Software Requirements Specification

Amazing Lunch Indicator

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1. Introduction

This section gives a scope description and overview of everything included in this SRS document. Also, the purpose for this document is described and a list of abbreviations and definitions is provided.

1.1 Purpose

The purpose of this document is to give a detailed description of the requirements for the "Amazing Lunch Indicator" (ALI) software. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications. This document is primarily intended to be proposed to a customer for its approval and a reference for developing the first version of the system for the development team.

1.2 Scope

The "Amazing Lunch Indicator" is a GPS-based mobile application which helps people to find the closest restaurants based on the user's current position and other specification like price, restaurant type, dish and more. The application should be free to download from either a mobile phone application store or similar services.

Restaurant owners can provide their restaurant information using the web-portal. This information will act as the bases for the search results displayed to the user. An administrator also uses the web-portal in order to administer the system and keep the information accurate. The administrator can, for instance, verify restaurant owners and manage user information.

Furthermore, the software needs both Internet and GPS connection to fetch and display results. All system information is maintained in a database, which is located on a web-server. The software also interacts with the GPS-Navigator software which is required to be an already installed application on the user's mobile phone. By using the GPS-Navigator, users can view desired restaurants on a map and be navigated to them. The application also has the capability of representing both summary and detailed information about the restaurants.

1.3 Definitions, acronyms, and abbreviations

Table 1 - Definitions

Term	Definition
User	Someone who interacts with the mobile phone application
Admin/Administrator	System administrator who is given specific permission for managing and controlling the system
Restaurant Owner	Someone who has a restaurant and wants his restaurant to be a part the application
Web-Portal	A web application which present special facilities for restaurant owner

	and admin
GPS	Global Positioning System
GPS-Navigator	An installed software on mobile phone which could provide GPS connection and data, show locations on map and find paths from current position to defined destination
Application Store	An installed application on mobile phone which helps user to find new compatible applications with mobile phone platform and download them from Internet
Stakeholder	Any person who has interaction with the system who is not a developer.
DESC	Description
RAT	Rational
DEP	Dependency
TAG	A unique, persistent identifier contained in a PLanguage statement [2]
GIST	A short, simple description of the concept contained in a PLanguage statement [2]
SCALE	The scale of measure used by the requirement contained in a PLanguage statement [2]
METER	The process or device used to establish location on a SCALE contained in a PLanguage statement [2]
MUST	The minimum level required to avoid failure contained in a PLanguage statement [2]
PLAN	The level at which good success can be claimed contained in a PLanguage statement [2]
WISH	A desirable level of achievement that may not be attainable through available means contained in a PLanguage statement [2]
DEFINED	The official definition of a term contained in a PLanguage statement [2]

1.4 References

[1] IEEE Software Engineering Standards Committee, “IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications”, October 20, 1998.

[2] Feldt R,”re_lecture5b_100914”, unpublished.

[3] Davis M A, “Just Enough Requirements Management: Where Software Development Meets Marketing”, New York, Dorset House Publishing, 2005.

[4] Karlsson J, “A Cost-Value Approach for Prioritizing Requirements”, Norges Teknisk-Naturvitenskapelige Uni. 1997

1.5 Overview

The remainder of this document includes three chapters and appendixes. The second one provides an overview of the system functionality and system interaction with other systems. This chapter also introduces different types of stakeholders and their interaction with the system. Further, the chapter also mentions the system constraints and assumptions about the product.

The third chapter provides the requirements specification in detailed terms and a description of the different system interfaces. Different specification techniques are used in order to specify the requirements more precisely for different audiences.

The fourth chapter deals with the prioritization of the requirements. It includes a motivation for the chosen prioritization methods and discusses why other alternatives were not chosen.

The Appendixes in the end of the document include the all results of the requirement prioritization and a release plan based on them.

2. Overall description

This section will give an overview of the whole system. The system will be explained in its context to show how the system interacts with other systems and introduce the basic functionality of it. It will also describe what type of stakeholders that will use the system and what functionality is available for each type. At last, the constraints and assumptions for the system will be presented.

