AfrIdge

Low-fi Prototyping & Pilot Usability Testing Report

Word Count: 2484

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1 Introduction

AfrIdge's goal is to help users shop easy and smart, and reduce waste by being "[a] personal food manager." People often do a poor job of tracking what is in their fridge, forgetting expiration dates and not realizing what can be done with what they have, leading to billions of pounds of food waste each year. While current Apps exist that allow users to manage their inventory and generate recipes, all of these include either manual data entry, creating a cumbersome user experience. Contrary to those programs, we auto-produce an inventory by scanning the fridge, in turn allowing it to smartly generate a grocery list, suggest quantities of food to buy, keep track of expiration dates, and recommend recipes based on the scanned inventory.

2 Sketches

We each storyboarded one set of application design for concept sketches (Figure 1, 2, 3).

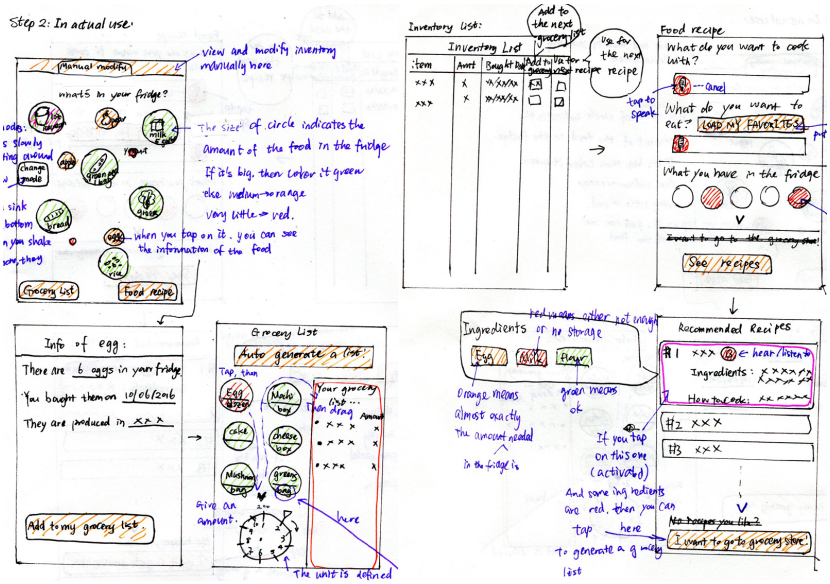

Figure 1: Concept Design by Jinglin S.

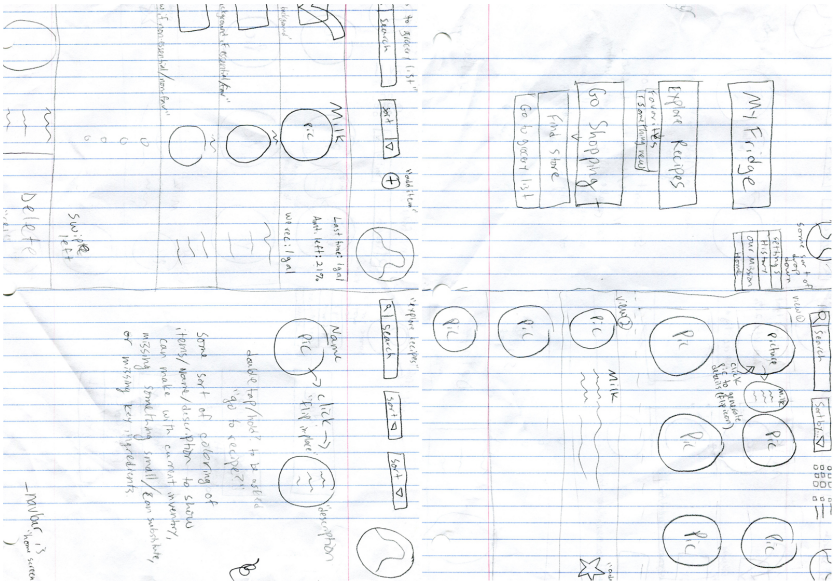

Figure 2: Concept Design by Brain R.

