Milestone 1

Team Name: ED

Eric Prologo

Daniel Kim

Note: Even though we did ask in our interview about robots and made observations about customers' interactions with technology, our project is not about a robot. Our project is focusing on an app that we envisioned controlling a robot in a store. So we wanted to gather some data about robots so that we could better develop a design for our app used to control the robot.

Requirements Gathering Report

- Methods used
    - Interview and disguised naturalistic observation
- Key interview questions or observation targets, etc.
    - Interview questions
    - Made sure to be persistent and ask follow up questions to elaborate on these main interview questions.
        - Approximately how much time do you spend going through your stores inventory on a daily basis?
        - Have you ever had to leave helping a customer due to something that needed to be taken care of in the inventory of the store?
        - Do you trust a robot's ability to successfully grab, deliver, and manage inventory?
        - Have you ever had complaints from customers due to employees not being there to assist them?
        - Do you currently have software that allows you to track inventory?
- Observational research. We'll be using disguised naturalistic observation at the hiking section in REI.
    - How many times an employee has to go back to inventory during 30min of observation?
    - How efficient do employees move around the store when attempting to locate inventory?
    - How long are customers left unattended during 30min of observation?
    - Observe how people interact with new technology in the store. Are they comfortable with the technology? What characteristics does the technology have?
- Number of participants

        - 5 or more
- Full interview scripts / observation protocols may be included in an appendix and not counted in the page
    - Included in appendix **1A**

Results

We interviewed three of the employees from REI, and here is the summary of the results.

Inventory

- They mentioned that they had to check their storage quite a lot since many of customers were mainly asking them to check inventories.
- In addition, the employees sometimes have to go to storage in the back to double check if they missed anything even though their website says it's out of stock. Because they have to go check the inventory in the back, they mentioned that they usually have to leave the customers behind which sometimes get negative feedback for taking too long. They do have a big storage in the back, so it does take some time to look for the specific inventory that the customers requested for.

We told the participants about our project and this is what they felt about robots. We mainly wanted to ask them since this was one of the topics that we went over in this course, and wanted to know how they would feel about them in the future.

Robots

- One of the employees mentioned that he does not completely trust robots in general, since he would rather go complete a task for himself and make sure that he did it correctly. However, the other two employees portrayed that robots would be convenient since completing customers requests can be tedious for them.
- All of the employees mentioned that having the robots could be nice, but they realized that having robots means they have to do maintenance on the robots. In other words, this could make them more busy since they have to take care of the robots while taking care of the customers.

We also asked the employees about their software/application to track their inventories.

Software / inventory management app

- They have their own app for employees for tracking inventories but they sometimes use their website (public for customers) due to simplicity compared to their app. They also mentioned that their inventory app is not accurate once in a while. This is one of the main reasons why they have to go back to the storage to double check the inventory.
- They think that their inventory app is a little more complicated than the public website is because of the user interface. They thought the mapping was unclear so it was hard to navigate what they wanted to do.

Observation Summary:

- While doing disguised naturalistic observations in the REI hiking section. We were able to gather some valuable information from our 30 minute observation session. Most commonly what was observed was that customers interacted with the technology available well. We also observed two instances where an employee had to leave the area when customers were present to help with inventory in the store. It was also observed that the employees seemed to be able to navigate their website/software well. Though there were times where the inventory was incorrect causing the employee to mislead customers.
- There was also one side observation made that we think would be a good addition to our app. When customers come in looking for only 1 item and they already know what they want, these customers sometimes are inconvenienced by long checkout lines. Although this was not taking place in the hiking section, this observation provided information we feel could enhance our app.

The subsequent requirements generated for your project

1. The app/website is difficult to navigate without experience
    a. Our app needs to be easy to navigate while also allowing the user to quickly/efficiently find their desired item and perform a desired task.
    b. The app needs to have good mapping to common features in order to help users understand and work with it.
2. Distrust between human and robot
    a. Our app needs to have total control over the robot. For example, the robot needs to be able to be shut down via the app or have its tasks changed dynamically via the app. This will help to build trust between users and the robot.
3. Inventory is wrong/not updated on the app or website
    a. The app needs to update dynamically so that inventory is always up to date.
4. Customer inconvenience to have to wait in line
    a. Customers will be able to pay through the robot (such as QR code invoice, card chip reader installed in robot, and etc.) in order to avoid waiting in line to pay.

