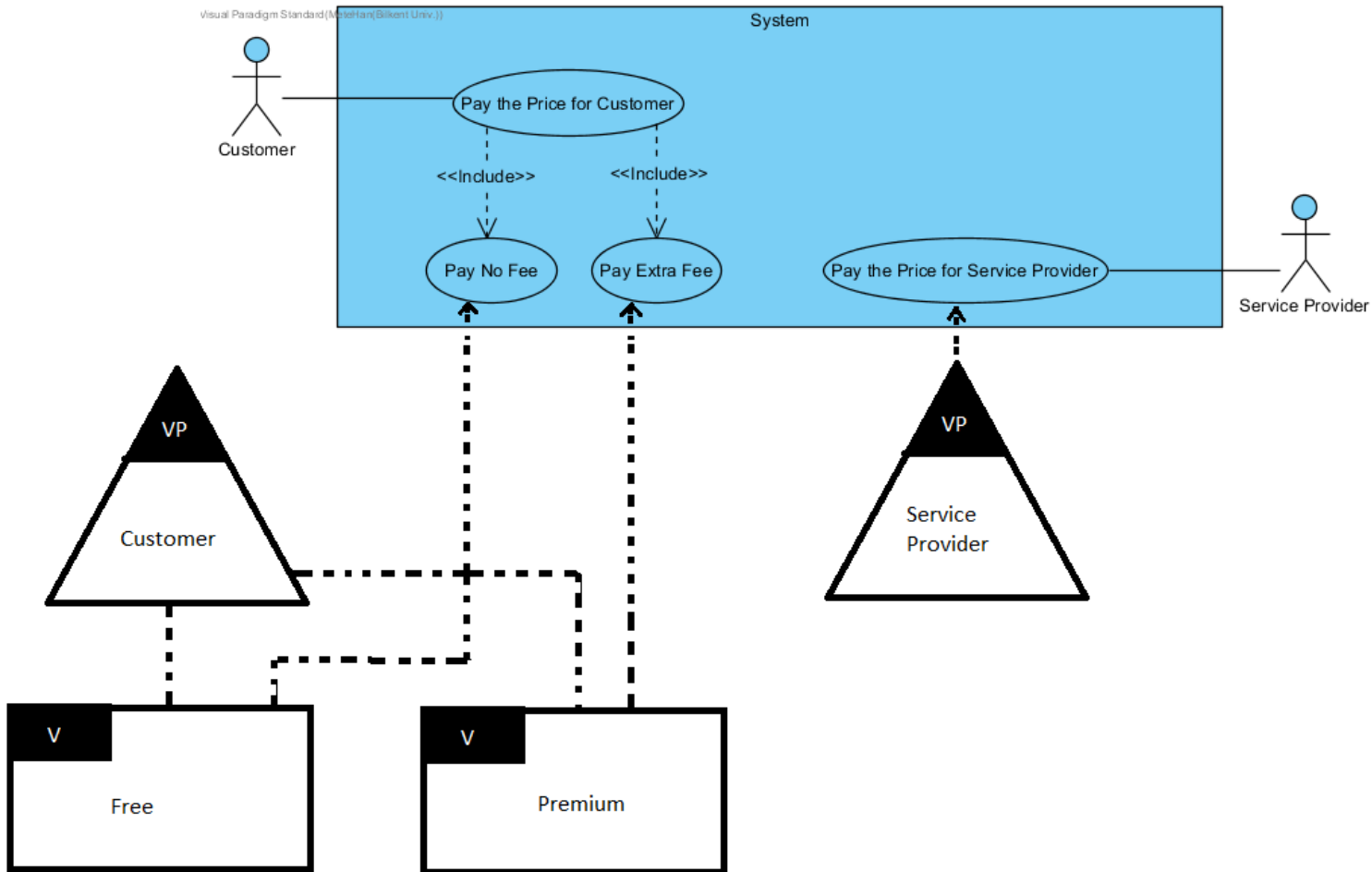
#### 6.1.1 Payment Method Use Case Model



**Figure 8 :** Use case model for Payment Method

A customer can make his payment in different ways. These options are credit card, cash, online credit card and PayPal. In FeedMe and MaturePear, users can pay with credit card or cash. They can also pay online with their credit card. In HealthyLife, users can only pay online with their credit card and they can use PayPal.

