Group 25

Buy the Way

Assignment 3: Prototype and User Testing

Grace Zang

Hanbo Yu

Lydia Bu

Qianyue Yuwen

Zilong Zhang

CISC 325: Human-Computer Interaction

Dr. T.C. Nicholas Graham

Updates

Our original plan was to build an application on the newest iPhones, but we found that Swift is a completely new language to learn, little documentation is available and some UI components we made in the low-fi prototype are hard to implement within the time constraint. In order to keep our original UI designs and all features available for prototyping and user testing, we switched to the web: use HTML, CSS, javascript, and jQuery to implement. We designed our user interface to be mobile-friendly.

Hi-Fi Prototype

1. Development Status

We have successfully implemented the overall functionality of the product including adding and deleting items to cart, adjusting the quantity of the item, items searching by categories, route recommendation, and jumping to google Maps with correct "from" address and "to" address. We have implemented a basic UI that outlines and describes all the necessary elements that we had in our LO-FI prototype. Although the graphs, pictures, and drawings look relatively simple and boring, all important concepts, elements, and main ideas of the user interface are there and provide a bug-free experience for the user. In addition, since the system is mainly based on the Kingston area right now, the weather system is implemented and will change based on what the weather is currently in Kingston.

For the backend of the system, we have designed and implemented a fake database just to be accessed for the prototype. The fake database included three stores: Metro, FoodBasics, and Costco. Also, all items that can be accessed and added using the user interface is also included in the database. The algorithm for calculating routes for users is also designed and implemented. The main idea is to take both the distance to the store and the price of items in each store and compute both values into a single value that is similar to the price versus performance ratio. We take the one with the highest value calculated and make it the Recommendation.

The users will be directed to the Google Map navigation page without the need to input addresses to get further travel instruction after choosing the route. We successfully implemented this feature with external links, which will be replaced by map signs later.

2. Development Tool

For the frontend of the website, we use HTML5 and CSS to design the static interface whereas JavaScript is used to make the website dynamic. We specifically used the onClick() function that javascript has to control the event when the user is clicking or touching specific content such as

category selection, adding items to cart, and quantity adjustment. The localStorage attribute is also used to act as a data structure to store the cart that user added on different pages.

For the backend part, we also use Javascript to implement the database and the recommendation algorithm; the database contains sample products with the store that they are in, their type, their price, and distance to the corresponding store. For example, an apple in the database will have "metro" as the store, "food" as their type, "2.99" as their price in float, and "3km" which is the relative distance to Metro.

Since the sort function on the route selection is more difficult than what we have imagined, we didn't implement this function in the prototype. However, this function will be added to the final released version.

3. Current Problem

There are two problems we are facing that may affect the prototype to perform correctly:

1. Due to the simplification of backend code and javascript elements, the maximum number that the user can add to their list is ten, which is relatively low for a system like ours. Also, routes under the Other tag that are shown to the users have also only three blocks for displaying.
2. In addition, because of the lack of real-world data, the database that we have composed is mainly faked and is relatively small in size. The database contains real store names, real distance, yet fake products and their prices. Also, the amount of items we provided on our system is also very limited due to the small size of the database.

4. Future Improvement

In order to make our prototype a better system for users to operate, there are multiple tasks that need to be performed.

1. We will delete the "sort" operation on the options page. Not only because the sorting algorithm and function are more difficult than what we have imagined, but also because of the fact that there is already a recommendation for users, which makes the necessity of sorting "Other" options becomes low, and will also confuse the user.
2. The UI design remains simple and somehow boring. We will refine some of the UIs such as adding more pictures and background colours, making the border on the page more smooth, and adjusting the size and position of both texts and pictures.

5. Third-Party Assets

During our implementation, we used some assets from the third party to improve the appearance of our pages. We are thankful for their works. They are:

1. Gretta Farley, *Grocery Store Category Items*
2. Meghan Heydt, *Grocery Store Category Items, circle all the…*
3. SimpleIcon.com
4. GoogleMap API

User Testing

Method

A Hi-Fidelity prototype of the system was created to allow the full execution of the user interface. We made the prototype as a web page which is suitable for phone size. Also, a subset of sample data was provided to support the implementation of the system. User testing and observation have followed the guidelines of Gomoll and Nicol's approach.

