Smart Waiter Software Requirements

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Revision History

Date	Comments
October 9, 2015	first draft.
January 19, 2016	Modified function and non function requirements.

Table 1: Revision History Table

Template

This document uses Volere Template for its organization.

1 Changes made

- Addressed all of Dan's comments
- Adjusted functional requirements (eliminated some)
- Adjusted non functional requirements (more specific)
- Added list of figures and tables
- Added design decisions

2 Project Drivers

2.1 The Purpose of the Project

This project aims to provide a solution that will allow users to order and pay through a mobile application at restaurants. This opportunity arose from the lack of a universal application in the market that allows; users to walk into a restaurant, scan a code to view the menu, and proceed to order and pay through the use of a singular app. Once the product is complete, Android users will be able to walk into any restaurant which offers our solution, and have the ability to use these services.

2.1.1 Project Goal

The delivered application will allow an Android user to use the application at any restaurant, which offers the Smart Waiter solution. More importantly, the client should be able to view restaurants complete menu, order selected items and pay for their meal through the application.

2.2 The Client, the Customer, and Other Stakeholders

2.2.1 The client

The prospective client of this application will be a restaurant owner or manager, who would like to implement an application based ordering system at their restaurant.

2.2.2 The Customers

The targeted customers will include clients of the restaurants, which offer Smart Waiter solution.

2.2.3 Other Stakeholders

Other Stakeholders of this project include:

- Supervisor Dr. Rong Zheng
- Android Users Clients of restaurant
- Developers and Testers Pavneet Jaual, Meraj Patel and Shan Perera
- Beta Testers
- Prospective manager/restaurant owners

2.3 Users of the Product

2.3.1 The Hands-On Users of the Product

Group - Restaurant clients

Clients who frequent restaurants, which offer Smart Waiter services.

User Role

These users will use the application to view restaurant menu, order their selection and pay for their meal.

Subject Matter Experience

These users can be categorized as novice, as they do not need extensive knowledge of the business. The user can simply be a client walking into a restaurant for the first time.

Technological Experience

The technological experience of this user can also be considered novice. The application will not require any training to use.

Other User Characteristics

There are some basic characteristics that the user should have, to qualify to use this application:

- Should have an android device and an internet connection
- Basic understanding of how to use an android application.
- Should have a credit card, to make payments through the application.

Group - Restaurant Owners

Restaurant managers who have Smart Waiter solutions implemented

User Role

These users will use the application to see how well it fits into their business requirements. These users will also demands features and enhancements.

Subject Matter Experience

To be considered masters, as they have in depth knowledge of the business.

Technological Experience

The technological experience of this user can be considered novice. The application will not require any training to use.

Other User Characteristics

There are some basic characteristics that the user should have, to qualify to use this application;

- Should have an android device and an internet connection
- Basic understanding of how to use an android application.
- Credit card required if they want to test payments method
- These users will pay attention to details. They will generally critique the UI and other aspects of the application to see how it fits their specific business needs.

Group - Testers/Developers

Testers and developers of Smart Waiter

User Role

These users will perform end-to-to system testing. The tester and developers will verify that each use-case and each feature in the application works correctly.

Subject Matter Experience

They will have complete knowledge of the business needs and requirements. Thus they can be considered a master.

Technological Experience

They will be a master in technological experience. They will know the code base of the application thoroughly. Similarly, they would know the application infrastructure and other technology used in the application.

Other User Characteristics

- Advanced knowledge of android framework
- Advanced knowledge of the code base
- Evaluate the application from the engineering perspective
- These users will pay close attention to detail
- Knowledge of all possible use-cases and expected outcomes of the application
- These users will also be responsible for settings the menus, and providing updates and support for the app.

2.3.2 Priority assigned to the user

Key Users

The key users of this application will be the target market of this product. Namely, the restaurant owners/managers and the restaurant clients.

Secondary Users

The secondary users will be considered the Testers/Developers.

2.3.3 User Participation

Restaurant Clients

These users will be participating and helping us provide the requirements and throughout the lifetime of the application. Specifically, they will be having a report bug feature built into the application to report bugs and suggest improvements. They will provide usability requirements.

Restaurant Owners

These users will also participate in providing requirements throughout the lifetime of the application. However, their main concerns are expected within 1 day of application usage. These users will provide business knowledge and business requirements for the application.

