MET CS682

System Modeling

Assignment 4

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Fall 2 - 2017

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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

1. Use Case Selection

1.1. Use Cases - Grab items, and leaves

Use case Name	Grab items, and leaves	
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.	

1.2. Use Cases - Search place of item by Voice Request

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.	

2. Entity Classes

The significant business (entity) classes listed below are the key objects of the WatchADeal application:

- ## Shopper

Main purpose: Shopper or customer is a key entity and main purpose of this entity is to explore Non-stop shopping experience where it means no check out and automatically charge a fee for the items when shopper exit the store.

Attributes: User ID, Password, First Name, Last Name, Address, Phone, email

Functionalities: The Shopper entity class is represent functionality and extra features to customer Non-stop shopping experience, including ease of navigation, clarity of item, location-based advice by 'Just Walk Out' technology. (Better, 2016)

Relationships: The Shopper entity class has three relationships with first **dependency** relationship to **design entity screen** where represent WatcthADeal application, Second **dependency** relationship to **Track User Location** class entity that is machine vision in-store sensors and cameras to track user's location and finally a **composition** relationship with **account** class that has multiplicity of 1 to 1..*. (Each shopper can have several accounts).

- ## <<Design>> Screen

Main purpose: Design Screen class represents WatchADeal application where provides customers a wearable smart watch app (Apple Watch, Samsung Gear, etc.) and an accompanying mobile app with the same name.

Attributes: Type of application (Smart watch or Smart Phone), Version, Release Date

Functionalities: WatchADeal application encompasses the smart watch application and the mobile phone application, which will communicate with a machine vision check out system.

Relationships: This design class has four relationships with other entities. First, it has **dependency** to **Shopper** and **Controller Search** and then has **association** relationships with **Alert** and **Scanner** entity classes.

- ## Scanner

Main purpose: By holding screen with the QR code on the screen to a scanning device, system is able to identify user and notifies to customer to begin shopping

Attributes: Scanner ID, Model, Year built, Maintain Date

Functionalities: This device is part of 'Just walk out' technology in order to identify customers and authorize them to begin shopping.

Relationships: Scanner has **association** relationship with **Design Screen** and Aggregation relationship to **Track User Location** that has multiplicity of 1..* to 1. (The store can have several scanners)

- ## Track User Location:

Main purpose: Track User Location entity class is machine vision in-store sensors and cameras to 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.

Attributes: Scanner ID, Model, Year built, Maintain Date

Functionalities: This device is part of 'Just walk out' technology in order to identify customers and authorize them to begin shopping.

Relationships: Track User Location entity class has four relationships with other entities as follows: **Dependency** relationships with **Shopper** and **Alert** class, in addition **Aggregation** relationships with **Scanner** and **Transition Area** that has multiplicity of 1 to 1..* for both of them.

- ## Alert

Main purpose: Alert is a design class, which sends a message to the screen for informing user in order to notify of deals, location-based advice, price comparisons and similar item suggestions depending on where they are in the store.

- **Attributes:** Alert Code, Alert Type
- **Functionalities:** Alert is part of traceability of 'Just walk out' technology where in fact using a combination of artificial intelligence, computer vision, and data pulled from multiple sensors and cameras in order to notify user for better shopping experience.

Relationships: Alert class has **composition** relationship with **Item** and **Alternative Item**, which has multiplicity of 1 to 0..* for both of them. In addition, it has **dependency** relationship with **Track User Location** and **association** relationship with **Design Screen** class.

- ## Search

Main purpose: By using search item or services, shoppers can readily evaluate before they purchase

Attributes: Search Name, Search category, Audio field

Functionalities: Search assist customer in determining the identity of items placed in inventory locations for picking up items.

Relationships: Search class has two **dependency** relationships with **Item** and **Design Screen**

- ## Inventory Location:

Main purpose: Inventory Location contains detailed records of the items, quantities and stock locations of the store.

Attributes: location code, Shelf floor, Item ID, Item name, Quantity

Functionalities: Inventory Location is a part of retail location that contains physical items that it could be tracked items by machine vision technology and multiple sensors & cameras. Shopper can pick up or even return item in this location.

Relationships: Inventory Location has two Aggregation relationships with Item and Alternative Item where has multiplicity of 1 to 0..* for both of them.

- ## Item

Main purpose: Item represents product, which is subject to sales.

Attributes: Item ID, Item Name, Quantity, Weight, price, Expired Date

Functionalities: Each item has a unique tag that means, it is traceable by 'Just Walk Out' technology.

Relationships: Item have six relationships with other entities as follows:
It has **Composition** relationship with **Alert** that has multiplicity of 1 to 0..*
It has **Dependency** relationships with **Alternative Item**, **Transition Area** and **Search.**
It has **Aggregation** relationships with **Inventory Location and Virtual Cart** that as multiplicity of 1 to 0..* for both of them.

