MET CS682

System and Requirements Analysis

Assignment 3

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Contents

Application Aspects of WatchADeal

Key Requirement Aspects

Table of Contents Figures

Application Aspects of WatchADeal

Abstract

This assignment focus on the presentation of the key requirement aspects of the wearable smart watch app and accompanying mobile app that called WatchADeal application, which allows customers where they simply walk in to Big Mart store, pick out what they want, and walk out without having to stop and "check out" with a cashier, or automated check station.

Assumptions

The following assumption will apply to the various elements presented in this assignment:

- BigMart is a brick-and-mortar physical store
- The store features 'Just Walk Out' technology and works with WatchADeal app
- WatchADeal application was develop for wearable Apple or Samsung smart watch, Android or iOS smartphone and tablet or iPad
- User will be able to download and install that application on their wearable smart watch, smart phone or tablet / iPad.
- Customer can just walk in to BigMart, grab items, and leave that means there's no need to wait in line or even check-out at register
- To get started with WatchADeal, customer need to create an account
- That is assuming everyone in the store has a smart watch, mobile device or tablet / iPad on their person, which means customers might not want to bring their kids to this store.
- WatchAdDeal will be able to generate the list of potentially matching items down to a small list to advice customer based on chosen item.
- If customers change their mind about chosen item, just put it, back. WatchADeal will update their virtual cart automatically.
- Customer will be notified of deals, location-based advice, price comparisons and similar item

Key Requirement Aspects

1. Overview

The WatchADeal application by joining to store features 'Just Walk Out' technology provides a Non-stop shopping experience. Customer with wearable smart watch (Apple Watch, Samsung Gear, etc.) or latest version of Android / iOS smartphone or even tablet / iPad can simply walk in, pick out what they want and even sometimes put items back on the shelf and walk out when customers exit the store through a transition area, automatically charge a fee for the items.

2. User Stories

1. As a Customer, I need to assist in determining the identity of items placed in inventory locations for picking up items.
2. As a Customer, I want to receive the list of potentially matching items bought by others and price comparisons in order to make a decision.
3. As an Inventory Management system, I will be responsible for aimed at ensuring all inventory are at required level and identify the item was actually placed in the inventory location.
4. As a system admin, I am responsible for maintaining WatchADeal application and ensuring all sensors and cameras properly track user's location, also manage all system activities in order to customer support.

3. Functional Requirements

The WatchADeal app shall work with store features 'Just Walk Out' technology (Bishop, 2016)
- The WatchADeal app shall track user's location so that the user will notify of deals, location-based advice, price comparisons and similar item suggestions depending on where they are in the store.
 - The WatchADeal app shall detect when items are taken or returned to the shelves and keeps track of them in customer virtual cart
 - The WatchADeal app shall be able to provide search tool in order to finding exact place of item based on:
  o Item category
  o Item name
  o Voice request
 - The WatchADeal app shall be able to provide search tool based on name of item

- The WatchADeal app shall generate the list of potentially matching items down to a small list to advice customer based on chosen item
- The WatchADeal app shall be able to vocal communication with customers to assist them in determining the identity of items placed in inventory locations for picking up items.
- The WatchADeal app shall display buying alternatives that include merchandise in stock, reviews and similar items bought by others.
- The WatchADeal app shall alarm and notified to Inventory Manager system, when inventory amount are less than required level
- The WatchADeal app shall alarm and notified to Inventory Manager system, when items are not proper placed on inventory location
- The WatchADeal app will be able to offer items with discount, based on customer purchase history
- When customers exit the store through a transition area, the WatchADeal app shall sense that they're leaving, add up the items and charge their account

4. Use Cases

Use case Name	Grab items, and leave	
Actor:	Shopper	
Description:	WatchADeal application, allows customers where they simply walk in to Big Mart store, pick out what they want, and walk out without having to stop and "check out" with a cashier, or automated check station.	
Precondition:	Customer need an BigMart account to get started with WatchADeal app	
Step #	**Actor**	**System**
1	1. Open the WatchADeal app on his/her smart watch or smartphones	2. Displays the main GUI with the qr code on the screen
2	3 Holding screen to a scanning device	4. Identifies user and notifies to customer to begin shopping
3	5. Entering the store and began shopping	
4	6. Picked up item from the shelve	7. Identifies on an item identifier list associated with the customer and added to his/her virtual cart