Testers/Developers

Throughout the development cycle of the application these users will continuously contribute to the requirements of the application. Specifically, they will provide interface prototyping, business knowledge and usability requirements for the application.

2.3.4 Maintenance Users

The testers/ Developers of the application will be considered the maintenance users. When going through the steps of unit testing, end-to-end testing and verification process, these users will continuously make changes to improve the product.

3 Project Constraints

3.1 Mandated Constraints

3.1.1 Solution Constraints

Constraint 1

Description

The application shall pull the restaurants menu from the server via a barcode

scan.

Rationale

Provide a simple solution, which supports multiple restaurants.

Fit criterion

Must be approved by tester and developer. They must confirm that complete information about the restaurants menu has been pulled from the server onto the users device.

Constraint 2

Description

The barcode scan by user shall send table and other user information to the server.

Rationale

Provide the restaurant with clients information and table number to serve food too.

Fit criterion

Must be approved by tester and developer. They must confirm that complete information about the user has been pushed to the server onto the users device.

Constraint 3

Description

The application must run on Android operating system.

Rationale

We are catering to the entire android platform users.

Fit criterion

The application must be approved from the developers and testers. This will involve thorough testing on the Android platform.

Constraint 4

Description

The application shall support credit card payments.

Rationale

This will transfer money to the restaurant account.

Fit criterion

The functionality must be approved by the developer and testers. This will require approving the code base and the end-to-end functionality.

Constraint 5

Description

The payment information for the client must be stored safely

Rationale

This is very sensitive data and should not be abused and exploited.

Fit criterion

The functionality must be approved by the developer and testers. This will require approving the code base and the end-to-end functionality.

3.1.2 Partner or collaborative applications

Not Applicable

3.1.3 Anticipated workplace environment

The users will be using this application in a restaurant. Typically, this work environment would be loud and distracting. Thus, we plan on making the UI of the application visually attractive, where the user does not need to read much. Specifically, the UI will use larger fonts, pictures and a design which is intuitive and straight forward to use. For further clarification, please refer to Smart Waiter User guide.

3.1.4 How long will the developers have on the project

The final deadline for the project is mid April 2016. The detailed deliverables and their respective deadlines are listed below;

- Requirements Document Revision 0: October, 9, 2015
- Proof of Concept Plan: October, 23, 2015
- Test Plan Revision 0: October, 30, 2015
- Proof of concept demonstration: November, 16, 2015 November, 27, 2015
- Design document revision 0: January, 11, 2015
- Revision 0 Demonstration: February, 1, 2015 February, 12, 2015
- Users Guide Revision 0: February, 29, 2015
- Test Plan Revision 0: March, 21, 2015
- Final Demonstration: Mid-April, 2016
- Final Documentation for the product: April, 1, 2016

3.2 Relevant Facts and Assumptions

3.2.1 Relevant Facts

Fact 1

Stripe API used for payment processing is payment card industry (PCI) compliant.

3.2.2 Assumptions

Assumption 1

Couchbase Database offers top-notch security for backend infrastructure from physical to application level.

Assumption 2

Communication between mobile device and server cannot be sniffed.

4 Functional Requirements

4.1 The Scope of the Work

4.1.1 The Current Situation

An android application is required to allow customers to walk into a restaurant and use their smart device to view a menu, place an order and pay for their meal. This will be a singular solution extended to multiple restaurants so users only have to use one mobile application to serve these functions.

4.1.2 The Context of the Work

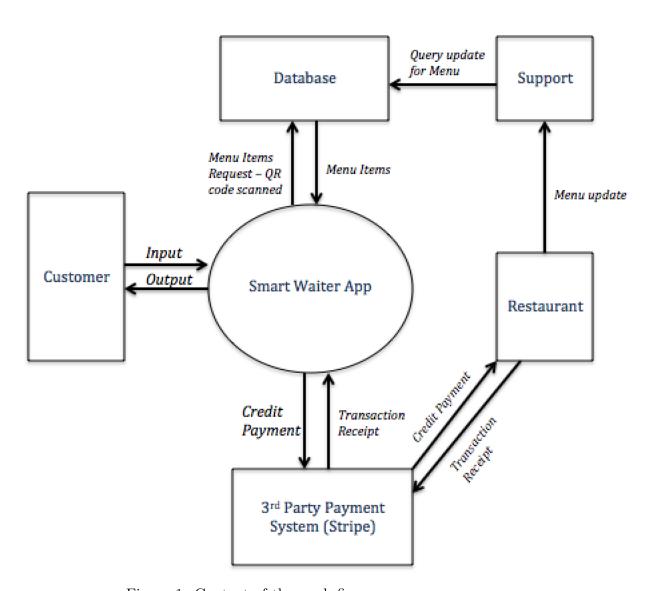


Figure 1: Context of the work figure.