2.1 Product perspective

This system will consist of two parts: one mobile application and one web portal. The mobile application will be used to find restaurants and view information about them while the web portal will be used for managing the information about the restaurants and the system as a whole.

The mobile application will need to communicate to a GPS application within the mobile phone, which in turn communicates with a physical GPS device to find the location of the user, see Figure 1. The GPS will provide the mobile application with locations of both the user and the restaurants and the distance between them, but it will also provide maps and the functionality to display the application's data on the map. The functionality provided by the GPS will be embedded into the application in order for the user to be able to use the functions in the application in a seamlessly manner.

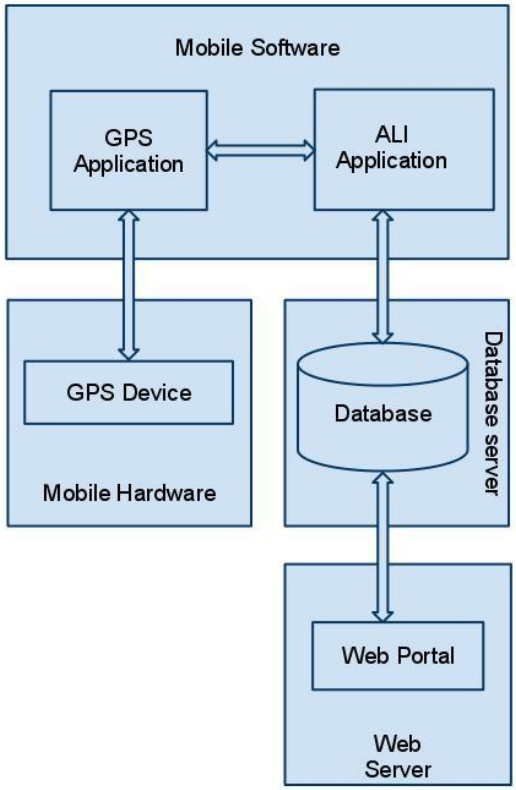

Figure 1 - Block diagram

Since this is a data-centric product it will need somewhere to store the data. For that, a database will be used. Both the mobile application and web portal will communicate with the database, however in slightly different ways. The mobile application will only use the database to get data while the web portal will also add and modify data. All of the database communication will go over the Internet.

The mobile application has some restrictions about the resource allocation. To avoid problems with overloading the operating system the application is only allowed to use 20 megabytes of memory while running the application. The maximum amount of hard drive space is also 20 megabytes.

2.2 Product functions

With the mobile application, the users will be able to search for restaurants. The result will be based on the criteria the user inputs. There are several search criteria and it will be possible for the administrator of the system to manage the options for those criteria that have that.

The result of the search will be viewed either in a list view or in a map view, depending on what criteria included in the search. The list view will have one list item for each restaurant matching the search criteria and show a small part of the restaurant information so the user can identify the restaurant. The

map view will show each restaurant location as a pin on the map as well as the user's own location. In both views the users will be able to either select a restaurant as target destination or get information how to get there, or view the information of a specific restaurant.

The web portal will provide functionality to manage the system and the restaurant information. It will also provide information about the system, for example show when there is a new update.

2.3 User characteristics

There are three types of users that interact with the system: users of the mobile application, restaurant owners and administrators. Each of these three types of users has different use of the system so each of them has their own requirements.

The mobile application users can only use the application to find a restaurant. This means that the user have to be able to search for restaurants, choose a restaurant from that search and then navigate to it. In order for the users to get a relevant search result there are multiple criteria the users can specify and all results matches all of those.

The restaurant owners will not use the mobile application but the web portal instead. There they will manage the information about their restaurant, for example a description of the restaurant, contact information and their menu.

The administrators also only interact with the web portal. They are managing the overall system so there is no incorrect information within it. The administrator can manage the information for each restaurant as well as the options for both the mobile application users and the restaurant owners.

2.4 Constraints

The mobile application is constrained by the system interface to the GPS navigation system within the mobile phone. Since there are multiple system and multiple GPS manufacturers, the interface will most likely not be the same for every one of them. Also, there may be a difference between what navigation features each of them provide.