- ## Alternative Item

- **Main purpose:** Alternative Item is a system alternative offering that means, when shopper pick up any item, he/she will be notified of deals, price comparisons and similar item suggestions depending on type of item chosen.

Attributes: Item ID, Item Name, Quantity, Weight, price, Expired Date

Functionalities: The WatchADeal app shall display buying alternatives that include merchandise in stock, reviews and similar items bought by others.

- **Relationships:** Alternative Item has **dependency** relationship with **Item** that has multiplicity of 1 to 0..*. It as **composition** relationship with **Alert** and **Aggregation** relationship with **Inventory Location**, which has multiplicity of 1 to 0..* for both of them.

- ## Transition Area

Main purpose: Main purpose of Transition Area is sensing customers along with items that exit store.

Attributes: Transition ID

Functionalities: Transition Area is part of 'Just Walk Out' technology for sensing that customer is leaving; add up the items and charge his/her account

Relationships: Transition Area has **Aggregation** relationship with **Track User Location** that has multiplicity of 1 to 1..*. in addition it has **Dependency** relationship with **Item** and directed **Association** with **Virtual Cart** and **Account** Class entities.

- ## Virtual cart

Main purpose: Main purpose of Virtual Cart is an e-commerce shopping cart on the WathADeal application that when shopper pick up item, system identifies on an item identifier list associated with the customer and added to his/her virtual cart.

Attributes: User ID, Item name, quantity, Unit price,

Functionalities: Virtual Cart is an e-commerce shopping cart on the WathADeal application that when shopper pick up item, system identifies on an item identifier list associated with the customer and added to his/her virtual cart.

Relationships: Virtual cart has a **Aggregation** relationship with **Item** that has multiplicity of 1 to 0..*. Another relationship is **Composition** with **Account** by multiplicity of 1 to 1. In addition, it has directed **Association** with Transition Area.

- ## Account

Main purpose: Main purpose of Account is a unique record for each type of expense.

Attributes: User ID, First Name, Last Name, Account Number, Balance

Functionalities: When shopper exit store, transition area senses customer and items belong him/her and charges customer account.

Relationships: **Account** has **Aggregation** relationship with **Shopper** by multiplicity of 1 to 1..* and also **Aggregation** relationship with **Virtual Cart** by multiplicity of 1 to 1. In addition, it has directed **Association** with **Transition Area**.

