M3

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Abstract. Lot of time when someone goes to store with a shopping list, they end up going through different aisle searching for the product they want and end up wasting time and energy. My objective is to make the shopping comfortable and efficient by creating an interface which can take shopping list and store name as inputs and output the shortest path to shop. I will be using Naturalistic observation to observe the users and participant observation to experience the challenges myself. Lastly, I will use survey to collect data points from broader user population to help me design the interface

Brainstorming Plan

My plan is to first perform individual brainstorm session for a day and then perform group brainstorm later. **Individual** brainstorming session will be done over a day with multiple breaks and will start by writing the core problem on top of the page and aim at getting ideas on different categories. Myself, my wife, one of my friend and his wife will be performing **group** brainstorming and rules are that we will not evaluate or rate the ideas, will not comment on each other's ideas, will keep the core problem in center of our discussion, and will have at least 2 ideas from each individuals. I will do round robin first to give everyone a chance and then it will be free flow session. We will not **discuss** any existing interface available for our core problem. We will only try to **generate** idea at **high** level which can be described in **few** lines. We will at least try to generate few ideas in multiple interaction modes. **Group** brainstorming session will be done over 60-90 min session and the aim would be at least generate **20** ideas with everyone at least contributing **2** ideas each. We will discuss on generating ideas on different interfaces like ideas to input the grocery list, ideas to navigate in the store.

Brainstorming Execution

Here are the consolidated list of ideas that were generated from individual and group brainstorming session. Each of these ideas were grouped in to three different categories. Both ideas from Individual and group brainstorming sessions were consolidated here,

Hardware/software Ideas (Total 5 ideas)

1. Interface on smart phone
2. Interface on smart watch
3. Interface on tablets
4. Create dedicated device for the interface
5. Create key fab device
6. Create for all mobile OS available

Implementation Ideas (Total 9 ideas)

1. Create plugins to existing GPS apps
2. Create GPS coordinates for every items in the shopping list and pass those to GPS to get walking navigation directly on those app
3. Use Google maps platform and build our app on top of it
4. Use Virtual reality
5. Use augmented reality Interface
6. Use actual photos of the stores
7. Have functionality for users to upload real photos of aisles
8. Use Voice based interfaces
9. Create gesture based interaction for smart watches
10. Create skin touch interface
11. Create simple text based directions that could be printed or sent to an email
12. Use finger print to login.

Ideas by Interface functionality (Total 10 ideas)

1. Location auto resolution to flag items as picked
2. Gestures to flag items as picked or cancel – especially for smart watch
3. Voice input for search and other things
4. Touch implementation – example right or left swipe to do things
5. Use Virtual reality to navigate
6. Use Augmented reality to navigate
7. Display 2d maps

8. Display 3D maps
9. Display actual aisle views as user are walking
10. Vibrate for alert or notification
11. Send text alert or notification
12. Use different colors and fonts for different alerts
13. For smart watch- only have 1 item on display and navigation guides

Selection Criteria

As per my **requirement** from **M2**, my selling price for app is low so I will be choosing ideas which will be **not costly**. My **need finding** implied that users in **hurry** are my ideal users, however other users might also use it **occasionally**. So based on this I am going to do persona profiling, create different user profiles, create timelines and create scenarios to find my **selection** criterion. Some of the ideas are too ahead of their time both from its **maturity** and **feasibility**, so those ideas will be dropped too.

For my **Persona** study, a user who is in **hurry**, my criterion would be to choose something simple and easy. Based on **user profiles** study, I would have both **expert and novice** users so that will be my criterion for selecting the design, my finding implied **usage frequency** to be occasional for both expert and novice hence I would keep the ideas which can make interface functions discoverable and affordable. Based on my **Timeline** study, my user would create the shopping list for days, so ideas which would alerts/reminds the users in this phase would be helpful, for other phases, he takes shorter time, so ideas which can help him complete the shopping efficiently will help. Based on my **Scenario** study, my ideal user might be in hurry and shopping for few items hence he might not use shopping cart instead he might use shopping basket. In this scenario, ideas which will give him **ease and comfort** while shopping will help, like smart watch, gestural interactions, and auto flagging items in the list as you go past the item location etc. So these criterion will be used to shortlist the idea.

Prototype 1: A textual prototype

My first prototype is going to be creating a simple interface on a smart phone. This is going to pretty basic and not going to have any gestural or voice

commands. The user will bring up the app on his smart phone, authenticate using his finger touch or registered email id and he will land on home screen. The home screen will have 2 toggle buttons at the top, namely Stores and List, depending on what you highlight/select, there will be history of last 5 instances on the top of the screen. If you select List, last 5 shopping list links will be shown in the shape of icons and are animated like Ferris wheels. The default will be last 5 shopping list or stores.