## 6.1.2 Pricing Use Case Model

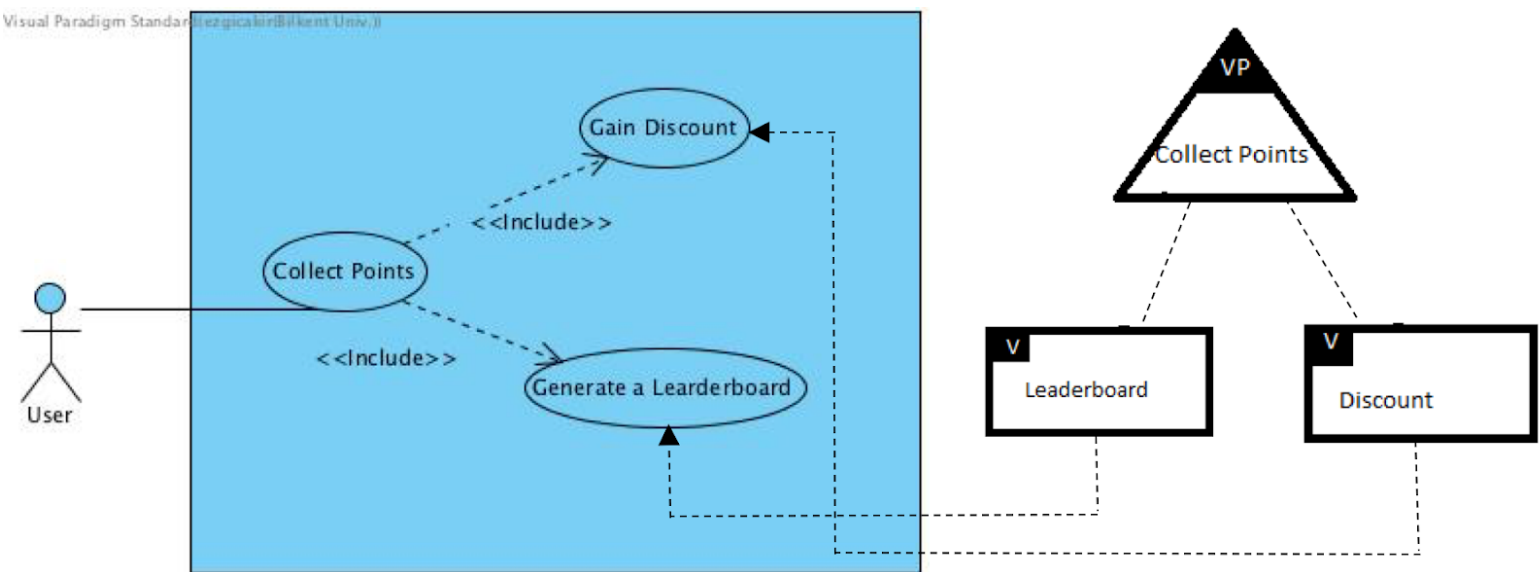


**Figure 9 :** Use case model for Pricing

There are different pricing options for different users like customer and service provider. FeedMe customer usage is free. However, FeedMe charges the restaurants with extra fees. However, FeedMe charges the restaurants with extra fees. MaturePear free. However, MaturePear charges the service providers with extra fees. Pricing for customer usage in HealthyLife is based on a subscription type.