The Internet connection is also a constraint for the application. Since the application fetches data from the database over the Internet, it is crucial that there is an Internet connection for the application to function.

Both the web portal and the mobile application will be constrained by the capacity of the database. Since the database is shared between both application it may be forced to queue incoming requests and therefor increase the time it takes to fetch data.

2.5 Assumptions and dependencies

One assumption about the product is that it will always be used on mobile phones that have enough performance. If the phone does not have enough hardware resources available for the application, for example the users might have allocated them with other applications, there may be scenarios where the application does not work as intended or even at all.

Another assumption is that the GPS components in all phones work in the same way. If the phones have different interfaces to the GPS, the application need to be specifically adjusted to each interface and that

would mean the integration with the GPS would have different requirements than what is stated in this specification.

2.6 Apportioning of requirements

In the case that the project is delayed, there are some requirements that could be transferred to the next version of the application. Those requirements are to be developed in the third release, see Appendix IV.

3. Specific requirements

This section contains all of the functional and quality requirements of the system. It gives a detailed description of the system and all its features.

3.1 External interface Requirements

This section provides a detailed description of all inputs into and outputs from the system. It also gives a description of the hardware, software and communication interfaces and provides basic prototypes of the user interface.

3.1.1 User interfaces

A first-time user of the mobile application should see the log-in page when he/she opens the application, see Figure 2. If the user has not registered, he/she should be able to do that on the log-in page.

If the user is not a first-time user, he/she should be able to see the search page directly when the application is opened, see Figure 3. Here the user chooses the type of search he/she wants to conduct.

Every user should have a profile page where they can edit their e-mail address, phone number and password, see Figure 4. Also, the user can set the mobile application to his/her preferred language. The "P" icon shows where the user can click to navigate to his/her profile page.

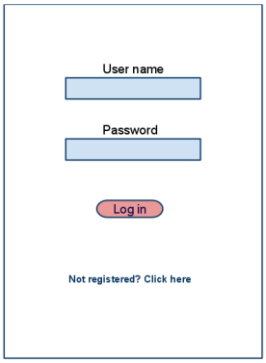

Figure 2 - Login page

Figure 3 – Search page

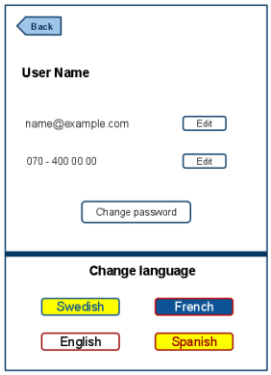

Figure 4 – Profile page

In Figure 5, the list view for the results is shown. When a user searches by price, this view should be the default one. The sorting header allows the user to sort the results according to price, restaurant name, distance, restaurant type and specific dish. Each result item includes information about the restaurants, a link to the restaurant's web-page and an information link, which provides a more detailed description of the restaurant. There is also a filtering option, where the user can choose to filter the results by increasing or decreasing the price or distance range, see Figure 7.

In the map view each restaurant is represented by a pin, see Figure 6. Next to every pin there is an information link which provides a more detailed description of the restaurant, as mentioned for the list view. The same filtering option, as for the list view, is included in the map view.

The restaurant owners and administrators interact with the system through a web-portal, see Figure 8. A restaurant owner should be able to register on the web-portal in order to log in and manage the restaurant information. An administrator should also be able to log in to the web-portal where he/she can administer the system by for instance editing restaurant or user information.