There will be a + or Add button at the bottom which will open a new screen to create a list and select the store. The interface will auto suggest the names of the store as you type or you can click on favorites stores and it will pop up your favorite stores to choose from. You can add new items to the shopping list either by scanning the bar code of old items at home or you can add manually by pressing + button. The interface will suggest names as you type the names. You can also drag one of the shopping list from the history out of the Ferris wheel pane and it will automatically populate the old list as new list. You can then add/modify that list to create a new list. The old list will also populate the name of the store you shopped at that time.

After you have entered the store name, the interface will dynamically find out if the store has stock for the items you have entered. If not, it will display the items in your shopping list to RED or give you alert based on how you have configured the settings. If configured to suggest alternatives, it will suggest alternative product or brand for the items not in stock. You can delete this list by dustbin icon at the bottom right corner. When ready you can just click on shortest path icon at bottom left of the mobile screen. Once clicked, the interface will calculate the shortest path for you to shop at the store selected and display that you on the next screen. The navigation screen is pretty simple, it will give you direction for the item it think you should shop first and will display you aisle number and shelve location. Once you pick up the item, you then would either swipe up the item to fetch the next item and so on so forth. The interface will have icon on top right corner which will track your status based on total items in the list and how many you have picked up so far.

This prototype **meets** most of the **requirement** mentioned in M2 for example, the **shortest** path to shop the list. It is able to store the old list. The interface also fulfilled other core requirement of availability check, suggesting

alternatives, suggesting names while typing etc. However, it did **not** meet the requirement of reading the list from a text file and creating the interface for PC but based on idea evaluation, I did not select PC interface for its mobility issue. It also covers the users in the **data inventory**. Since the interface will be used occasional, the interface is made simple and returning users will have no problem discovering the functions. The shopper in hurry is also served as he will have the direction to the items to quickly finish his shopping.

Prototype 2: Paper Prototype

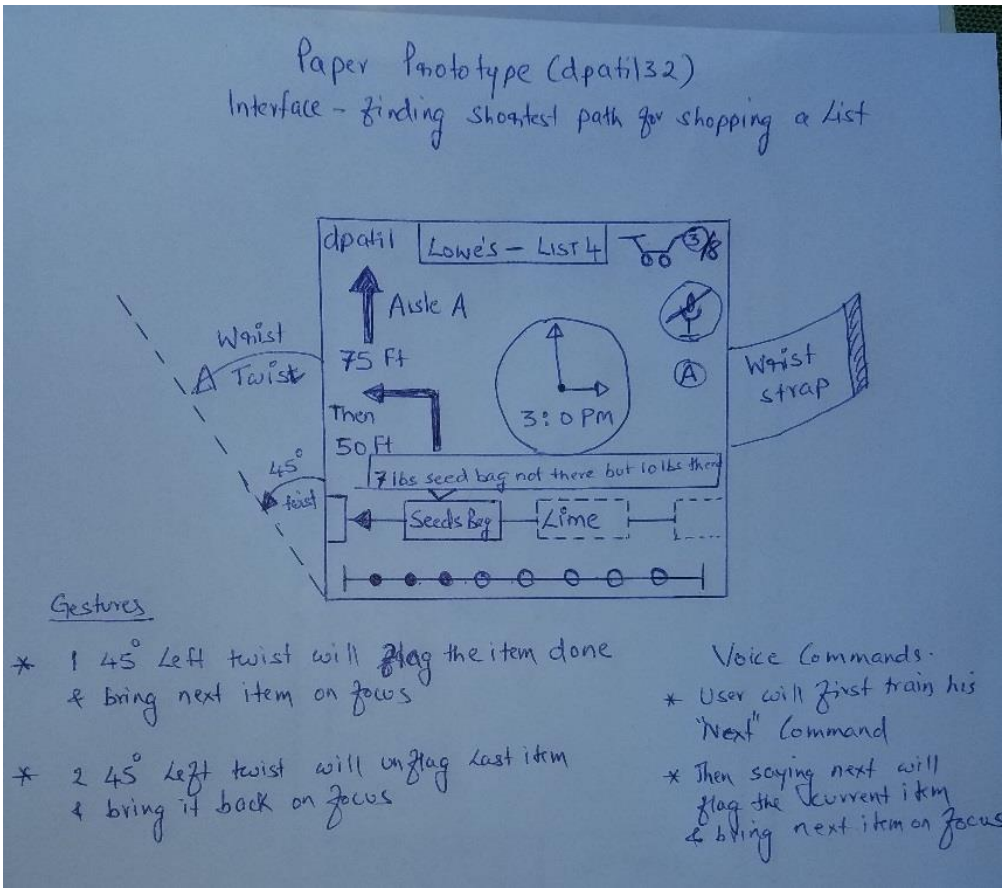

Figure 1. Paper prototype for design alternative two

I am designing the interface from bottoms up hence there are multiple screen and sub tasks in it. Since we have to only focus on one task and its different idea, I am focusing on the main screen which answers the core problem