5		8. Display buying alternatives that include merchandise in stock, reviews and similar items bought by others.
6	9. Change his/her mind and put item back on the shelve	10. Identifies on an item back and update his/her virtual cart
7	11. Exit the store through a transition area	12. Sense that customer is leaving, add up the items and charge his/her account
8		13. Displays items bought with price and total price plus tax in the GUI for confirmation
9	14. Clicks the button for confirmation the shop	
10		15. Displays "Thanks for your shopping"
11		16. Display the main GUI
12	17. Close the app	
Alternate Courses:	(**Alt 1 Step 1**) clicks on Help icon	(**Alt 1 Step 2**) displays Help page with instructions.
	(**Alt 2 Step 1**) clicks on Previous arrow	(**Alt 2 Step 2**) brings Previous Page
	(**Alt 3 Step 1**) clicks on my list icon	(**Alt 3 Step 2**) displays what customer s bought after they have left
Implementation Constraints:	WatchADeal functional areas shall be no more than five clicks away from the main page.	

| Use case Name	Search place of item by Voice Request	
Actor:	Shopper	
Description:	WatchADeal application assist customer in determining the identity of items placed in inventory locations for picking up items.	
Precondition:		
Step #	**Actor**	**System**
1		1.Displays the main GUI
2	2. Click "Advice Shopping" button	3.Displays three icons: -looking by items - Enter the name of item -Voice request
3	4. Clicks the "Voice Request" button	5. Display Voice recording GUI
4	6. Asks about location of specific item	7. Repeats name of your item for confirmation
5	8. Confirm that by saying "yes"	9. Display the exact location of the item in the store with voice response
6	10. Clicks "Done" button	11. Displays message "Is there anything else?"
7	12. Clicks "No" button	13. Displays the main GUI
Alternate Courses:	**(Alt 1 Step 1)** clicks on Looking by name radio button	**(Alt 1 Step 2)** displays prompt of get item's name page
	(Alt 2 Step 1) clicks on Home icon	**(Alt 2 Step 2)** brings Home Page
Implementation Constraints:	Search results should not take more than one second.	

5. State Transition Diagram
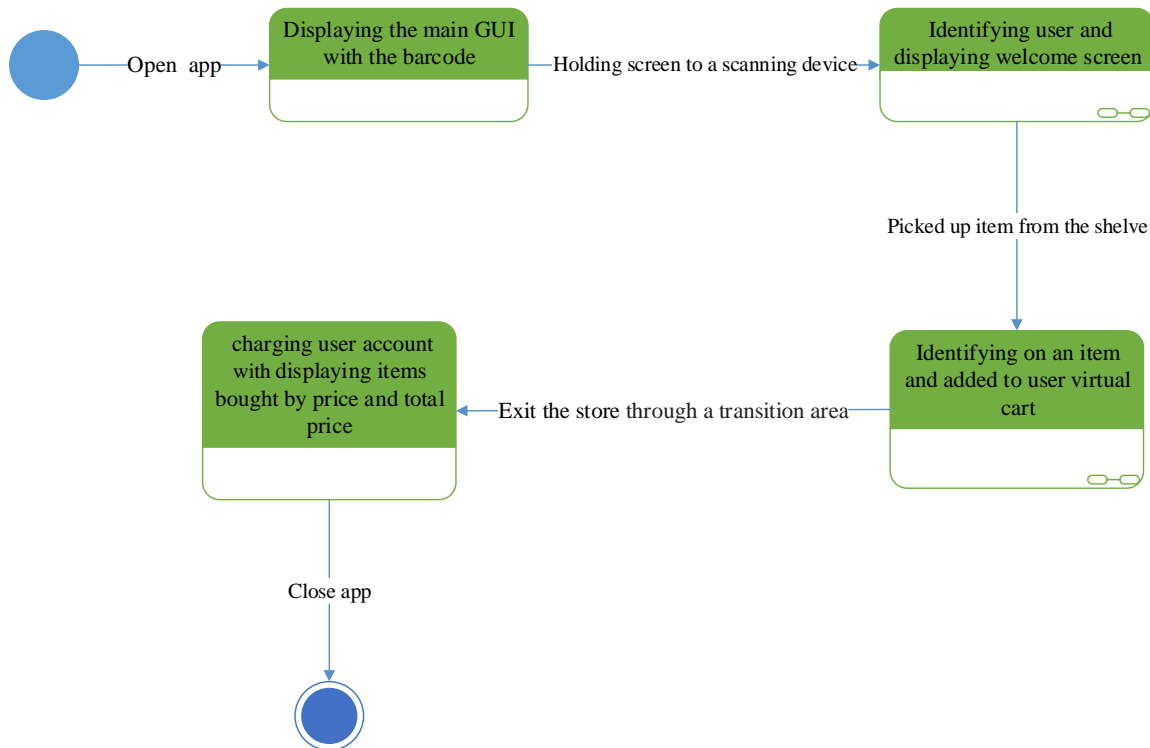
Fig1. State Transition Diagram of high level of 'Just Walk Out' with WatchADeal app