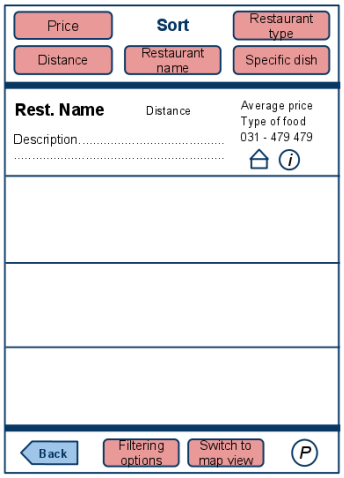

Figure 5 – List view

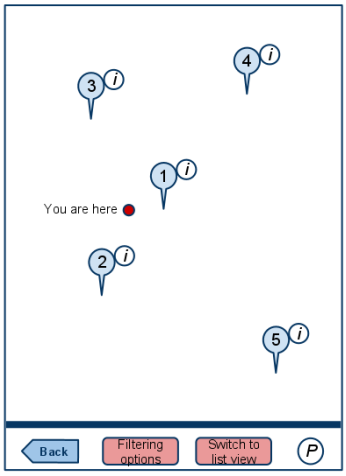

Figure 6 – Map view

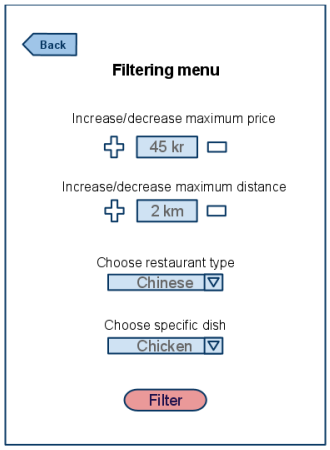

Figure 7 – Filter menu

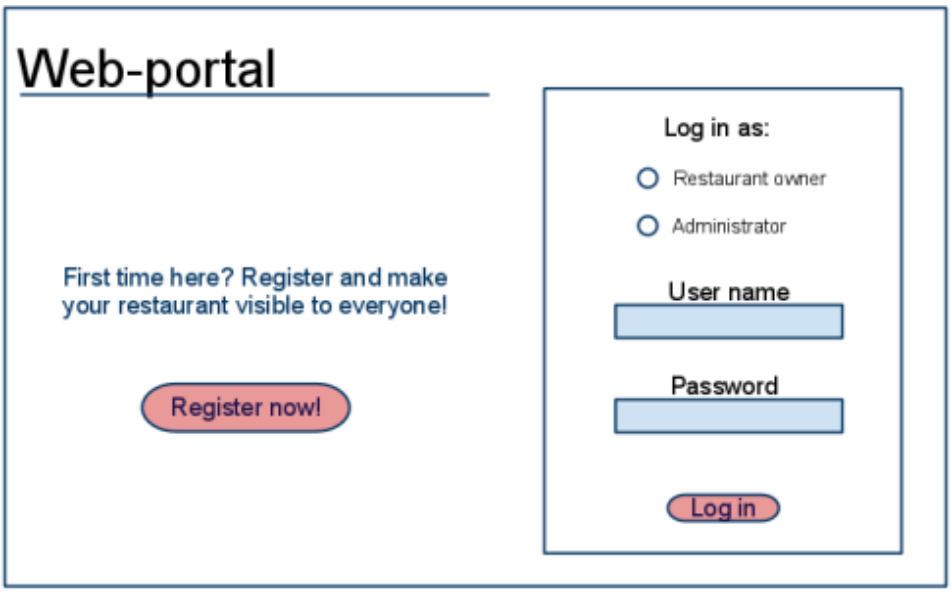

Figure 8 – Web Portal

3.1.2 Hardware interfaces

Since neither the mobile application nor the web portal have any designated hardware, it does not have any direct hardware interfaces. The physical GPS is managed by the GPS application in the mobile phone and the hardware connection to the database server is managed by the underlying operating system on the mobile phone and the web server.

3.1.3 Software interfaces

The mobile application communicates with the GPS application in order to get geographical information

about where the user is located and the visual representation of it, and with the database in order to get the information about the restaurants, see Figure 1. The communication between the database and the web portal consists of operation concerning both reading and modifying the data, while the communication between the database and the mobile application consists of only reading operations.

3.1.4 Communications interfaces

The communication between the different parts of the system is important since they depend on each other. However, in what way the communication is achieved is not important for the system and is therefore handled by the underlying operating systems for both the mobile application and the web portal.

3.2 Functional requirements

This section includes the requirements that specify all the fundamental actions of the software system.

