Reverse Recipe

Evaluation Plan

Shannon Farazi
Department of Electrical Engineering and Computer Science, Oregon State University
Corvallis, Oregon, United States
farazis@oregonstate.edu

Carter Fritsch
Department of Electrical Engineering and Computer Science, Oregon State University
Corvallis, Oregon, United States
fritschc@oregonstate.edu

Dylan Kieu
Department of Electrical Engineering and Computer Science, Oregon State University
Corvallis, Oregon, United States
kieud@oregonstate.edu

Yu Chuan Tey
Department of Electrical Engineering and Computer Science, Oregon State University
Corvallis, Oregon, United States
teyy@oregonstate.edu

Michael Ton
Department of Electrical Engineering and Computer Science, Oregon State University
Corvallis, Oregon, United States
tonm@oregonstate.edu

ABSTRACT

Reverse Recipe attempts to empower users to be able to shop, cook, and organize the kitchen in a revolutionary way. We will evaluate our interface design concept using a heuristic analytical evaluation and an empirical evaluation. We will utilize our revised paper prototype to gain insight into user experiences at this stage of development.

KEYWORDS

Heuristic evaluation, Analytical evaluation, Empirical evaluation, UI, Usability, User-friendly, Discoverability

I. Introduction

Both heuristic and empirical evaluations will be critical to how we proceed to the next step of our app development. Heuristic evaluation will help us identify the problems with the user interface tasks that users have to overcome to be able to use the app at its current state. The heuristic evaluation will be carried our by two of our team members who are familiar with the app and its workflow. The empirical user test focuses on just one of the app features to get an actual user's perspective and assess whether UI is easy and learnable or users experience difficulties when interacting with the app. The empirical evaluation will be conducted by two actual users. The outcome of these evaluations will be incorporated into our update for the app's workflow and transition to high-fidelity prototyping stage.

Figure 1: Example of heuristic evaluation guidelines[2]

II. Analytical Evaluation

The purpose of our analytical evaluation is to gain insight into the application's quality of usability in various contexts encountered by users, and to use our findings to identify usability problems and make improvements wherever possible. Accordingly, we have chosen to use Nielson's heuristics as our evaluation criteria, with two of our team members as test users who can walk through the tasks involved in the app's core functionalities to examine their conformance to the heuristics, focusing on those which are most relevant in the context of our application's use.

Some of the key tasks we will use in this evaluation include:

- Use a previously-created account to log in and find data saved to your account
- Navigate to screens
- Scan and add several items to your ingredients inventory
- Search for a recipe based on ingredients in your inventory
- Access instructions for your selected recipe

While using the heuristic evaluation process, we will try to understand the different criteria through the lens of our target users: home kitchen users. However, we will explicitly try to identify issues that may arise at different severity levels for users based on factors like age, attention, and general technology familiarity - allowing us to optimize usability and discoverability for as wide a user base as possible.

Adapted Heuristic Criteria

Using Nielsen's 10 Heuristics[1] as a reference point, we adapted the following questions to examine in detail while walking through the tasks listed above, and other smaller tasks that may arise. Some may not apply as strictly to some tasks, and some are less concerned with any particular task as they are with the app's experience as a whole, but all will be relevant from an analytical standpoint to gain insight to our app's user experience.

1. Ease of Use (Recognition rather than recall)
    a. Will you be lost or unable to navigate to the page you want or don't know what is going on?
    b. Can you go forward and backward easily and quickly get back to the homepage?
    c. Is it easy to delete something that you don't want after scanning it in to your recipes' item list?
2. Usefulness (Match between system and the real world)
    a. Will you feel disconnected to the world when using the app?
    b. Are you annoyed or easily frustrated when using the app?
3. High-level view (Visibility of system status)
    a. Is inventory clear and easy to understand?
    b. Is the result of scanning (success/failure) easy to understand?
    c. Is the match between inventory and recipes presented clearly?
4. Consistency (Consistency and standards)
    a. Do identical or similar buttons on different pages do the same thing?
    b. Is the arrangement similar between pages?
    c. Are there buttons that contradict expectations established by other buttons?
5. Feedback (Error prevention)
    a. If a user has an error during log in, does the app let you know specifically why?
    b. When unable to identify scanned items, does the app adapt to the error level by either suggesting possible items or indicating ways to improve a scan?
6. Graceful Recovery (Help users recognize, diagnose and recover from errors)
    a. Are error messages understandable and descriptive? Do they make follow-up actions clear?
7. Timeliness (Flexibility and efficiency of use)
    a. How long do users take to get from the home screen to an item page in a task?
    b. Does the app give ways to quickly revisit frequently used pages? Are there any shortcuts that directly navigate there??
    c. When scanning items, is it takes a long time to figure out what the item is.
8. Clean Presentation (Aesthetic and minimalist design)
    a. Does the app contain too many controls or options on a specific page?
    b. Do item pages & recipe pages have information that is readily useful to users?
    c. Is every function of each page clearly defined and free from distraction?