Before the testing starts, we set a table of objectives we need to test and designed a set of representative tasks to do to achieve our goal. Testing is conducted by informing the users about the tasks they need to perform and give a verbal description of the features of our application while not mentioning anything about how they can achieve the task. We use the front-camera of the laptop to record the users' reactions during the testing process. The video was valuable for collecting information and analyzing the testing result. The testing was conducted in a quiet and enclosed room with a desk, a laptop, a headphone with a microphone and also a video camera. Three representative users that dissimilar from our members of the group were found. They are all university students.

Our observation followed the 10 steps for conducting a user observation. After introducing ourselves to the user, we describe the purpose of the observation in general, understandable terms to them. We would also mention that the testing is about our user interface, not themself to relieve their stress. The user could quit at any time of the testing, and the video equipment opened under their permission. The "think aloud" method was explained to users. The information was recorded and captured while the users were talking about their plan and mind out aloud. We would not provide help during the testing process. The users need to solve their problems on their own. If they really get stuck, we would provide some help properly. Once the users had no question on the testing, we would start it. The subtasks were written out as short, simple instructions that were easy to understand for users. All users' reaction on our user interface was recorded, and the observation was concluded when the test was over.

We would pay more attention to the subtask and the corresponding interface where the users got confused or stuck. We would focus on figuring out the reason. The actual user manipulation would also be compared with our expected user procedure to find the reason for causing the difference.

User Characteristics

Our user group is the university students who do not have a car. They may lack time or budget and need to use our app to balance the cost of money and time. Most of them are familiar with electronic products and have experience using various apps. We have interviewed three distinct users who may use our application in different manners.

User 1

Lisa is a busy third-year university student majoring in mathematics and statistics. She does not own a car and would like to save time and money every time she wants to purchase things. She is a friendly user who has some technical knowledge and can give informative suggestions to our prototype.

Tasks for user 1

Browse and select items by **categories**

Add items into the shopping cart

Go with my list and choose the route

Instruction for user 1

Please find soda by browsing the categories

Please add 10 sodas into your shopping list

Please find banana by browsing the categories

Please add 10 bananas into your shopping list

Please find a route to these items that save more money

Expected Procedures for user 1

1. Clicks the '+' icon to start browsing items.
2. Clicks the 'drinks' category icon.
3. Presses the '+' icon to change the quantity, then add 10 soda by clicking the shopping cart icon
4. Repeat steps 2-3 to add 10 bananas into the shopping cart.
5. Clicks 'My List' and then 'Go With My List'
6. Choose a route and go with the map

User 2

Betty is a third-year university student majoring in film and media. She does not own a car and always needs to buy something hard to find, especially in common stores like metro and food basics. Betty is a friendly user that has some technical background and knowledge.

Tasks for user 2

Browse and select items by **searching**

Add items into the shopping cart

Go with my list and choose the route

Instruction for user 2

Please find cookie by searching

Please add 2 cookies into your shopping list

Please find turkey by searching

Please add 1 turkey into your shopping list

Please find a route to buy these items that save more time on the trip

Expected Procedures for user 2

1. Clicks the '+' icon to start browsing items.
2. Clicks the search bar to search cookie
3. Presses the '+' icon to change the quantity, then add 2 cookies by clicking the shopping cart icon
4. Repeat steps 2-3 to add banana 2 turkey into the shopping cart.
5. Clicks 'My List' and then 'Go With My List'
6. Choose a route and go with the map

User 3

Hans is a busy fourth-year student in computing. He is familiar with electronic products and has experience using various apps. He is a friendly user who has some technical knowledge that could give useful suggestions during the testing.