3.2.1 User Class 1 - The User

3.2.1.1 Functional requirement 1.1

ID: FR1
TITLE: Download mobile application
DESC: A user should be able to download the mobile application through either an application store or similar service on the mobile phone. The application should be free to download.
RAT: In order for a user to download the mobile application.
DEP: None

3.2.1.2 Functional requirement 1.2

ID: FR2
TITLE: Download and notify users of new releases
DESC: When a new/updated version or release of the software is released, the user should check for these manually. The download of the new release should be done through the mobile phone in the same way as downloading the mobile application.
RAT: In order for a user to download a new/updated release.
DEP: FR1

3.2.1.3 Functional requirement 1.3

ID: FR3
TITLE: User registration - Mobile application
DESC: Given that a user has downloaded the mobile application, then the user should be able to register through the mobile application. The user must provide user-name, password and e-mail address. The user can choose to provide a regularly used phone number.
RAT: In order for a user to register on the mobile application.
DEP: FR1

3.2.1.4 Functional requirement 1.4

ID: FR4
TITLE: User log-in - Mobile application
DESC: Given that a user has registered, then the user should be able to log in to the mobile application. The log-in information will be stored on the phone and in the future the user should be logged in automatically.
RAT: In order for a user to register on the mobile application.
DEP: FR1, FR3

3.2.1.5 Functional requirement 1.5

ID: FR5
TITLE: Retrieve password
DESC: Given that a user has registered, then the user should be able to retrieve his/her password by e-mail.
RAT: In order for a user to retrieve his/her password.
DEP: FR1

3.2.1.6 Functional requirement 1.6

ID: FR6
TITLE: Mobile application - Search
DESC: Given that a user is logged in to the mobile application, then the first page that is shown should be the search page. The user should be able to search for a restaurant, according to several search options. The search options are Price, Destination, Restaurant type and Specific dish. There should also be a free-text search option. A user should be able to select multiple search options in one search.
RAT: In order for a user to search for a restaurant.
DEP: FR4

3.2.1.7 Functional requirement 1.7

ID: FR7
TITLE: Mobile application - Search result in a map view
DESC:

- Search results can be viewed on a map. On the map, the relevant and closest restaurants according to the user's position are shown.
- A specific pin will represent a specific restaurant location. On each pin there should be an information link.
- There should be maximally 100 results displayed. The map view should have a default zoom.
- The map view should include a button that, when selected, should display different filtering options in a filtering menu.

RAT: The way results are displayed in a map.
DEP: FR6

3.2.1.8 Functional requirement 1.8

ID: FR8
TITLE: Mobile application - Search result in a list view
DESC:

- Search results can be viewed in a list. Each element in the list represents a specific restaurant. Each element should include the restaurant name, telephone number, type of food, distance according to the user's position, average price, a short two-line description, a link to the restaurant's web-page and an information link.
- There should be maximally 100 results displayed. If the result contains more restaurants than what can be displayed on the screen at one time, the user should be able to scroll through them.
- When searching by price the restaurants should be sorted according to the following order:
    1. average price
    2. distance
    3. restaurant type
    4. specific dish
- When searching by a search option, other than price, the restaurants should be sorted according to the following order:
    1. distance
    2. average price
    3. restaurant type
    4. specific dish
- The list view should include a header with different selectable sorting options.
- The list view should include a button that, when selected, should display different filtering options in a filtering menu.

RAT: The way results should be displayed in a list.
DEP: FR6

3.2.1.9 Functional requirement 1.9

ID: FR9
TITLE: Mobile application - Navigation to restaurant
DESC: A user should be able to select a pin on a map or an element on a list. When a selection is made, the location of the restaurant should be sent to the mobile phone's GPS-navigation program. The user should then be navigated to the destination. When the destination is reached, a user should be able to go back to the search page on the mobile application.
RAT: To navigate a user to a chosen restaurant.
DEP: FR7, FR8

3.2.1.10 Functional requirement 1.10

ID: FR10
TITLE: Mobile application - Switch result view
DESC: A user should be able to switch between a map view and a list view for all search options.