9. Usage Flow (User control and freedom)
    a. Is it easy to connect use of related tasks together? (e.g.: going from scanning a few items to finding relevant recipes)
    b. Are tasks connected in logical ways at various junctures in their process? (e.g.: can you go from the homepage to searching for a recipe to seeing what ingredients you have scanned or need to purchase)
10. Help (Help and documentation)
    a. Do labels and instructions presented in-line adequately answer user questions, without needing a dedicated help section?

In each task, we will identify the heuristic criteria that were most relevant or raised explicit issues in their completion, and will also include an overview evaluation based on our findings throughout the task-completion process.

III. Empirical Evaluation

An empirical evaluation made through a user test will aim to provide researcher with insight on whether or not our designed user interface for scanning in ingredients and creating a meal using those ingredients is easy to learn and navigate. This objective was determined based on one of the primary focuses of the application: to optimize/streamline an everyday process to potentially contribute to quality of life improvement for occupied individuals. To that end, it is important that design elements not only be intuitive, but also straightforward, in order to create an efficient user experience.

The evaluation will have the user mimic their real world actions while using this app in an attempt to generate user feedback and thoughts on the design. Data collected will help inferences be made regarding the efficiency and effectiveness of the UI, and bring attention to potential design flaws that hinder the user's ability to either use, or learn how to use, the application and its core features.

The concept and pre-conditions of the app will be explained to the users. User will then be explained their task: to scan their ingredients into the application, and find a recipe to make using their available ingredients. Users will have the option of selecting meals they would like to try, and have the ability to mark both their selected meals and/ or ingredients as their "favorites". Although the context may differ, users whom are experienced with technology should be familiar with this task of creating plans, and marking objects as their favorite. This will provide insight on how a user may interact with the system to perform a given objective. The task will test the user's ability to learn and navigate the app. It will also test the application's ability to perform its intended role while providing a comfortable, effective user experience.

The first user is a male in his early 40's that is an expert in using technology and web services applications. He currently manages his own construction company where he collaborates with others in building high rises in major cities. He is an ideal candidate as he fits the demographic of the target audience, has a busy life, and does not have previous exposure to our application design. This will allow us to get insight on new user interaction with our application and how well they grasp the different elements within the app.

The second user is a married female in her mid-30's with a 4-year old boy. She is currently pregnant with her next child, and works full-time in the healthcare industry. Her husband also works full-time as a business owner. She is a good candidate that fits the target demographic, has no previous knowledge of the application, and considers herself to be adept in general use of technology and mobile applications.

This empirical test will involve a physical copy of a low-fidelity prototype provided to the users for this task. The test allows the researchers to observe the users' experience in navigating the app's interfaces, and provide insight on potential problems with the design. Users will receive no prior training or information outside of the pre-conditions and task description to reduce potential biases when using the prototype to accomplish their task.

A low-fidelity prototype design was selected for use in the evaluation. In doing so, design flaws that are discovered can be easily documented, reviewed, and resolved in a future iteration of the prototype. With limited research and information on usage of the application in these early stages of development, it is more effective to use low-fidelity prototypes for bulk collection of data and flaws to determine changes before committing to a high-fidelity prototype.