Ideation & Brainstorming Report

Some results from your consolidation discussion

After having our consolidation discussion. We have many ideas for how our app should look and function. Some of the things we both agreed should be incorporated into our app are, big buttons with universal signs (such as plus and minus signs, search button, and etc.), gestures that map well to their outcome, having very few steps required to complete a task, power button in the top right of the app, a setting configuration just left of the power button, easy to read writing as well as images that match each item in the inventory, easy to access “shutdown robot” button for the user, and a feature that allows the inventory to dynamically update. We will also add a section where they can edit and review their employees information so that the app can also track who’s using which robot. In addition, there will be a warning pop up if there is something wrong with the robot or being malfunctioned. Finally we will have a stylus with the app that only the app registers. This will enable the desired user to use the app with the stylus but no one else. This will prevent the apps and robots from being mishandled by people other than the intended user. We also discussed having a barcode scanner so that people can pay through the app with the employee supervision. All of these features will have major benefits for our app and we feel will help users be successful when working with inventory.

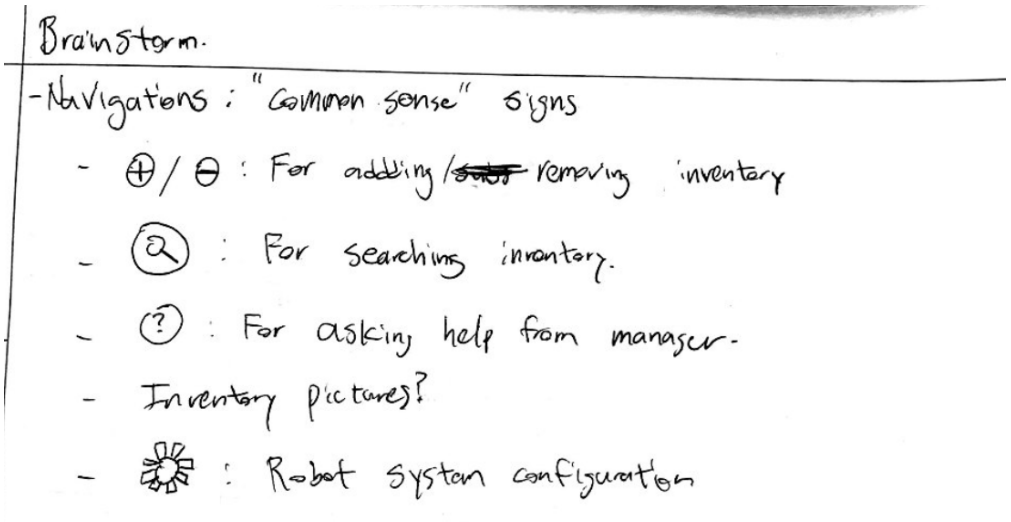
Summary of the Final Design Ideas to Move Forward

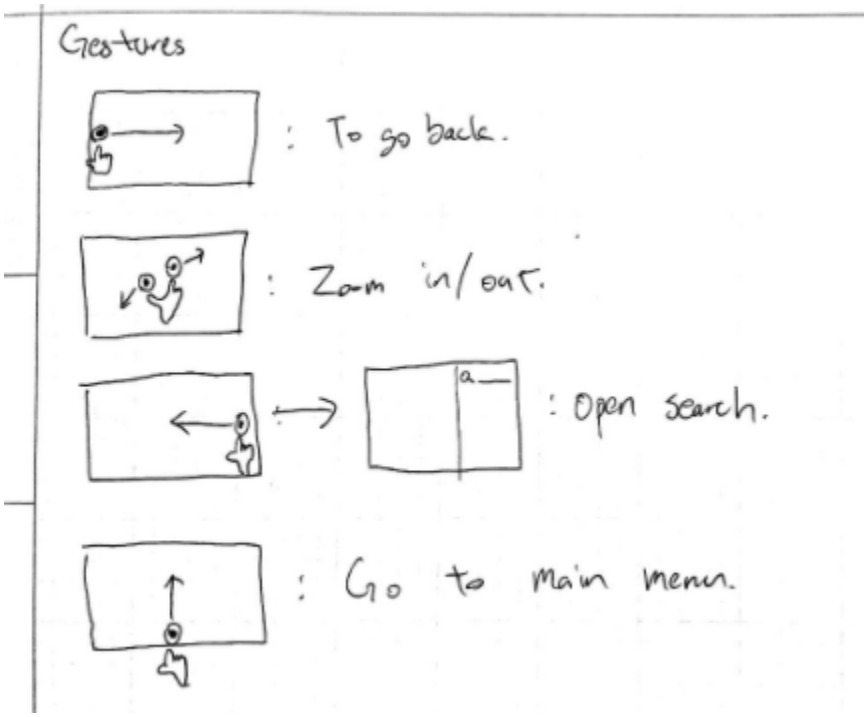
From discussing and comparing the features of our application, we decided to include these following features in our application: bigger buttons, gestures, limited amount of steps to complete tasks, universal buttons/signs, mappings that are easy to navigate, warning pop up for robot malfunction, and complete control over the robots.