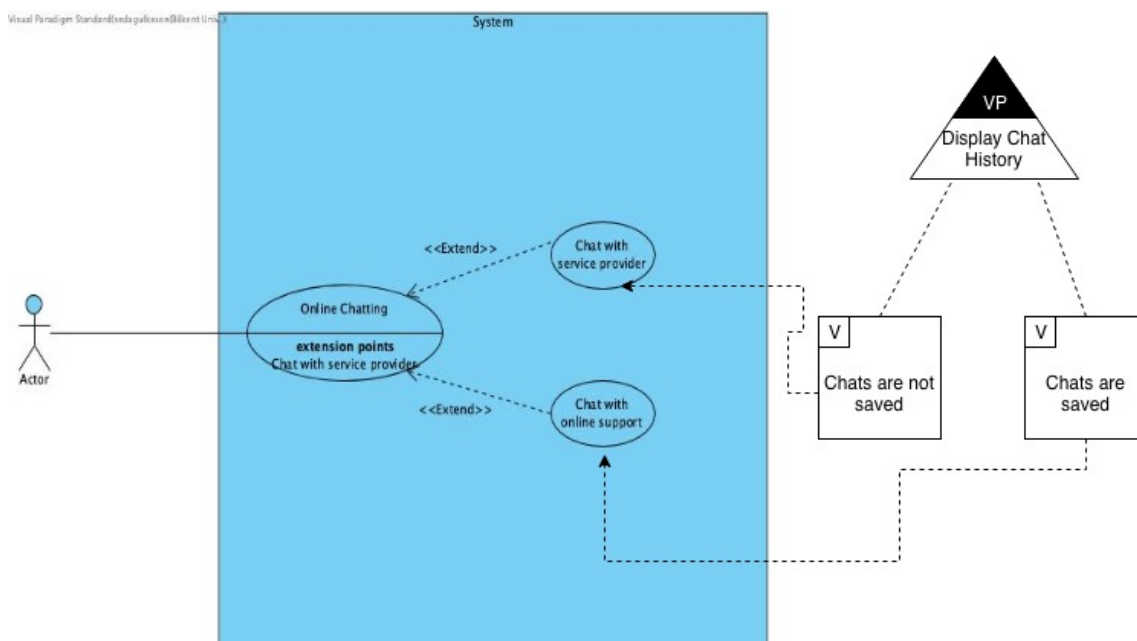
### 6.1.3 Collect Points Case Model



**Figure 10 :** Use case model for Collecting Points

Users may collect points as they order products in application. After they collect, they may use this points for gaining discount for their upcoming orders. Otherwise, they may be listed in a leadership list based on their points in the application. These features are available in meal order application.

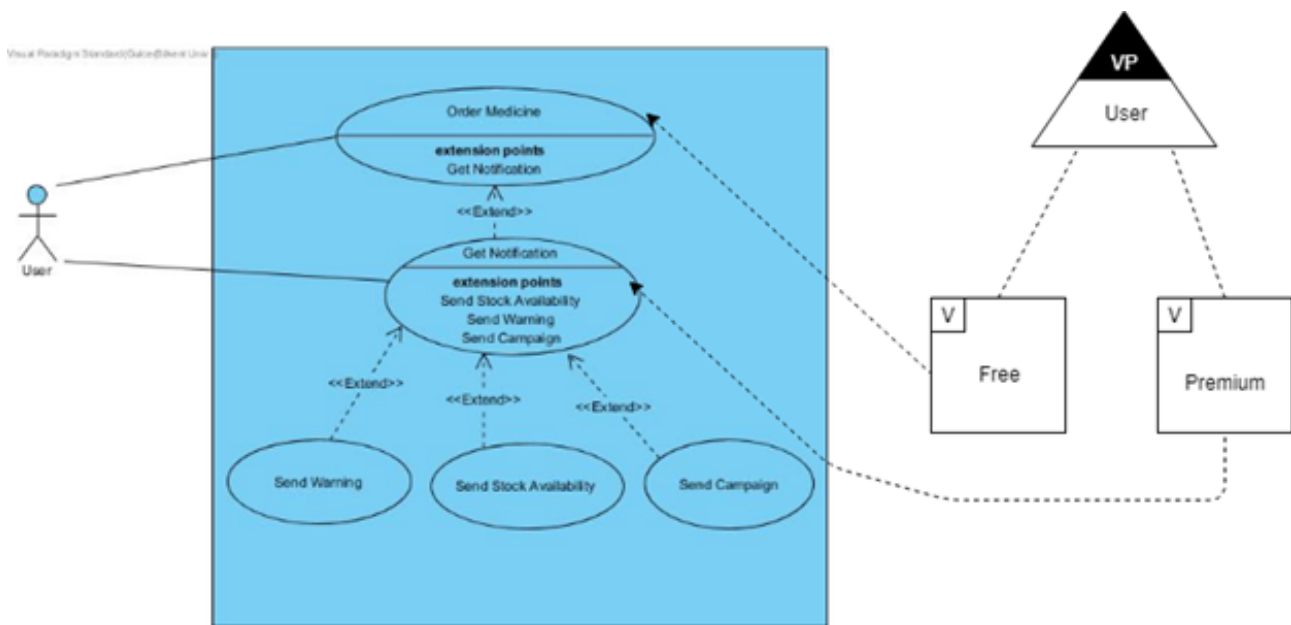
### 6.1.4 Online Chatting Use Case Model



**Figure 11 :** Use case model for Online Chatting

Users may chat with service providers to discuss details about the service that they want to get. These chats are saved into the system so that users can display chat history later. This feature is available in service order application. Users can also get online support by using the application. However, these chats are not saved into the system so that user cannot display chat history that have done with online customer supporters.