RAT: In order for a user to switch between result views.
DEP: FR7, FR8

3.2.1.11 Functional requirement 1.11

ID: FR11
TITLE: Mobile application - Selecting the information link
DESC: A user should be able to select the information link, which is included on all result items. The link will direct the user to an information page, which includes a picture of the restaurant, the restaurant name, address, phone number, e-mail address, type of food, average price, restaurant description and a menu with name, description and price of the different dishes.
RAT: In order to show information about the restaurants.
DEP: FR7, FR8

3.2.1.12 Functional requirement 1.12

ID: FR12
TITLE: Mobile application - Search by price
DESC: A user should be able to input a maximum and a minimum price range. The result is displayed in a list view by default.
RAT: In order for a user to search by price.
DEP: FR8

3.2.1.13 Functional requirement 1.13

ID: FR13
TITLE: Mobile application - Search by destination
DESC: A user should be able to input a maximum and a minimum distance, according to his/her position. By default the minimum distance is set to 0 km and the maximum to 10 km. The user should be able to input a higher or lower maximum distance and a higher minimum distance than set by default. The result is displayed in a map view by default.
RAT: In order for a user to search by destination.
DEP: FR7

3.2.1.14 Functional requirement 1.14

ID: FR14
TITLE: Accepted input for price and destination search
DESC: Integers should be accepted as input when a user searches by price or destination. If the system receives an invalid input the user should be informed and prompted to insert an accepted input.
RAT: In order for a user to search with valid input.
DEP: FR12, FR13

3.2.1.15 Functional requirement 1.15

ID: FR15
TITLE: Mobile application - Search by restaurant type

DESC: A user should be able to select a restaurant type in a given list as input. The result is displayed in a map view by default.
RAT: In order for a user to search by restaurant type.
DEP: FR7

3.2.1.16 Functional requirement 1.16

ID: FR16
TITLE: Mobile application - Search by specific dish
DESC: A user should be able to select a specific dish in a given list as input. The result is displayed in a map view by default.
RAT: In order for a user to search by specific dish.
DEP: FR7

3.2.1.17 Functional requirement 1.17

ID: FR17
TITLE: Mobile application - Free-text search
DESC: A user should be able to conduct a search by providing either restaurant name, restaurant description, restaurant address, restaurant type or restaurant menu in the free-text search field. The result is displayed in a map view by default.
RAT: In order for a user to search through the free-text search.
DEP: FR7

3.2.1.18 Functional requirement 1.18

ID: FR18
TITLE: Mobile application - No match found
DESC: If no match is found the user should be informed but kept on the search page in order to get the possibility to conduct a new search right away.
RAT: In order for user to conduct a new search if no match is found.
DEP: FR5

3.2.1.19 Functional requirement 1.19

ID: FR19
TITLE: Mobile application - Sorting results
DESC: When viewing the results in a list, a user should be able to sort the results according to price, distance, restaurant type, specific dish or restaurant name.

- When sorting by restaurant name, specific dish or restaurant type the results should be ordered alphabetically.
- When sorting by price the results should be ordered from cheapest to most expensive.
- When sorting by distance the results should be ordered from closets to furthest distance according to the user's position.

When the sort button for a specific search option is clicked, then the order should be reversed and ordered in a descending matter. If the sort button is clicked again the order of the results should be reversed.
RAT: In order for a user to sort results in a list.
DEP: FR8

3.2.1.20 Functional requirement 1.20

ID: FR20
TITLE: Mobile application - Filtering results
DESC: When viewing the results in a list or a map, a user should be able to filter the results in a filtering menu. The filtering options include:

- increasing or decreasing the maximum distance
- increasing or decreasing the maximum price
- choosing a restaurant type
- choosing a specific dish

When filtering the results, only the existing results shall be affected and a new search query should not be sent.
RAT: In order for a user to filter results in a list or a map.
DEP: FR7, FR8

3.2.1.21 Functional requirement 1.21

ID: FR21
TITLE: Mobile application - Profile page
DESC: On the mobile application, a user should have a profile page. On the profile page a user can edit his/her information, which includes the password, e-mail address and phone number. A user should also be able to choose what language the mobile application should be set to. The different language choices are Swedish, English, Spanish and French.
RAT: In order for a user to have a profile page on the mobile application.
DEP: FR1