Once the task description has been given to the user, they will be given the prototype to begin. The user will have the opportunity to ask questions before being given the prototype if clarification of the task is needed; they will not be allowed to ask questions during the task and must operate on their own. This restriction helps create an experience similar to a real-life situation where the user is navigating the app in an ordinary, everyday setting. All user questions will be documented alongside post-interaction interview questions.

Observational notes will be taken as the user works through the application to complete their task. The

researcher will attempt to document any initial comments, impressions, and reactions of the user, as well as when and where the user faced difficulties. Users will be told that they can verbalize their thought processes; their body language and actions will also be observed and recorded. Documentation will also include whether or not the user was able to complete the given task.

Task Description:

The Reverse Recipe application is a software tool to keep track of ingredients available in your refrigerator and pantry to create meal plans and/or a shopping list. The prototype for the app can be utilized to perform the task described above. The assumption is that you already have an account created, and you have previously entered your login information using the application on your personal phone. Furthermore, you have given permission for the app to access the camera on your device. You are welcome to simulate usage of the app, such as by pressing, clicking, and swiping as if this was an interactive prototype. The number on the paper prototype will guide you to access the appropriate screen according to your interaction with each screen.

1) From “Home Page”, select the scan button to proceed to the “Scan” screen.
2) Align the scan area with the barcode on your item or just take a picture for our AI recognition software to register ingredients that you are scanning.
3) Update the information regarding the entered ingredient by utilizing the “Edit” button or save the entry by utilizing “Save” button on the same screen.
4) Press the back button on the top left side of the screen to scan more ingredients.
5) Press the “Match Recipe” button to be presented with populated recipes on the “Recipe” screen based on ingredients available in your inventory.
6) Select any recipe that you would like to be navigated to its details.
7) View ingredients and instructions of the selected recipe.

Interview & User Interaction:

The guideline for the follow-up questions asked users about their experience navigating the app, as well as details and thoughts regarding their interaction with it.

1) How did you feel about navigating through the app to perform the task?
2) How difficult was it to find the scanning function? Did you find the process of scanning or manually adding items confusing at all?
3) Can you think of any changes that might improve the feature?
4) How difficult was it to access the ingredient inventory page?
5) How difficult was it to search for a recipe?
6) Did the recipe page present all the information you would want? Was it presented in a way that was easy to read or find what you wanted?
7) What changes would you make to the recipe page?
8) How difficult was it to figure out how to add a recipe to your favorites?
9) Do you have any overall impressions of the app you would like to share, based on what you experienced while performing the task?
10) Do you feel that the app/task was easy to understand, or would you have preferred to be given an in-app tutorial before beginning?
11) Did you feel like you were lost at any point while navigating the interface?
12) What did you like and/or dislike regarding this experience?
13) Any other thoughts, questions, or comments?

The prototype used for this evaluation is attached at the end of this document. Each screen will be enlarged and printed on separate sheets of paper for the user to work with during the task. This allows the evaluators to present users with different screens as they interact with and navigate through the design.

The following describes the navigation flow of the prototype, based on screens available in the current iteration. The page numbers are assigned such that the page number corresponds with the screen number in attached prototype.

- Screen #1 goes to Screen #4 if users are logged in
- Screen #1 goes to Screen #2 if users are new to the app or logged out
- Screen #2 goes to Screen #3
- Screen #3 goes to Screen #4
    - Several icons on Screen #3 are used with linked social media accounts, not currently represented in this prototype.
        - “G” ICON: Login using linked Google account.