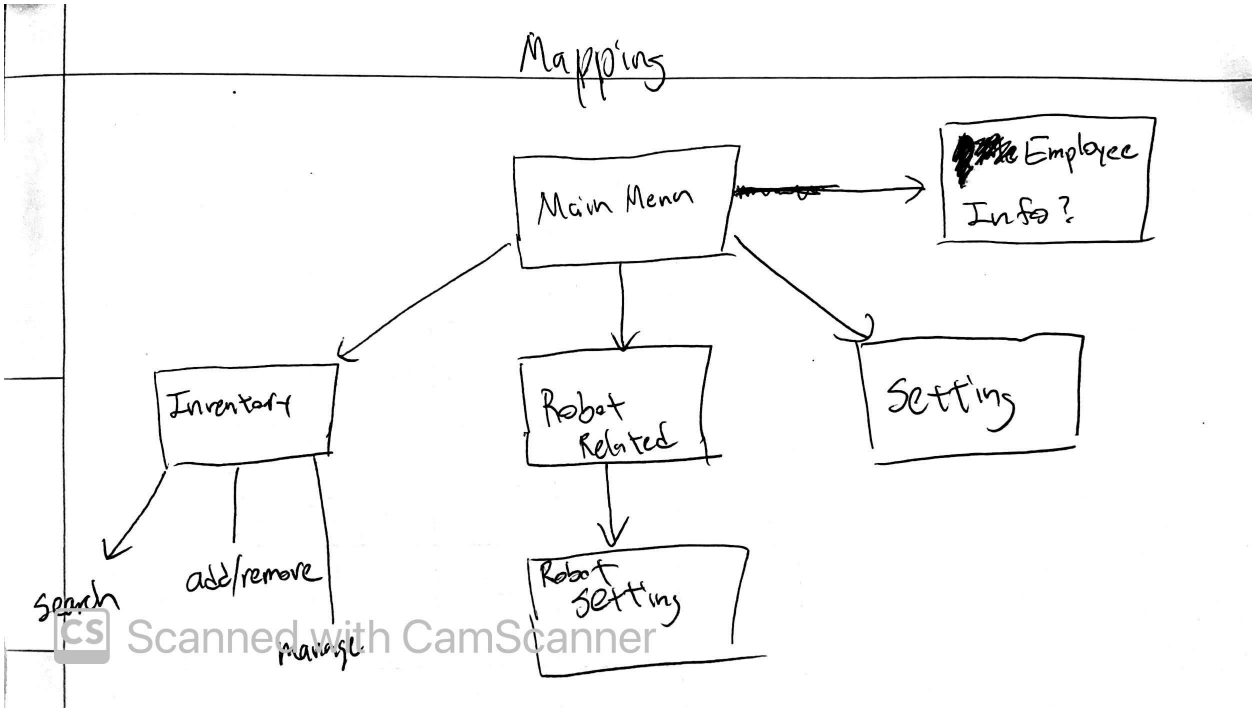
To elaborate more on these features, we want to justify why each feature is being included. To start, bigger buttons will allow users to quickly and effectively access what they want in the app when they are in a rush. This takes away the stress of having to be precise with button clicks ultimately giving the user a good experience when using the app. We also want gestures that map well to their outcome because this will make it easier for new users to learn and use our app. By making our gestures correspond to their outcomes, we can improve the learning curve of our app making it more desirable to users. Another goal we want to achieve is to limit the steps it takes to reach a desired outcome. It can often be annoying for users to have to navigate lots of screens in order to perform a task. By making it simpler and quicker for users to manage inventory, users will again be able to focus on other tasks ultimately allowing them to do their job better. Following our goal of having limited steps, we want the power button to be in the upper right corner of our app with a settings configuration button to the left of it because these are universal spots for these two buttons. This means that the buttons will be easy to