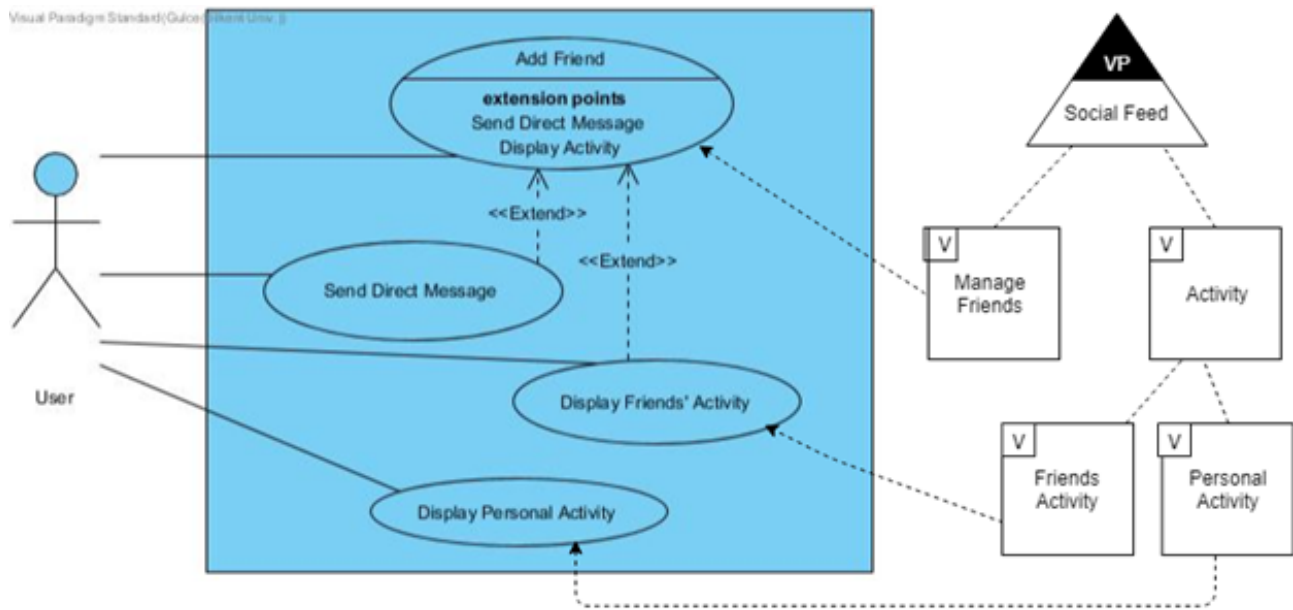
### 6.1.5 Get Notification Use Case Model



**Figure 12:** Use case model for Get Notification

Free users can order medicine by using the system. However, Premium users are able to get notifications sent by the system which include warning messages sent before users' medicines are over and stock availability messages containing information about stock status of medicines and campaign messages which inform users about current campaigns and discounts on medicines.