Tasks for user 3

Browse and select items by both ways

Add items into the shopping cart

Delete item from the shopping cart

Browse and select items freely to see which way is performed

Go with my list and choose the route

Instruction for user 3

  Please find soda by browsing the categories

  Please add soda into your shopping list

  Please find juice by searching

  Please check your shopping list, and then delete juice

  Please find ham by either way you want

  Please add ham into your shopping list

  Please find cookie by either way you want

  Please add cookie into your shopping list

Expected Procedures for user 3

1. Clicks the '+' icon to start browsing items.
2. Clicks the category to search soda
3. Presses the '+' icon to change the quantity, then add 2 cookies by clicking the shopping cart icon
4. Clicks the searching bar to search juice
5. Presses the '+' icon to change the quantity, then add juice by clicking the shopping cart icon
6. Clicks 'My List' and then clicks the 'delete' icon to delete the juice
7. Repeat steps 2-3 or step 4-5 to add ham and cookie (In the way that user performed)
8. Clicks 'My List' and then 'Go With My List'
9. Choose a route and go with the map

Data Capture

  Data during the test was captured by videotaping the user's manipulation through testing. We use the front-camera of the laptop to record the users' reaction while also recording the screen to see their action at the same time. By listening to the user's thought and plan from the "think aloud" method, the expectation of our user interface could be examined. The users' intentions and their problem-solving strategies were also useful for the analysis. The subtask where the users got confused or stuck would be highlighted, and we would focus on figuring out the reason caused by the corresponding user interface. The user's satisfaction would also be considered as their general feedback to our system. All information was captured under the users' permission.

Findings:

Finding on Mainpage:

1. According to participant 1, the UI for browsing items by category/search to the shopping cart is mixed up with the items users added to the shopping list: both are plus signs, button UI are not distinct.

2. Participant 2 mentioned she clicked the add button by instinct and did not read the "Start with the + button" picture at all. The "Start with the + button" picture on the main page might be too small, and there is a weak connection between the actual add button's position and the picture.

3. Participant 2 clicks the "go with my list" as the first thing she sees on the main page. The "go with my list" button looks more clickable than the add button at first glance.

Finding on 'MyList':

1. During the testing after our development, we realized the name of 'My List' may not be clear to users at first glance since it does not address the functionality of this feature.

2. Participant 3 reports that the 'delete' icon in the 'My List' page is not clear and obvious enough. He clicked multiple times on the delete icon to delete items and unable to get it in one click since it is very small.

3. Participant 1 and 2 shows a natural desire to slide up the 'My List' area instead of just clicking it.

4. Applying guidelines, our group member found that the "My list" navigation is incompatible with small screen sizes (for example iPhone 8).

5. During usability testing, it is observed that the item number icons appear in different positions for item name length that is different.

Finding on item searching(category/searching):

1. Participant 2 wants to use searching than using categories when they have a specific target.

2. The '+' sign and '-' sign under the item's adding area did not adapt with the common habit of people. All participants tried to use '-' when they intended to add items, since the position of these two signs being placed opposite.

Finding on result page :

1. When participant 1 gets the result, she did not click the 'GO' icon and get the direction from google maps. The icon was not obvious enough to lead the users toward Google Maps.

2. Participant 2 takes 40 seconds to find the route in options that give the lowest price, The recommendation and other options are not highlighted, it is not obvious for the user to select which one in the first glance.

Recommendations

Recommendation on Mainpage:

1. Information Text and UI icons can be refined by adding our original lo-fi prototype design to the simple prototype we have. This way, the start browsing search icon will no longer be confused with the plus sign on item quantity.
2. Participant 2 recommends placing the search bar on the main page. This would cause us to change the full design. We take this into consideration and form a goal to do a search and browse by category more obvious. This can be done by replacing the "Start by adding the button" with search and category directly. It is our fallback position to change this part of the design.

Recommendation on My List

1. "My List" can be named as "My Shopping List", so it is easier for users to relate their list to shop, which could aid clarity in the functionality of this feature.
2. The icon in the 'My List' page can be changed to a more simple, obvious cross symbol '×'. The icon was made big enough so that the user could click it without any trouble.

Recommendation on item searching(category/searching):

1. The order of the '+' sign and '-' sign under the item's adding area can be changed to minus sign on the left, plus sign on the right to adapts the common habit of most of the users.
2. Add spell recommendation features in the search area so that in case the user spell some words wrong, they can select the corrected spell and don't have to retype the item out.

Recommendation on result page :

1. Make "Go" UI bigger, and more colourful, connect Go with each option, so it is obvious to click.
2. Make the price, distance bold, emphasize the separation of recommendation and other options so that it is apparent to the user what this page is about and how the recommendation system works.