navigate to by the user further improving the learning curve of our app. This will ensure that new users can still be effective in the workforce using this app. We also decided to make the writing on the app easy to read and to put an image of each inventory item next to the corresponding product. This is also in an attempt to make the app clear and concise so that users can easily navigate through the store inventory. The images will allow users to know what product is being managed if they do not know the name of the product and clear writing allows users to read the items in inventory from a distance while performing other tasks simultaneously. For the “shutdown robot” button, we want to build trust between the user and the app/robot. By allowing the user to be in total control over the robot, the user will be more accepting of the robot. This button also helps to manage the robots so that users and customers are never put in potentially dangerous situations while trying to handle the robot (if a robot starts malfunctioning). For more ease of use, we want to have the inventory automatically update so that users do not have to worry about taking time to manually update their inventory. This would be a tedious task that would take away from users doing other work. Following automatically updating the inventory, we also want an alert to appear on the app if something is wrong with a robot so that users can identify the problem and fix it. Finally, we want to have users be able to login and assign themselves to robots on the app so that they can be monitored and held reliable if anything were to happen in the workplace. This feature is targeted towards managers of stores who want to keep their employees in check while using this app.

Initial raw sketches / brainstorming notes







Prototype & Three Tasks

A link to an interactive version of your prototype (or a file I can open using figma)

https://www.figma.com/proto/hLgP85UlyUfxbNNnm892xE/HCI-Project?node-id=1%3A2&scaling=contain&page-id=0%3A1

A document outlining three user tasks

Task 1: Add / Remove Inventory

- If you want to add to inventory, click the + button and if you want to remove from inventory, click the - button
- Once on the inventory list, you can scroll through a list of inventory and click the item that you want to modify. You can also click the X button to go back to main menu
- If you click the item you want to modify, it will ask you to input how many items you want to add / remove. If you want to go back to the inventory list, you can click the X button.
- Click the check mark after you input the number of items.
- Task complete

Task 2: Robot Control

- Click the robot picture to configure / control the robot
- To make the robot go back to charging station, click the battery with cord button
- To see what's wrong with the robot, click the warning button
- To turn on / off the robot, click the power button

Task 3: View / Edit Employee Information

- First click the setting buttons in the top right of the home screen to navigate to the settings page.
- Once on the settings page, you will enter your employee id and click the check mark to confirm.
- Then you will enter the number of the robot you are assigned to and click the check mark to confirm this box.
- You will also have the option to increase or decrease font size based off of clicking the plus or minus (this feature does not work in the prototype yet).
- You can also change background color by entering a background color and clicking the check mark to confirm the color change (this feature does not work in the prototype yet).

- At any time during this task you can cancel to the home screen by clicking the red “x” in the right corner. You can also power down the app at any time via the power button.

README

We met up on Saturday and went to REI to interview employees and make observations. We both attended REI and collaborated on the milestone simultaneously. We worked through every task on the milestone together and contributed equally to this document.

1A. Appendix Interview Scripts and Observation Protocols

Ask these following main questions in addition to the indirect questions for better understanding.

- Approximately how much time do you spend going through your stores inventory on a daily basis?
    - Does going through the inventory to find items ever feel tedious to you?
    - Do you find it difficult to find items in the inventory?
- Have you ever had to leave helping a customer due to something that needed to be taken care of in the inventory of the store?
    - If the interviewee says yes
    - Has a customer ever expressed frustration when you have had to do this?
    - Have you ever had a customer leave the store or find help elsewhere because you had to leave?
- Do you trust a robot's ability to successfully grab, deliver, and manage inventory?
    - Are there features, this includes the speed (at which the robot moves) and design, of a robot that you might find to be threatening?
- Have you ever had complaints from customers due to employees not being there to assist them?
    - Do you think this could be changed if you had more help managing parts of the store such as inventory?
- Do you currently have software that allows you to track inventory?
    - Would you say your software is easy to navigate?
    - What would make your software more applicable to what you do in your job?
    - What tends to be confusing about your software?

After gathering information, we start with observational research. Here are the observation protocols:

- Disguised naturalistic observation
- Stayed in the REI hiking section to see how customers interacted with technology and employees
- Also checked to see how employees interacted with customers and technology
    - It was difficult to see how customers interacted with new technology just because there were not many items in REI that would reflect if a robot was introduced to a store
- Made sure to focus on the observation targets when gathering data (how efficiently employees helped customers and how customers reacted to technology)
- Observation targets
    - How many times an employee has to go back to inventory during 30min of observation?

- How efficient do employees move around the store when attempting to locate inventory?
- How long are customers left unattended during 30min of observation?
- Observe how people interact with new technology in the store. Are they comfortable with the technology? What characteristics does the technology have?
- How quickly can employees navigate their inventory tracking software to help customers (if they have any)?