The prototype image (Figure 1) is the main screen where GPS navigation will be displayed to help in shopping. Due to lack of screen space it is made simple and only 2 lines for current 2 navigational directions are shown. The screen's top line is reserved for user name, store name, shopping list ID and count of items already picked and total number of items in the list. If the screen shows 3/8, it means shopper has already picked 3 items out of total 8 items. At the bottom of the screen there is graphical mapping of items picked up (solid dots) and remaining items (non solid dots). Also, there is a mapping of what items is in focus currently (solid rectangle boundary) and next items in the list (dotted rectangle boundary). There are 2 shortcuts/hotkeys, one for enabling/disabling voice commands and other is for showing detailed alternative option for an item. As this is hosted on a smart watch, I have a clock at the center to show the current time. This design is most suited for smart watch or even mobile.

It does **meet** most of the **requirement** from M2. The interface provides store navigation, alerts and alternatives. It can be used by anyone. It maintains the user profiles and shopping history. The Interface also shows the shopping progress and has voice command functionality which user can enable or disable at any time. The Interface also has gesture interface to do few sub-task. **Requirement** like PC, store comparison and file import were **missed** because of mobility and feasibility (screen space) issue. It also covers the users from **data inventory**. Shopper in hurry will benefit from this design as he might have shopping basket and smart watch and its gestural interface can augment his user experience in long way.

Prototype 3: Card Prototype

This is purely a design which will be hosted on a mobile platform. Since mobile will have more screen space, this interface design will have more detailed view than the previous 2 designs. It has in store **navigation** for **shortest** path, and it throws **availability** alerts and gives **alternatives**. It can also **compares** different stores. It provides old shopping **patterns** and helps user to **create** new list from them. It does **miss** few requirement like the interface is not available on PC because of mobility issue. The interface does cover all the **users** identified from the **data inventory**. User who is in hurry will benefit from this so will be the

occasional users. **Expert** users has shortcuts and functions like swipe, voice command and imports. Users in **hurry** can use the navigation to shop quicker. **Novice** users do not have to ask for help as the interface will do the work.