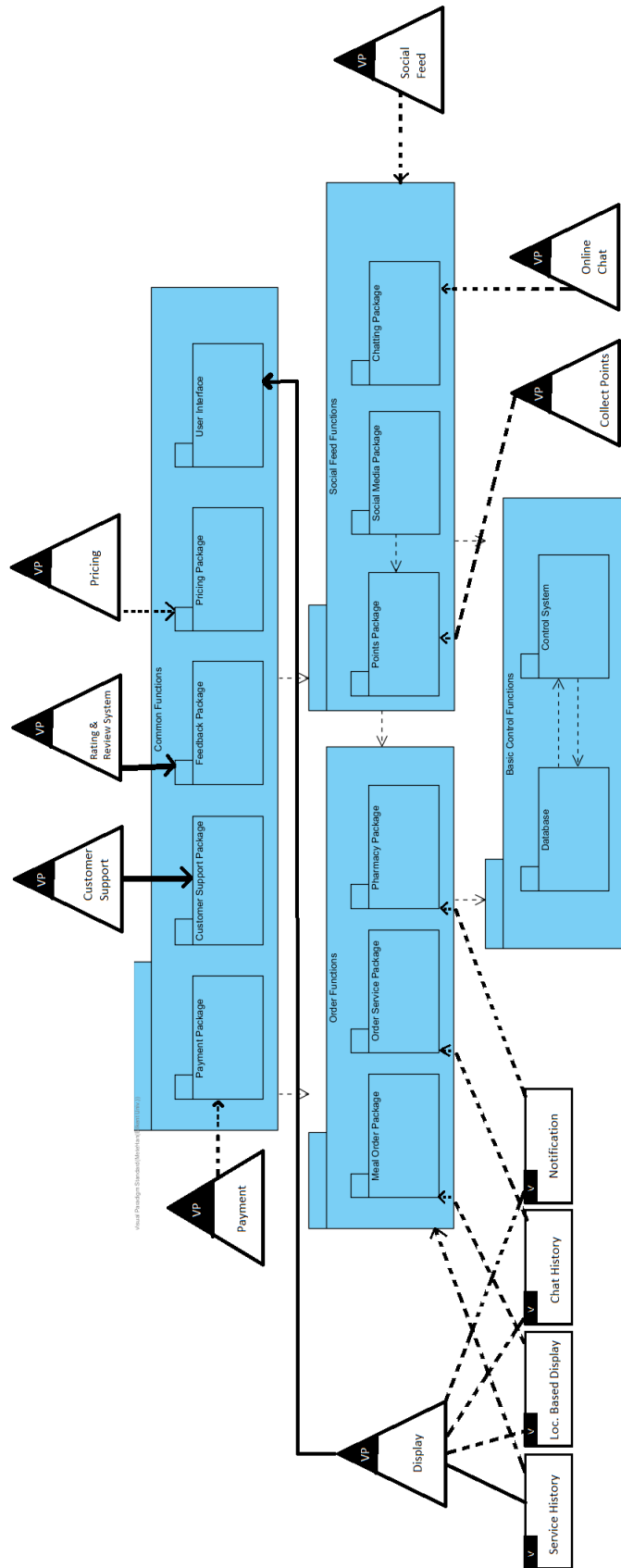
## 6.1.6 Social Feed Use Case Model



**Figure 13 :** Use case model for Social Feed

Users can add other users as friends and are able to send direct messages to each other. Moreover, users stay updated about their friend's actions by displaying friends' activities on the system such as the last they ordered a food or the restaurant that they ordered from etc. Also, users are able to display their own activities on the system.

## 6.2 Component Diagram

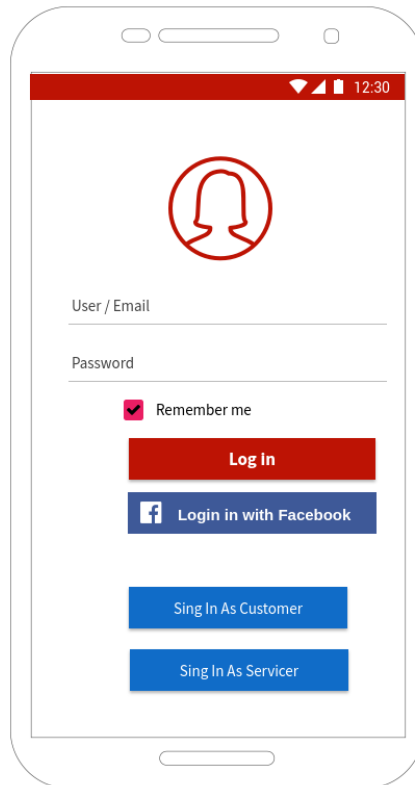


**Figure 14 :** Component Diagram of Order Management System

## 7. Prototype

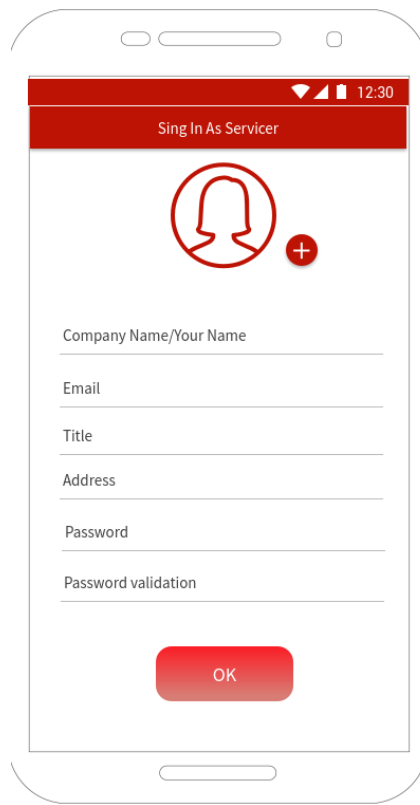
Some of mock-up design of three variants can be found below.

### 7.1 Common Prototypes



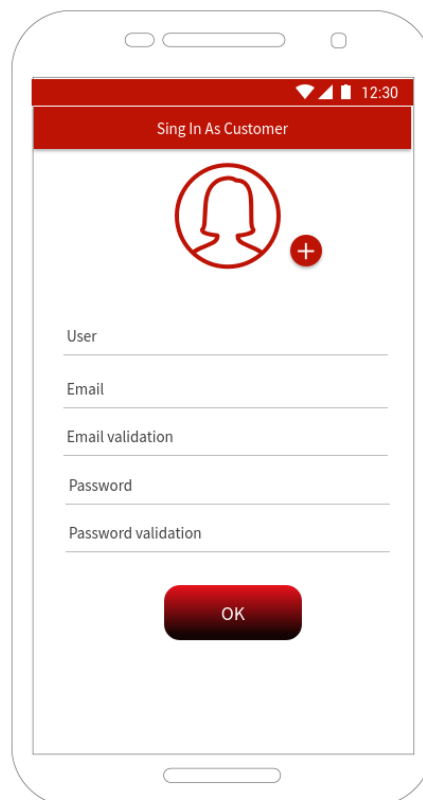
**Figure 15:** Login Page

When a user launches any of applications, she/he will be faced with an login page. They may log in with their username and password. Additionally, users may login with their facebook account in FeedMe to have a social network feed. If she/he does not have any account, she/he needs to sign in.