 This State Transition Diagram represents high level of 'Just Walk Out' technology with WatchADeal application. WatchADeal app shall detect when items have taken and keeps track of them in customer virtual cart until customer exit the store through transition area. That time app shall sense that customer is leaving, add up the items and charge customer account.
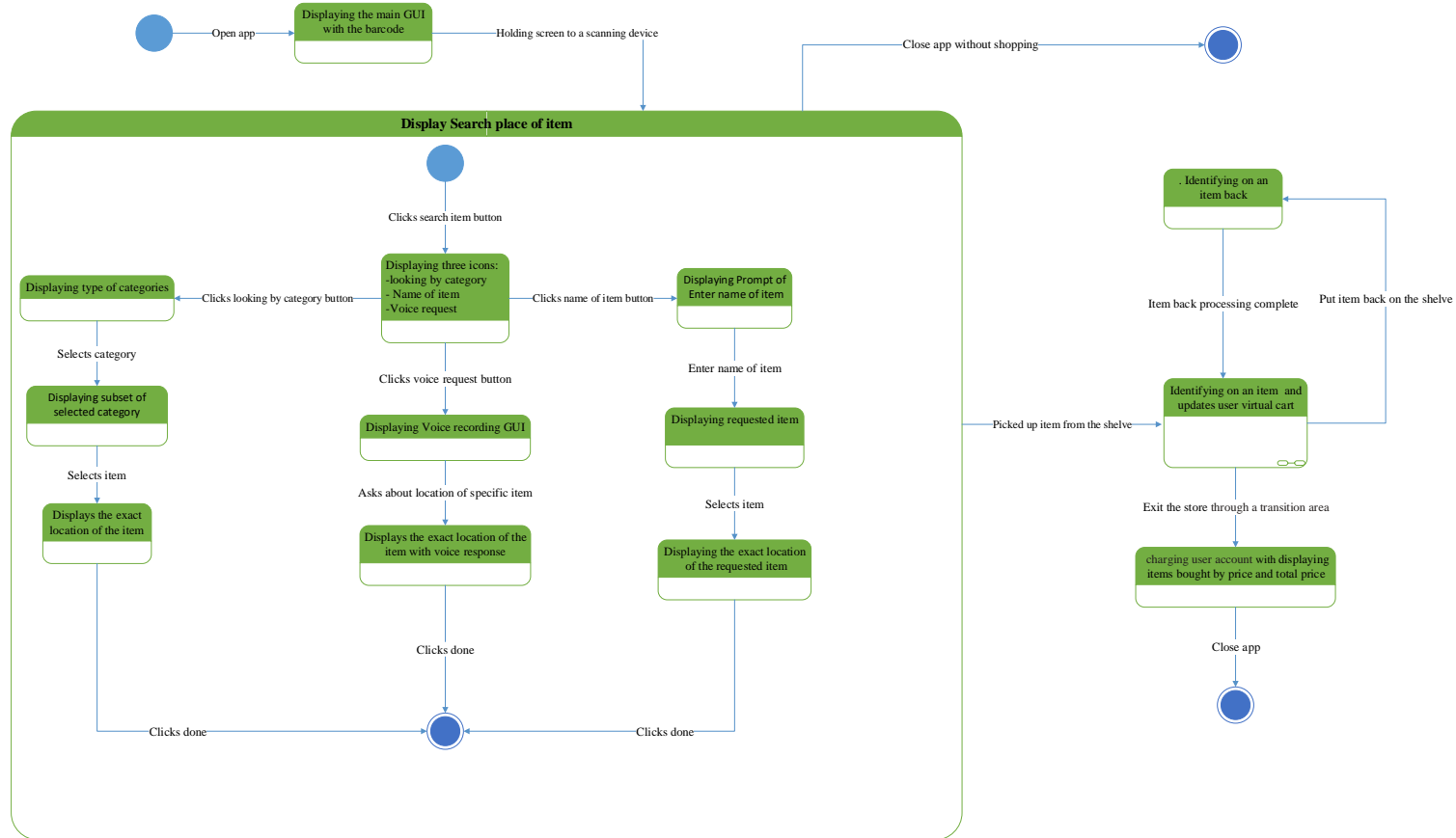
6. Sub-States

Fig2. Sub State Transition Diagram of search item's place and put item back on shelve

This diagram represents details of search item's place and processing of put item back on shelve by shopper.