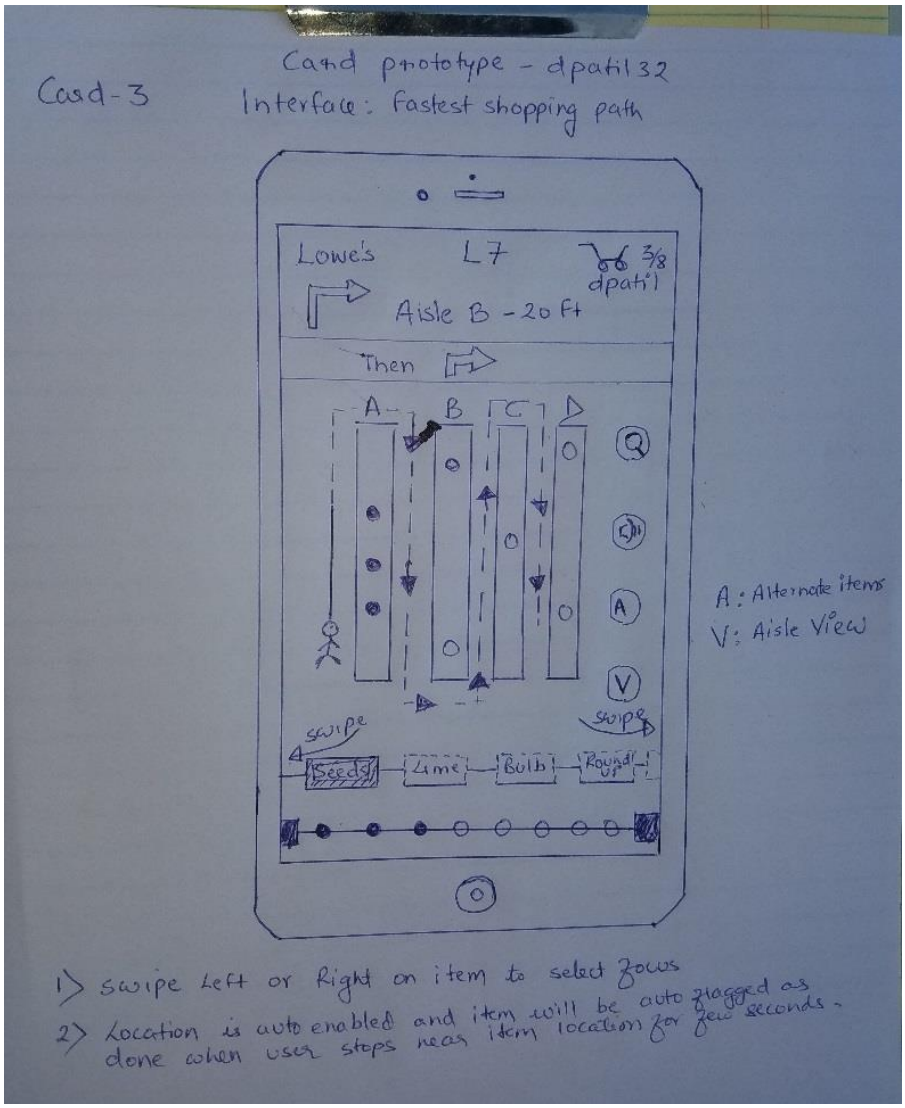

Figure 2. Card prototype for design alternative three- Card -3

The design provides detailed in store navigation with virtual store layout. The GPS also displays the items he has picked and items to be picked. User can also import a list from a file or speak the name of the item and interface will transcribe it for him. Interface will put a question mark (?) sign next to the item which is not available and on clicking the sign will suggest alternatives. It

has button to compare different stores. So most of the requirements are met by this design alternative

The Card-1 (Figure 3 in Appendix A) is a 1st screen of this design. Here you create a new shopping list. Shopping history is displayed on the top and can be also listed by stores. User can also drag one of old list to create a new list. It can show this card and ask user for what he thinks? Can he see the interface and understand how to create new list? Are the functions discoverable? Can he realize that he can drag the old list to create a new list? I will note the user's feedback for revision

The card-2 (Figure 4 in Appendix A) is a screen where user will add the items in to the list. He can either manually type, or click on eye icon to scan the bar code. He can also import a file or use a voice command to add the items. My questions to user would be, can he identify his actions looking at card-2? Can he discover scanning function? Can he make out that he can use voice command to add the items? Can he discover manual entry? Can he resolve "?" sign alert? All these feedbacks will be noted down to revise my design

The card-3 (Figure 2) is the main screen which user will be using to shop. On top of screen, it has name of the store, list Id and count of items picked and total count of items in the list. Next few lines are for navigational. Major part of the screen space is used for virtual store and relative position of user, items to be picked and path to be taken and can help user to visualize where is he is in the store. The bottom part of the screen is reserved for showing current items in focus and nest few items to be picked. There is a shopping status mapping line which shows how far the user is in his shopping episode. There are few shortcuts , "Magnifying glass" is for searching a new item , "Speaker" for voice guidance of the navigation, "A" for alternatives if items is out of stock and "V" for aisle View of the position. He can also swipe left or right on the items train view to shift the current item focus. Items are automatically flagged as picked when user stays at items location. I will ask user if he can follow the navigation. Does he understand how gesture works? Can he discover how he aisle view is activated? How to swipe items to go to next items? Does it help him in shopping? Can he visualize his shopping progress? Is this interface useful, can he discover all its function? I will note the user's feedback to help me revise the design