**Figure 16:** Sign in as servicer page

“Sign in as servicer” button is for registering the servicers for the applications. Such servicers are restaurants in FeedMe, architects, repair-mans, vs. in MaturePear, or pharmacies in HealthyLife.



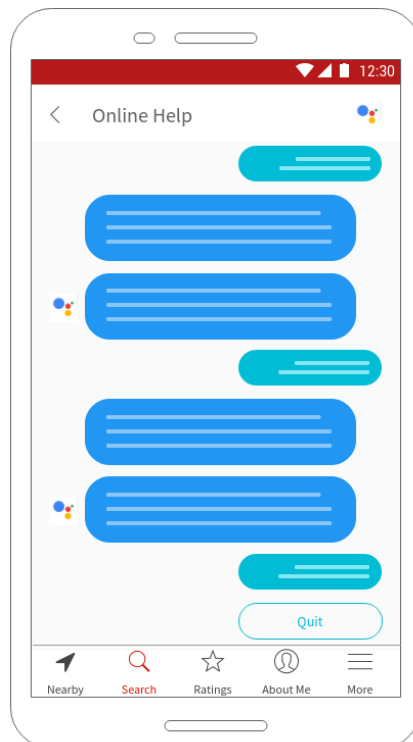
**Figure 17:** Sign in as customer page

This page is for customers to register that will use HealthyLife, MaturePear, and FeedMe.



**Figure 18:** Online payment

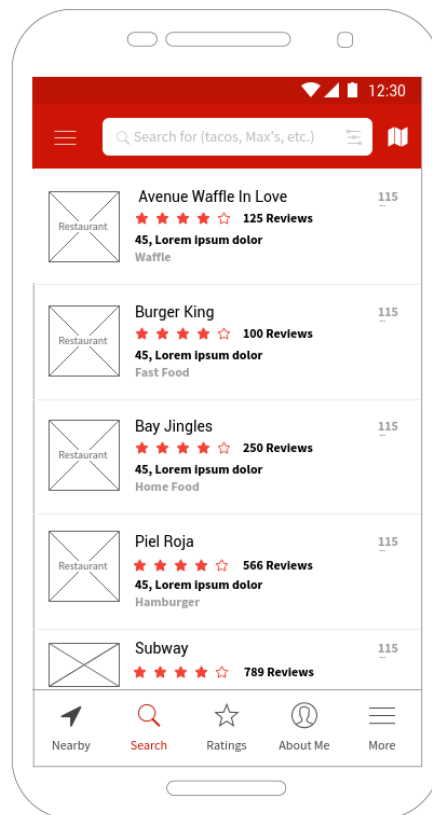
This page is optional for some applications since in FeedMe and MaturePear, users may make a payment cash.



**Figure 19:** Online help

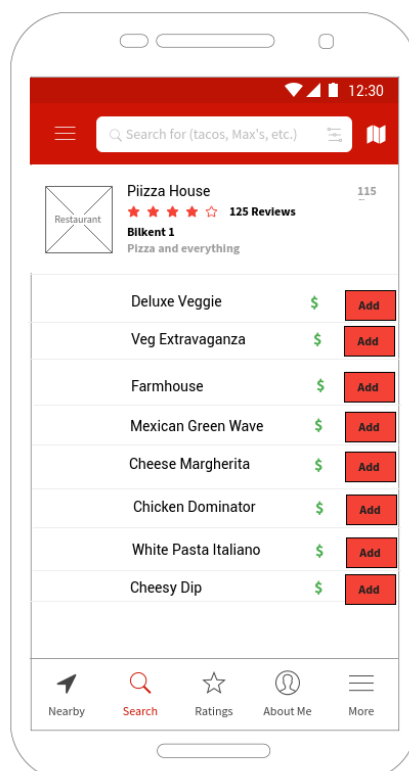
Online support is available for HealthyLife, MaturePear, and FeedMe.