3.2.2 User Class 2 - Restaurant Owner

3.2.2.1 Functional requirement 2.1

ID: FR22
Feature: Create an account
In order to create an account
A restaurant owner
Should register on the web-portal

When the restaurant owner registers on the web-portal by providing user-name
And password
And address
And e-mail address
And phone number
Then the restaurant owner should be able to apply for verification

3.2.2.2 Functional requirement 2.2

ID: FR23
Feature: Restaurant owner log-in
In order to use the system
A restaurant owner
Should be logged in to the web-portal

Scenario: Successful log-in
Given the restaurant owner wants to log in
When the restaurant owner logs in with his/her account
Then the restaurant owner should be logged in as a restaurant owner

3.2.2.3 Functional requirement 2.3

ID: FR24
Feature: Manage information
In order to manage information
A restaurant owner
Should be logged in to the web-portal

3.2.2.4 Functional requirement 2.4

ID: FR25
Feature: Restaurant owner - Selecting preferred language on the web-portal
In order to understand the web-portal
A restaurant owner
Should be able to select a preferred language for the web-portal

3.2.3 User Class 3 - Administrator

3.2.3.1 Functional requirement 3.1

ID: FR26
Feature: Administrator log in
In order to administer the system
An administrator
Should be logged in to the web-portal

3.2.3.2 Functional requirement 3.2

ID: FR27
Feature: Verify restaurant owner
In order to allow a restaurant owner to use the system
An administrator
Should be able to verify the restaurant owner

3.2.3.3 Functional requirement 3.3

ID: FR28
Feature: Manage restaurant types
In order to have a list of restaurant types
An administrator
Should be able to manage the restaurant types

3.2.3.4 Functional requirement 3.4

ID: FR29
Feature: Manage restaurant dishes
In order to have a list of dishes
An administrator
Should be able to manage the dishes

3.2.3.5 Functional requirement 3.5

ID: FR30
Feature: Manage restaurant information
In order to manage restaurant information
An administrator
Should be logged in to the web-portal

3.2.3.6 Functional requirement 3.6

ID: FR31
Feature: Manage users
In order to keep track of the users
An administrator
Should be able to manage the users

3.2.3.7 Functional requirement 3.7

ID: FR32
Feature: Manage restaurant owners
In order to keep track of the restaurant owners
An administrator
Should be able to manage the restaurant owners

3.2.3.8 Functional requirement 3.8

ID: FR33
Feature: Administrator - Selecting preferred language on the web-portal
In order to understand the web-portal
An administrator
Should be able to select a preferred language for the web-portal

3.3 Performance requirements

The requirements in this section provide a detailed specification of the user interaction with the software and measurements placed on the system performance.

3.3.1 Prominent search feature

ID: QR1
TITLE: Prominent search feature
DESC: The search feature should be prominent and easy to find for the user.
RAT: In order to for a user to find the search feature easily.
DEP: none

3.3.2 Usage of the search feature

ID: QR2
TITLE: Usage of the search feature
DESC: The different search options should be evident, simple and easy to understand.
RAT: In order to for a user to perform a search easily.
DEP: none

3.3.3 Usage of the result in the list view

ID: QR3
TITLE: Usage of the result in the list view
DESC: The results displayed in the list view should be user friendly and easy to understand. Selecting an element in the result list should only take one click.
RAT: In order to for a user to use the list view easily.
DEP: none

3.3.4 Usage of the result in the map view

ID: QR4
TITLE: Usage of the result in the map view
DESC: The results displayed in the map view should be user friendly and easy to understand. Selecting a pin on the map should only take one click.
RAT: In order to for a user to use the map view easily.
DEP: none

3.3.5 Usage of the information link

ID: QR5
TITLE: Usage of the information link
DESC: The information link should be prominent and it should be evident that it is a usable link. Selecting the information link should only take one click.
RAT: In order to for a user to use the information link easily.
DEP: none

3.3.6 Response time

ID: QR6
TAG: ResponseTime
GIST: The fastness of the search
SCALE: The response time of a search
METER: Measurements obtained from 1000 searches during testing.
MUST: No more than 2 seconds 100% of the time.
WISH: No more than 1 second 100% of the time.