References

1. Prof Joyner Video at Udacity https://classroom.udacity.com/courses/ud400
2. Lowe's store

Appendices

1. Appendix A: Prototype 3 – Card

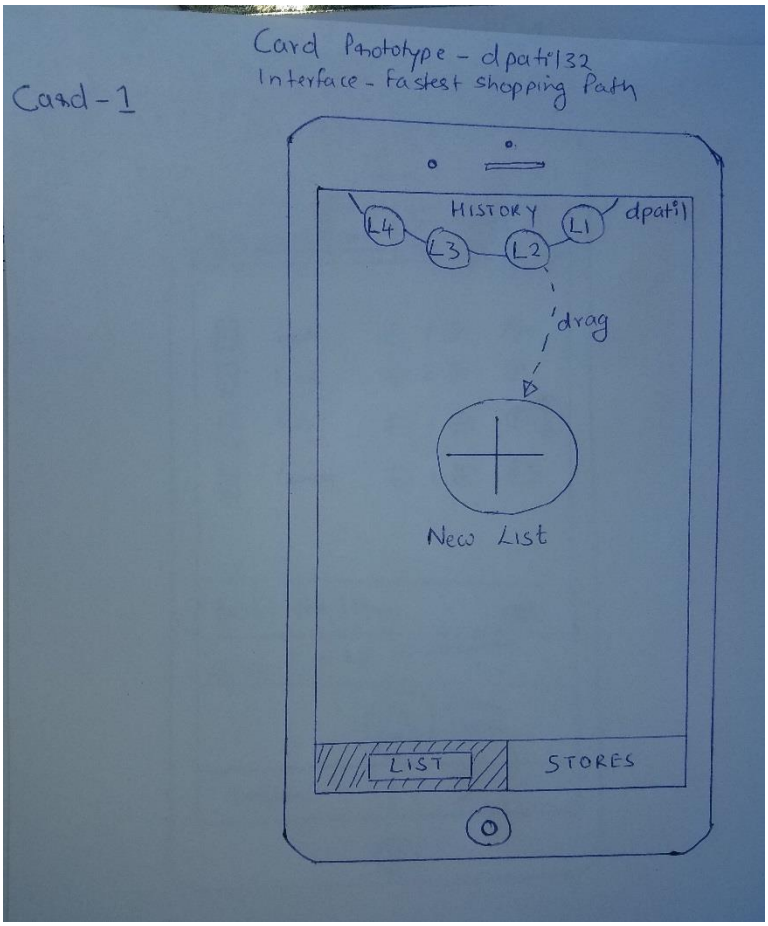

Figure 3. Card prototype for design alternative three- Card -1

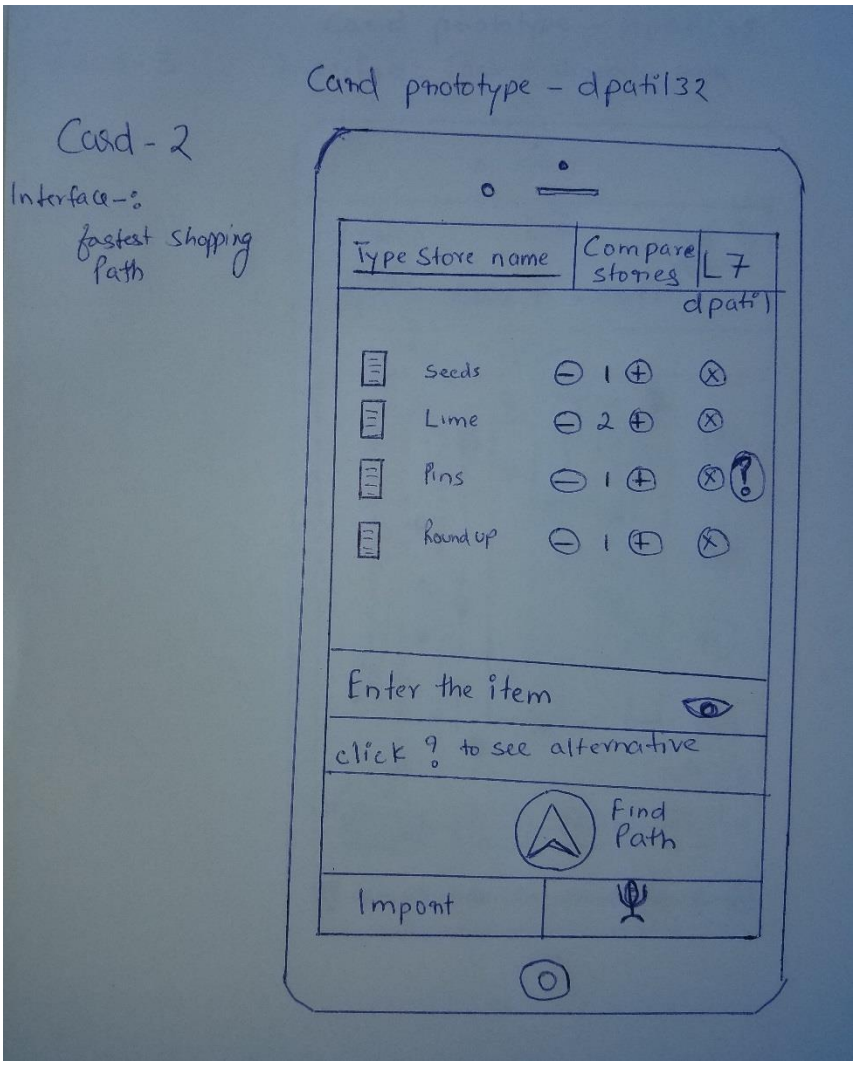

Figure 4. Card prototype for design alternative three- Card -2