## 7.2 Variable prototypes



**Figure 20:** Listing all restaurants in FeedMe

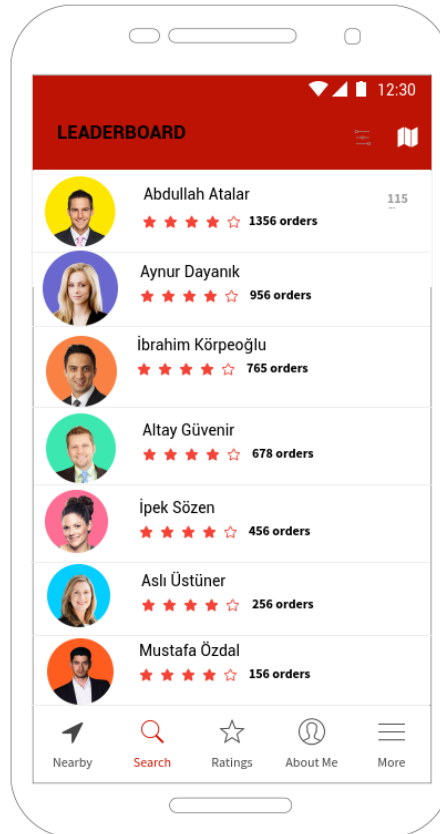
All restaurants are listed respect to the user's location. The users may filter them by using filters on the top.





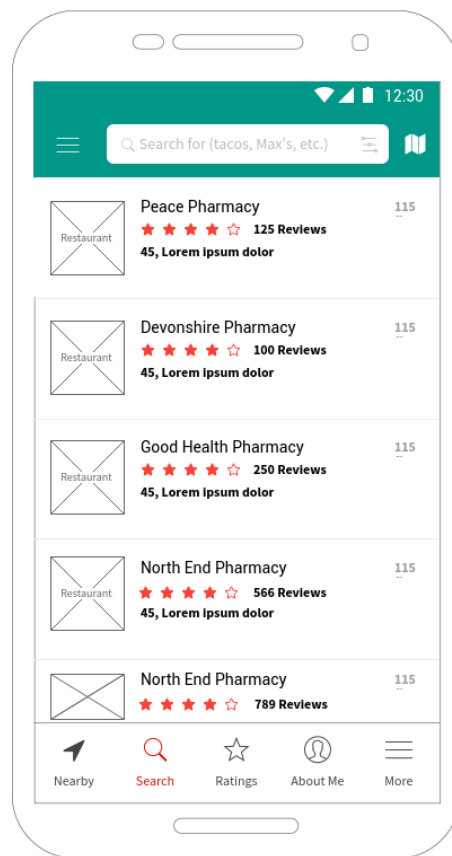
**Figure 21:** Listing all products in a restaurant in FeedMe

After listing all restaurants, the user may choose one of them, click on its image and all products served by the restaurant may be seen. The user may add these products to his/her cart.



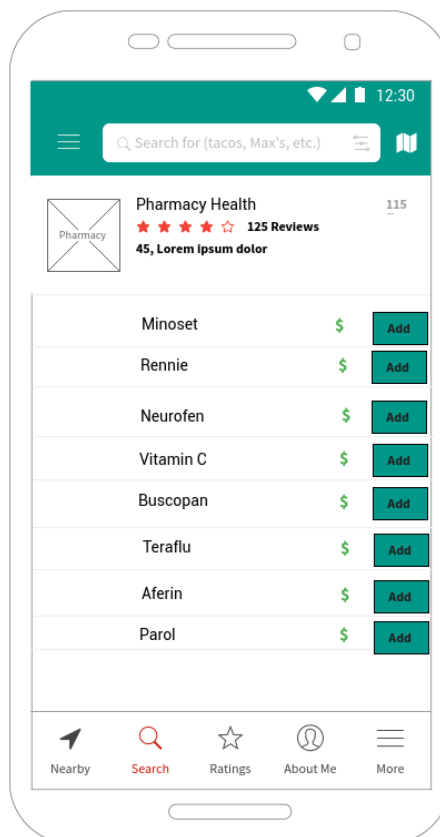
**Figure 22:** Leadership board in the FeedMe

Leaderboard can be seen as list of the most active users in the application respect to their orders. This list consists of the user's facebook friends.



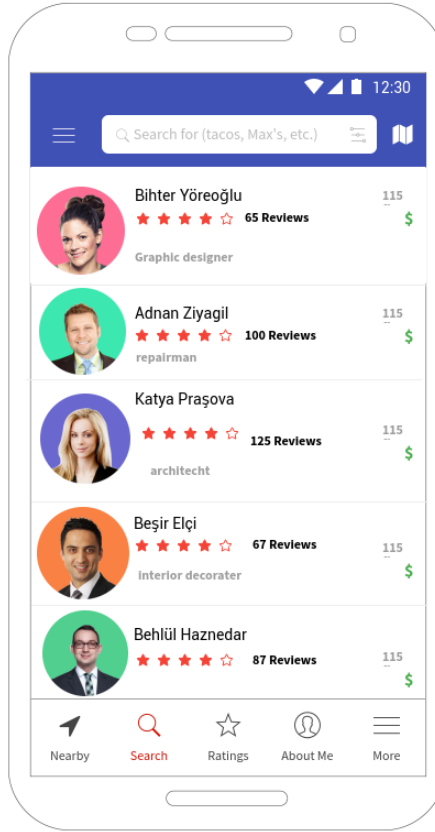
**Figure 23:** Listing all pharmacies in HealthyLife

All pharmacies are listed. Users may filter them by using filters on the top.