        - “F” ICON: Login using linked Facebook account.
        - “T” ICON: Login using linked Twitter account.
- There are several buttons on Screen #4:
    - “Scan” button goes to Screen #5
    - “Inventory” button goes to Screen #8
    - “Recipe Book” button goes to Screen #10
    - “Menu” button goes to Screen #14
    - “Settings” button goes to Screen #16 (where user can logout)
- There are several buttons on Screen #5:
    - “Scan” button scans the object or barcode centered within the camera frame and opens the modal on Screen #6
    - “Manual Entry” button opens the modal on Screen # 6 for manual entry
    - “Inventory” button goes to Screen # 7
- Screen # 6 displays the scanned/manually entered ingredients
    - “Edit” button allows user to edit item info on Screen #6
    - “Save” button adds the item to Screen #7, but does not change screens
    - “Add” button allows user to add an item manually without leaving Screen #6
    - “Heart” button adds the item to “Favorites” on Screen #15, but does not change screens
    - “Back” button goes to Screen #5 for more scanning
- Screen #8 top banner buttons filters the current view
- “Ingredient” buttons on Screen #7 opens modal on Screen #6
- “Match Recipe” buttons on Screen #8 goes to Screen #10 if sufficient ingredients are entered
- “Match Recipe” buttons on Screen #8 goes to Screen #9 if sufficient ingredients are not entered
- “Shopping List” buttons on Screen #8 and 9 goes to Screen #15
- “Search For Recipes” button on Screen #10 goes to Screen #11
- “Match Recipe” button on Screen #11 goes to Screen #12
- “Recipe Title/Image” buttons on Screen #12 goes to Screen #13
- “Heart” button on Screen #13 adds recipe to “Favorites” on Screen #15, but does not change screens
- “Logout” button on Screen #16 goes to Screen #2
- All arrow buttons in the top-left, where present, return to the most recent, previous screen

ACKNOWLEDGMENTS

Shannon Farazi, Carter Fritsch, Dylan Kieu, Yu Chuan Tey, and Michael Ton, "Project 6", pp 1-9, unpublished.

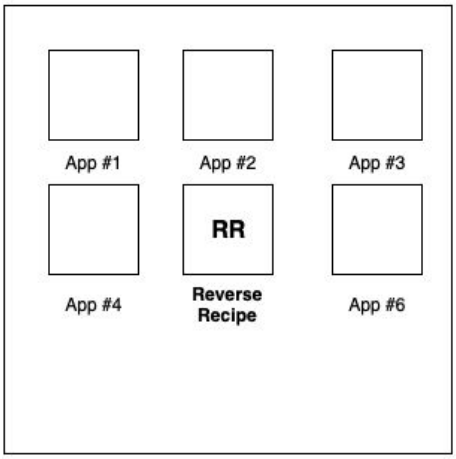
REFERENCES

[1] Intro To Usability Engineering CS_352_400_F2019. W5 - Design Gallery #1 https://oregonstate.instructure.com/courses/1738960/discussion_topics/8598265

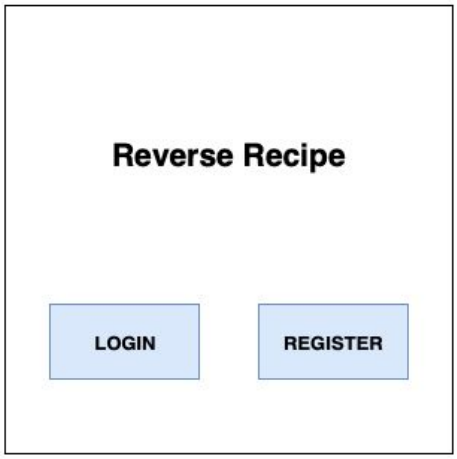
[2] Niels, A.; Janneck, M. The Influence of Computer-Related Attributions on System Evaluation in Usability Testing. i-com 2017, 16 (1), 15–22.