4.2 Business Data Model and Data Dictionary

4.2.1 Business Data Model

4.2.2 Data Dictionary

Name	Content	Type
Restaurant	Restaurant Identifier	Class
User	User Identifier	Class
Waiter	Waiter Identifier	Class
Table	Table Identifier	Class
Order	Order Identifier	Class
Menu	Menu	Class
QR Code	QR Code	Class
User Identifier	Username + Password + Credit Card Info	Attribute/Element
Waiter Identifier	Employee Name + Employee Number	Attribute/Element
Table Identifier	Table Number + Waiter Assigned	Attribute/Element
Order Identifier	Table Number + User Identifier	Attribute/Element

Table 2: Data Dictionary Table

4.3 The Scope of the Product

4.3.1 Product Boundary

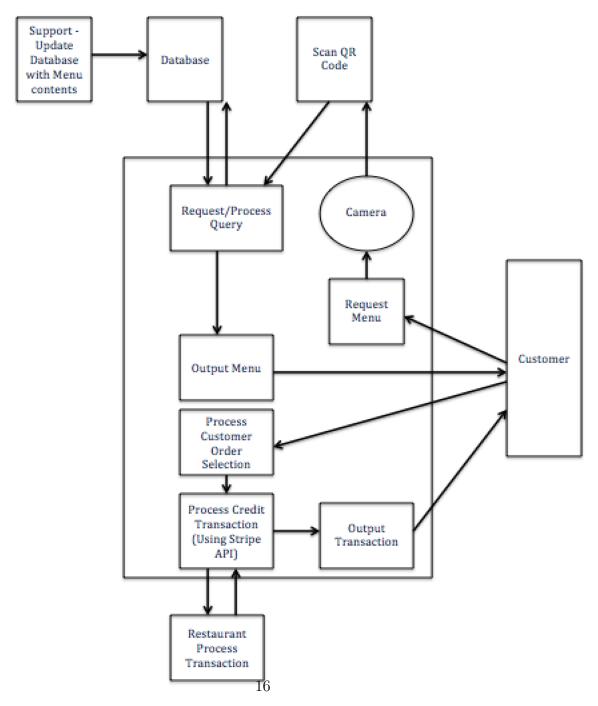


Figure 2: Product boundary figure.

4.3.2 Product Use Case Table

PUC#	PUC Name	Actor/s	Input/Output
1	Request Menu	Restaurant	QR Code (In)
		Customer	
2	View Menu	Restaurant	Menu Contents
		Customer	(out)
3	Order	Restaurant	Order Specification
	Customization	Customer	(in)
4	Submit Order	Restaurant	Submit Order (in)
		Customer	
5	Process	Strip API	Process
	Transaction (3rd		Transaction for
	party)		order (in)
6	Process	Restaurant	Process and
	Transaction		Record
	(restaurant)		Transaction (in)
7	Display Receipt	Customer	Display Receipt to
			customer (out)
8	Rate Items	Customer	Submit Rating out
			of five stars (in)
9	View ratings	Customer	View ratings of
			menu items (out)
10	Provide Employee	Customer	Provide feedback
	feedback		about employee
			(in)

Table 3: Product Use Case Table.

4.4 Functional Requirements

4.4.1 Functional Requirements

Requirement 1

Description:

The product shall scan a QR code to access the restaurant's menu.

Fit Criterion:

The product should access the camera application on the respective device to take a picture of the QR code and it will bring up the restaurant menu or display an error.

Requirement 2

Description:

The product shall allow the user to register an account for complete access to the products payment services.

Fit Criterion:

The product will ask the user if they would like to register an account, if the user agrees: the product will bring them to the registration page asking the user to provide a username, password, and credit card information. If the user declines, the product will bring them back to the main menu of the application.

Requirement 3

Description:

The product shall provide error codes for common errors.

Fit Criterion:

The user enters incorrect details when trying to login to their account. The product reports the error code 1, with the following message: Incorrect login information. i.e., Error Code 1: Incorrect login information.

Requirement 4

Description:

The product will display the menu in a similar fashion to the hard copy menu offered at the restaurant.