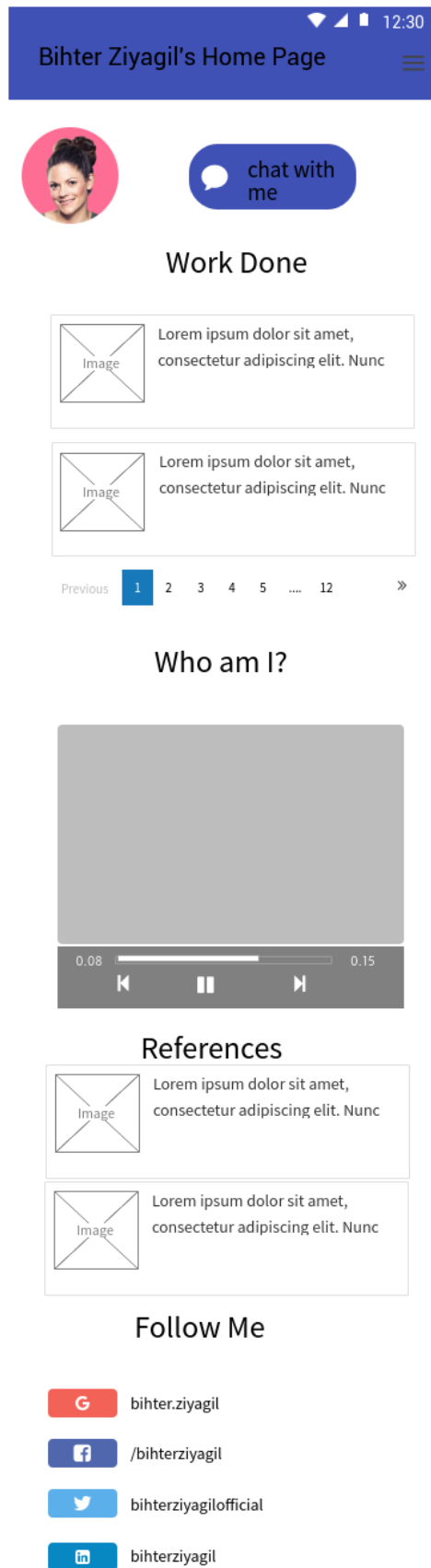
**Figure 24:** Listing all products in a pharmacy in HealthLife

After listing all pharmacies, the user may choose one of them, click on its image and all products served by the pharmacy may be seen. The user may add these products to his/her cart.

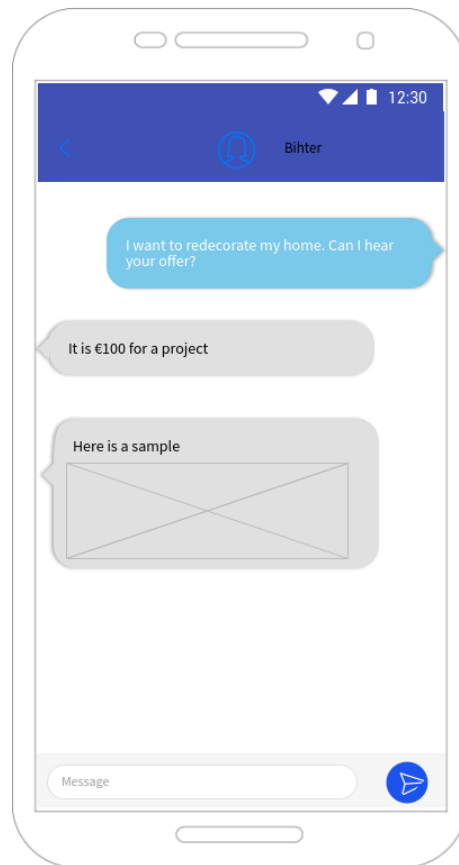


**Figure 25:** Listing service providers in MaturePear

Users may filter the list by using filters on the top. When a user clicks on name of a person, his/her customized personal page will be displayed.



**Figure 26:** Customized personal page the person who offer a service in MaturePear  
Users may investigate servicer’s works done, references, maybe watch her “who am I?” video to get to know her. If the user wants to get a service, she/he may start a chat with her.



**Figure 27:** Direct message with services in MaturePear

Users and service providers may directly chat and make a deal for a service.