3. Sequence Diagram

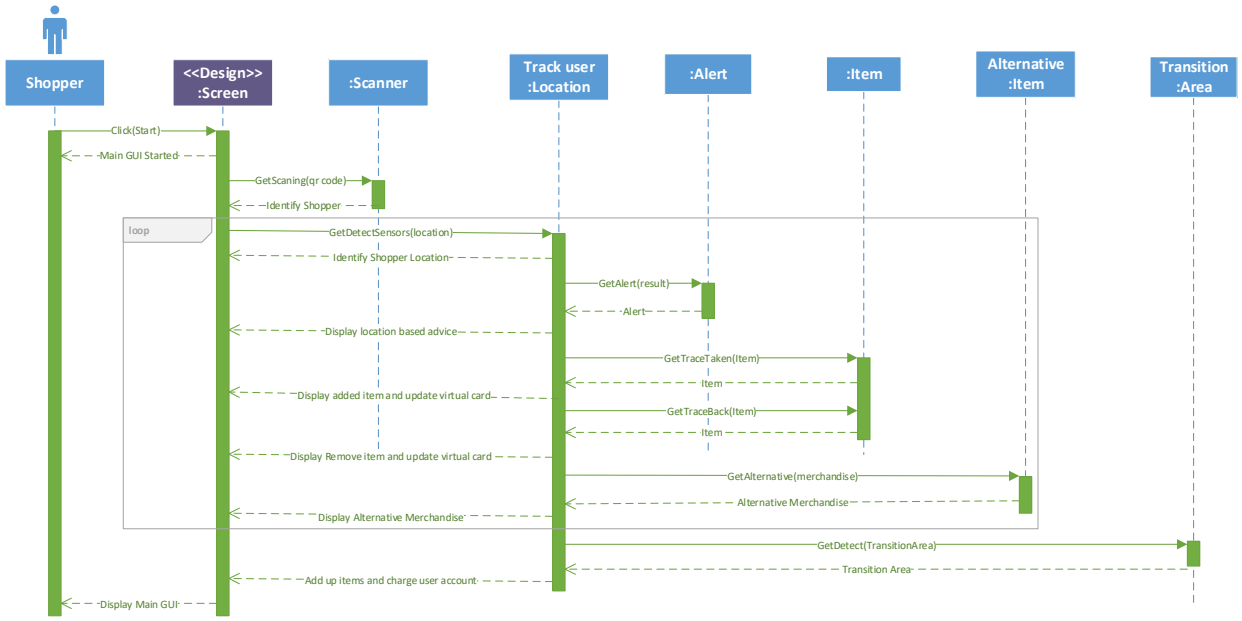

Fig 1: Sequence Diagram for Grab items, and leaves Use Case

Note: As a mention in diagram Shoppers opening the app on their device, then holding it to a scanning device, and entering the store. Shoppers then put away their device and began shopping. Track User Location is machine vision in-store sensors and cameras to 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. When Shopper Picked up item from the shelve, system identifies on an item identifier list associated with the customer and added to his/her virtual cart and alert buying alternatives that include merchandise in stock, reviews and similar items bought by others. Finally, when Shopper Exit the store through a transition area, system sense that customer is leaving, add up the items and charge his/her account. (Bishop, 2016)

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4. Class Model

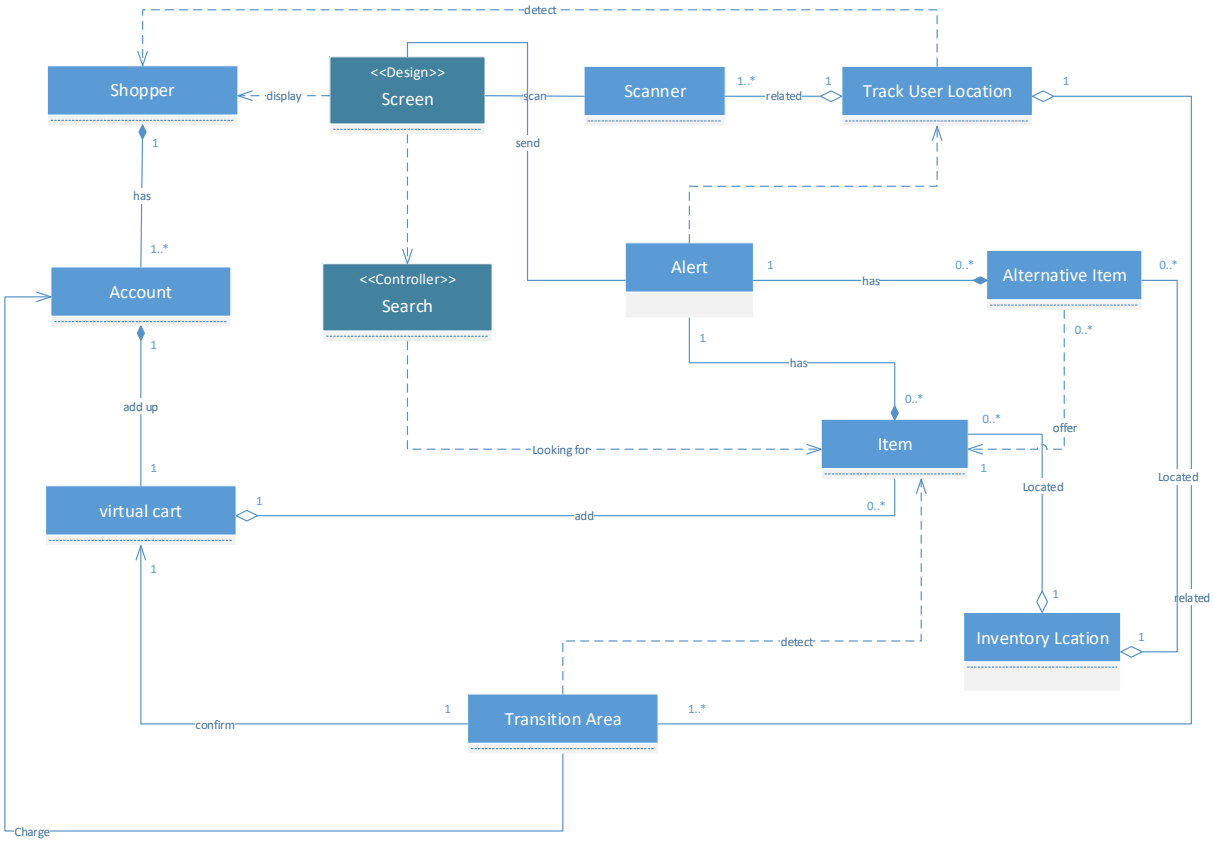

Fig 2: Class Model of WatchADeal System

Note: This diagram represents important classes for WatchADeal System. Design Screen and Cntroller Search are both design class. Shopper, Item and Track User Location along Transition Area are key entities and main purpose of these entities is to explore Non-stop shopping experience. As a mention in fig 2, you can see, Item entity class has most relationships with other entities that it indicates the importance of this class.

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