Fit Criterion:

A user accesses the menu using the product, it looks similar, if not identical to the paper menu offered at the restaurant.

Requirement 5

Description:

The product will provide detailed information on a menu item when selected.

Fit Criterion:

A user is browsing the menu and selects a hamburger, a new screen is brought up on the users device which details the ingredients of the hamburger and any extra ingredients they may add to the hamburger.

Requirement 6

Description:

The product will allow a user to request special instructions for food items they have ordered.

Fit Criterion:

A user is browsing the menu and selects a steak to his order, a new screen is brought up on the users device with a text entry box that allows the user to give special cooking instructions to the chef. The user types medium rare into the text box and confirms the order.

Requirement 7

Description:

The product will allow the user to view their current order.

Fit Criterion:

A user is browsing the menu and adds a chicken entrée and a beer to her order. Afterwards she adds a side dish to her order. She wants to see the subtotal of her order, she views her order through the interface.

Requirement 8

Description:

The product will update the total amount owed for the order in real time.

Fit Criterion:

A user is browsing the menu and adds an entrée to his order, the total is calculated immediately afterwards. If they add an item to their current order, the total should update immediately

Requirement 9

Description:

The product will allow users to pay for their order using a credit card.

Fit Criterion:

The user should be able to process their payment through the application using their credit card. No interaction with the restaurant personnel should be required.

Requirement 10

Description:

The product must be Payment Card Industry (PCI) compliant.

Fit Criterion:

Use a third party API in the application to process credit card which is PCI compliant.

Requirement 11

Description:

The product will allow users to place their order.

Fit Criterion:

User should be capable of placing their entire order, including special instructions through the application.

Requirement 12

Description:

The product will show a summary of the user's order before they place it.

Fit Criterion:

There should be a screen which shows all of the order details for the client.

Requirement 13

Description:

The product will allow users to remove items from their order before it has been placed.

Fit Criterion:

A user adds a hamburger, fries and a milkshake to their order. The user then decides they no longer want a milkshake and remove it from their order before he place the order.

Requirement 14

Description:

The product will allow the menu to be viewed on a smart phone.

Fit Criterion:

A user sits down at a table in a restaurant and scans the QR code using the product. The menu is brought up on the smart phone.

5 Nonfunctional Requirements

5.1 Look and Feel Requirements

5.1.1 Appearance Requirements

The user interface for this app will be simple minimal interface that allows the user to view restaurant menu and place an order with no complications.

5.1.2 Style Requirements

The style of the app will be consistent between most pages by using a template. As well, the style will be consistent between multiple restaurants. Only menu items will change. Doing this would make it easier for the user to get used to the interface and keep it memorable.

5.2 Usability and Humanity Requirements

5.2.1 Ease of Use Requirements

The app will be easy to use for any casual customer equipped with a smart device in a dining establishment. This can range from an elementary student to a senior citizen.

5.2.2 Personalization and Internationalization Requirements

Considering this app can be used in various ethic restaurants, customers may prefer to communicate in their own language. Thus, for a future functional requirement, the app will provide option to restaurant mangers to allow them to add an additional language setting. The app will always have English setting.

5.2.3 Learning Requirements

The learning curve will be kept as minimal as possible. The requirement is a user should be able to flawlessly use the app to view the restaurant menu and place and order without the use of a help function. The user should be comfortable and have complete understanding with this process as soon as he/she does it once. To meet this requirement, usability tests will be conducted to until high percentage of users feel comfortable with the process. We will add a help function which will allow users to seek help when required.

5.2.4 Understandability and Politeness Requirements

To promote understandability, appropriate images, text descriptions and symbols will be in place. That is, the user will understand this app is meant to serve as a menu and waiter by incorporating pictures, description and price of food available. A checkout button will clearly be indicated when the user is ready to place the order.

5.2.5 Accessibility Requirements

This app will be accessible to those with relatively good eyesight and have use of their index finger.

5.3 Performance Requirements

5.3.1 Speed and Latency Requirements

Query restaurant information should take no longer than five seconds. Processing transactions should take no longer than 10 seconds.

5.3.2 Safety-Critical Requirements

To maintain confidentiality, credit card and personal information will not be stored in the backend database. As well, an secure connection will always be instantiated when placing an order to ensure data protection.

5.3.3 Precision or Accuracy Requirements

The restaurant will set all monetary amounts for food and beverages seen on the app. All appropriate taxes will be included in the bill when making an order. This is covered in requirement number 9.