Prototype Screens

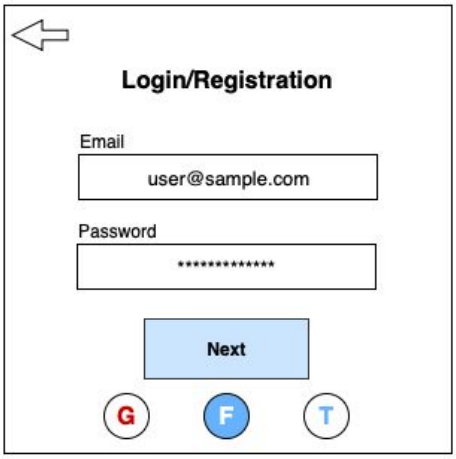
#1 App Icon



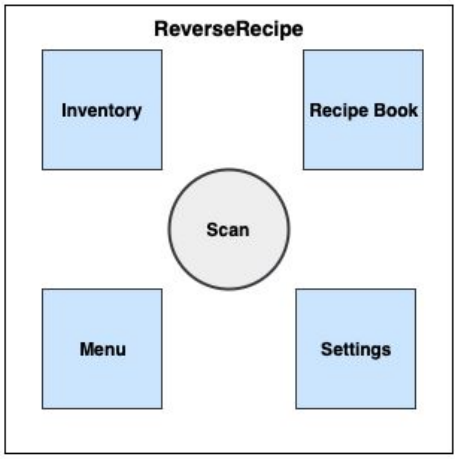
#2 Start



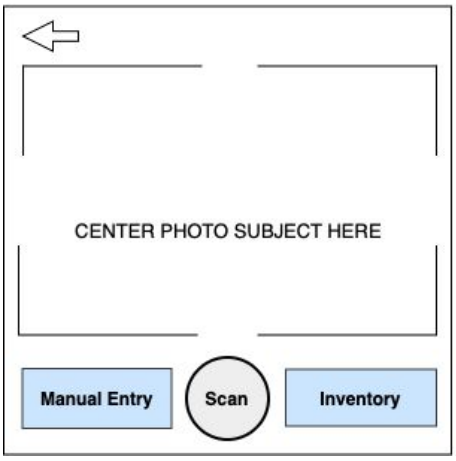
#3 Login/Registration



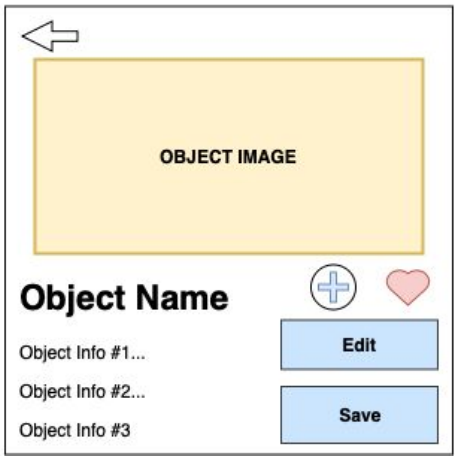
#4 Homepage



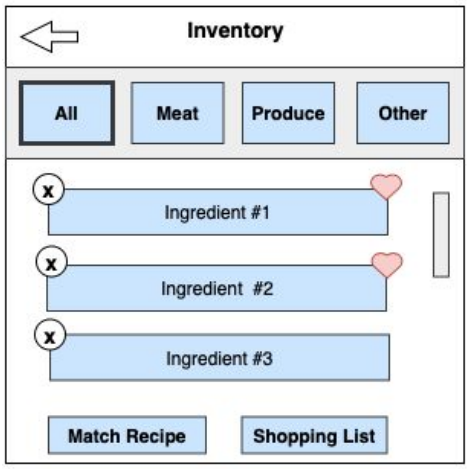
#5 Item Scanning



#6 Object Modal

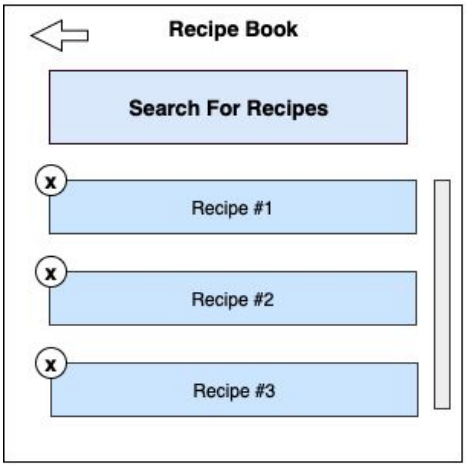


#8 User Inventory

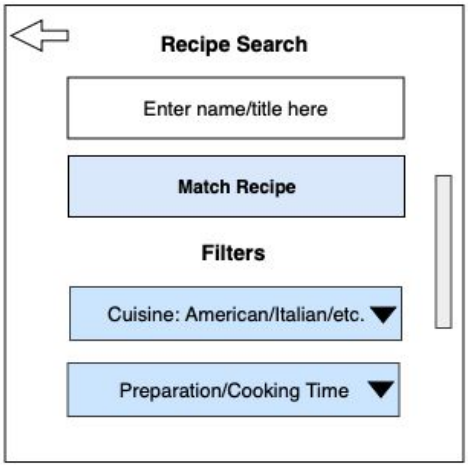


#9 Alert

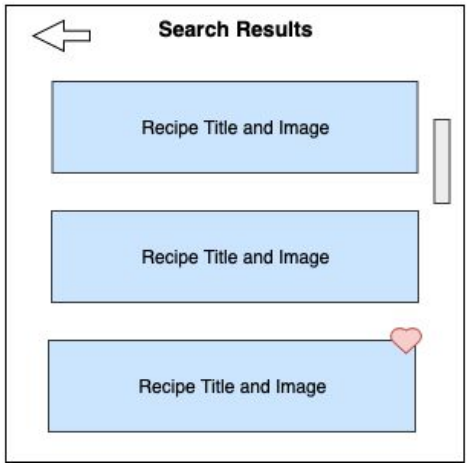
#10 Recipe Book



#11 Recipe Search

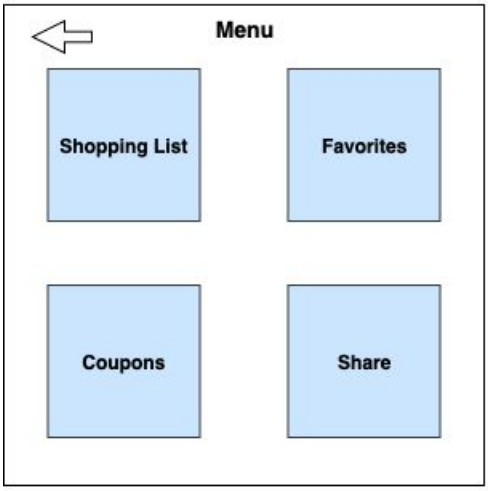


#12 Search Results

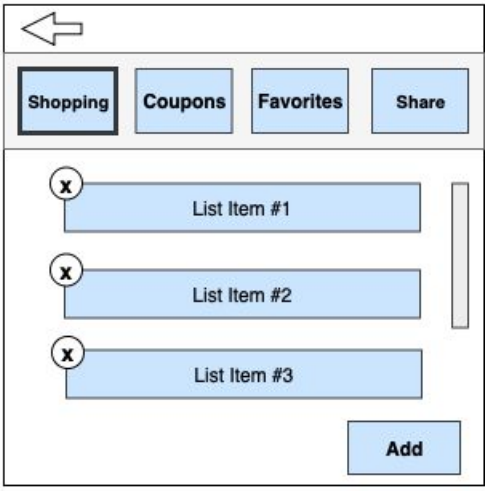


#13 Recipe Information

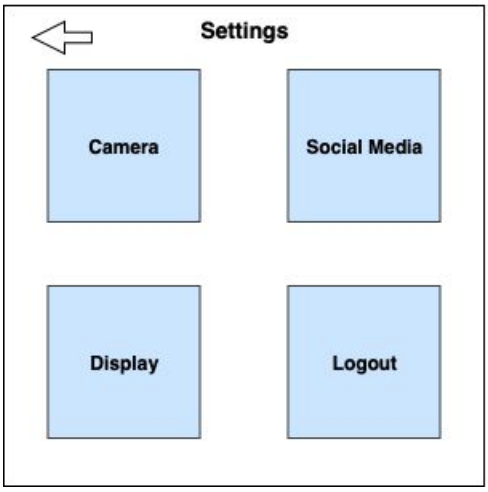
#14 Menu



#15 List View



#16 Settings



Peer-Evaluation of Team Members:

Table 1: Group members, Assigned Tasks, and Task Completeness Grade

Group Member name	Role	Responsibilities and Assigned tasks	Tasks Completeness Grade* 0-5
Shannon Farazi	Leader	● Managing the meetings ● Intro, Task Description and prototype update ● Helping on writing the document	5
Carter Fritsch	Collaborator	● Analytical Evaluation ● Helping on writing the document	4
Dylan Kieu	Collaborator	● Empirical Evaluation ● Helping on writing the document	5
Yu Chuan Tey	Collaborator	● Analytical Evaluation ● Helping on writing the document	5
Michael Ton	Collaborator	● Empirical Evaluation ● Prototype update ● Helping on writing the document	5