7. GUI Sketches

WatchADeal app has a navigation bar at the bottom with tabs for four screens: "Home", "Search", "My list", and "Help". The QR code that the store's turnstiles scan to let customers in, and my list screen serves up what customer s bought after they have left. (Better, 2016)
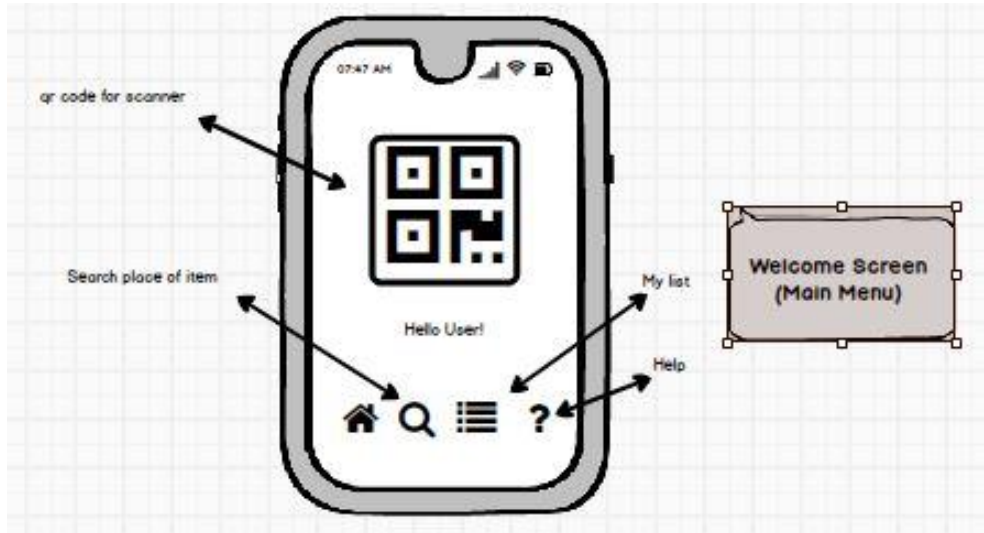

Fig3. Showing the main GUI the WatchADeal application

The WatchADeal app provides search tool in order to finding exact place of item based on: category, name and Voice request. Figur4

Fig4. Showing the search page for looking item's place

8. Non-Functional Requirements

One of the most important Non-Functional Requirements in application based on computer vision and AI is Reliability (measure of observed faults) because in this case, the store features 'Just Walk Out' technology such as cameras and sensors work with WatchADeal application and system should behave consistently in a user-acceptable manner. Therefore, we want the system to be as reliable as possible, due user will automatically be charged a fee for the items. (Bishop, 2016) Next important Non-Functional Requirement in this project, which has relationship with reliability, seems is external interface in term of hardware. (Booth, 2015) As it mentions before, "This system is a camera-tracking system that also uses AI in the form of facial recognition or user biometrics, as well as sensors, such as something in the label of products." (Better, 2016) Therefore maintaining hardware and integrated them with software is a critical aspect of making reliable system during the life cycle of this particular project.

9. Reflecting on Requirements

I would use "**Use Cases**" to document and organize requirements for the WatchADeal application. Because, "Use Case" is appropriate way to extract requirements from users and making the core of each functional requirement document. It also fits to most of development methodology. (Firesmith, 2002) Significant risk of using GUI than use cases is **GUI appears to require more time and more steps, which leads to more costs.** (Zhang & Chen, 2007)
Use cases offer many important benefits that some **key advantages** of using "**Use Cases**" are:
-   Use cases are easy to understand and provide a proper way for communicating with customers and users/stakeholders.
-   Use cases can help manage the complexity of large projects by decomposing the problem into major functions and provide tools for requirements traceability and capturing functional requirements.
-   Use cases provide framework for driving the system development project.
-   Use cases provide a good basis for identifying, assigning, tracking, controlling, and managing system development activities.
(Firesmith, 2002)
The following provides an overview of the **key disadvantage** associated with use cases:
-   Use cases ignore the encapsulation of attributes and operations into objects.
-    The simple structure of the use case model does not clearly map to the network structure of the object model with its collaborating objects and classes.

- Use cases avoid description of user motivations and experiences.
- In large project, it can take a significant amount of time to complete a set of use cases.

(Firesmith, 2002)

GUI (Graphical user interface) plays an important role in computing. Some key advantages of graphical user interface are:

- Easiness for non-technical people
- Looks nicer than text interface
- Drag and drop feature

Disadvantages of graphical user interface can mention:

- Difficult to develop and high cost
- Slower than command line tools
- Extra attention required
- Consuming lots of memory resources which make system or device slow to perform.
- Testing and implementation takes lot of time

(Rehman, 2017)

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