5.3.4 Reliability and Availability Requirements

Mobile app will be working whenever the user wants. However, services such as viewing menu and placing orders will only be available during restaurant hours.

5.3.5 Robustness or Fault-Tolerance Requirements

If the app fails to scan the QR code repeatedly (after 3 times), it will prompt the user to reach out to their waiter/waitress for service.

5.3.6 Capacity Requirements

Multiple users within the restaurants must be able to use the application and place orders simultaneously.

5.3.7 Scalability or Extensibility Requirements

Increasing number of participating restaurants may induce database upgrade in terms of efficiency in querying. There is one database for each restaurant.

5.3.8 Longevity Requirements

App is relies on the restaurants business life. For example, if restaurant decides to shutdown, the app will no longer serve that restaurant.

5.4 Operational and Environmental Requirements

5.4.1 Expected Physical Environment

Ordering component of the app will be functional only at restaurants. This includes, viewing a menu and placing an order.

5.4.2 Requirements for Interfacing with Adjacent Systems

Our product must be compatible with various versions of android. The smart device must have a camera to operate.

5.4.3 Productization Requirements

App will be available on Google Play for download by customers.QR codes will be implemented at participating restaurants. These codes will be placed on tables so customers can scan appropriately if they have the app.

5.4.4 Release Requirements

A new app release will not affect restaurant data or compromise integrity. For example, customers with an older app version would still be able to view the same information as those with updated version.

5.5 Maintainability and Support Requirements

5.5.1 Maintenance Requirements

Restaurants menu changes will be processed after restaurant hours and take effect the next day. This ensures all customers see the same information.

5.5.2 Supportability Requirements

If a restaurant manager requires support on maintenance (updating menu items), they will log a request with us to make this change. Customers using the app will rely on self-support (download and update when new release is available).

5.5.3 Adaptability Requirements

For a future requirement, the app will be extended to other mobile platforms (IOS, blackberry, windows)

5.6 Security Requirements

5.6.1 Access Requirements

User is only allowed access to restaurant data by scanning QR code. Other participating restaurants data will not be available unless they have QR code.

5.6.2 Integrity Requirements

Credit information is never recorded on backend database, thus no chance of leakage.

5.6.3 Privacy Requirements

Will inform user that credit card information transactions will be secured through the use of encrypted connection. Also, will ensure restaurant mangers that data is read from QR code cannot be tampered with.

5.6.4 Audit Requirements

N/A

5.6.5 Immunity Requirements

Allow QR code to be read only, prevent tampering of data. Always ensure secure connections with processing credit card transactions.

5.7 Cultural and Political Requirements

5.7.1 Cultural Requirements

N/A

5.8 Legal Requirements

N/A

5.8.1 Compliance Requirements

N/A

5.8.2 Standards Requirements

N/A

6 Project Issues

6.1 Open Issues

- Amount of data to be queried is unknown as it is specific to each restaurant.
- Amount of concurrent clients requesting data is variable. Will affect efficiency

6.2 Off the Shelf Solutions

6.2.1 Ready Made Products

N/A

6.2.2 Reusable Components

Stripe API will be incorporated as a form of payment system. This will reduce the hassle of reinventing a payment processing system. As well, it insures data integrity.

6.2.3 Products That Can Be Copied

Open table offers similar solution. However this product lacks functionality in terms of ordering. Similar UI can be constructed to appeal to mass audience.

6.3 New Problems

N/A

6.4 Tasks

- Develop product prototype and perform testing
- Introduce prototype to supervisor for feedback

- Work on revisions
- Design decisions need to be made
- Test plan should be designed to cover all use cases

6.5 Migration to New Product

N/A

6.6 Risks

- Dependency on third party API Stripe. If company happen to shut down, unable to process credit card payments until alternative solution is found
- Network threats. If new threats are discovered (e.g., heartbleed), may comprise data integrity.

6.7 Design Decisions

The environment will require the following;

- Source code will be written in Java because it is the only common language between third party API's used, and Android platform.
- Cloud storage must be used, because of the dynamic nature of the application. The menus cannot packaged with the application.
- A third party API or correct security features must be integrated into application to support credit card payments
- Restaurant clients should not be able to dine and dash.

6.8 Costs

N/A

6.9 User Documentation and Training

Work in progress

6.10 Waiting Room

Work in progress

6.11 Ideas for Solutions

Work in progress