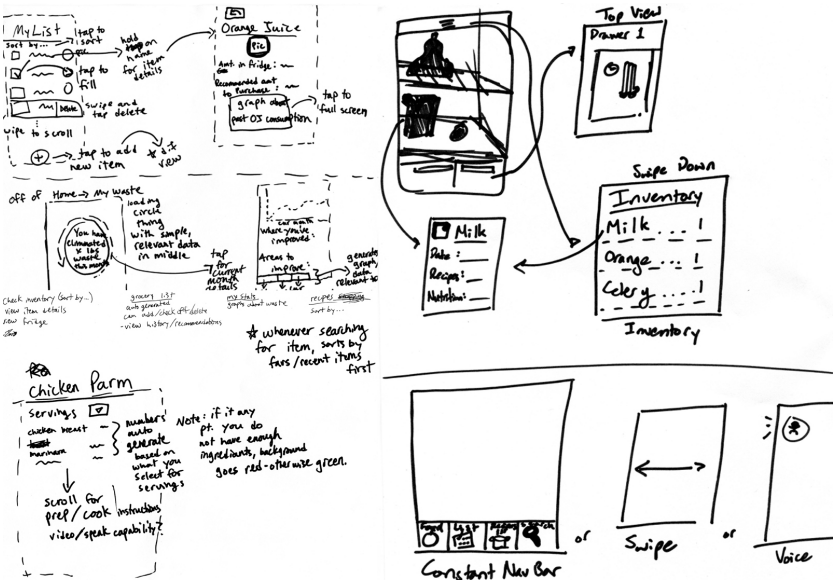

Figure 3: Concept Design by Tarek A.

We then pooled the concept sketches, categorize them by function, and did UI sketches in more detail.

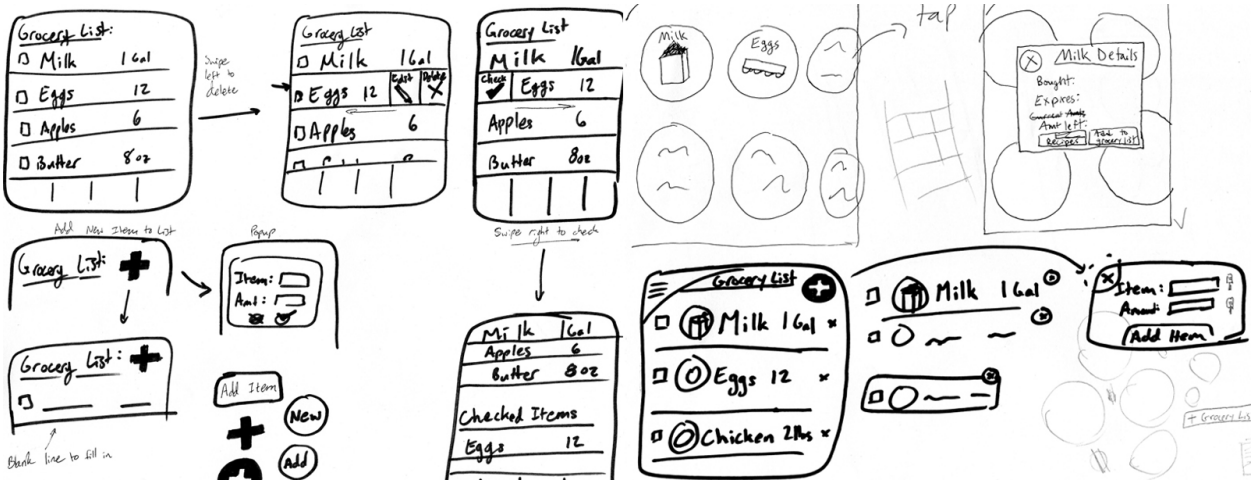

Figure 4: UI Sketch for Grocery List

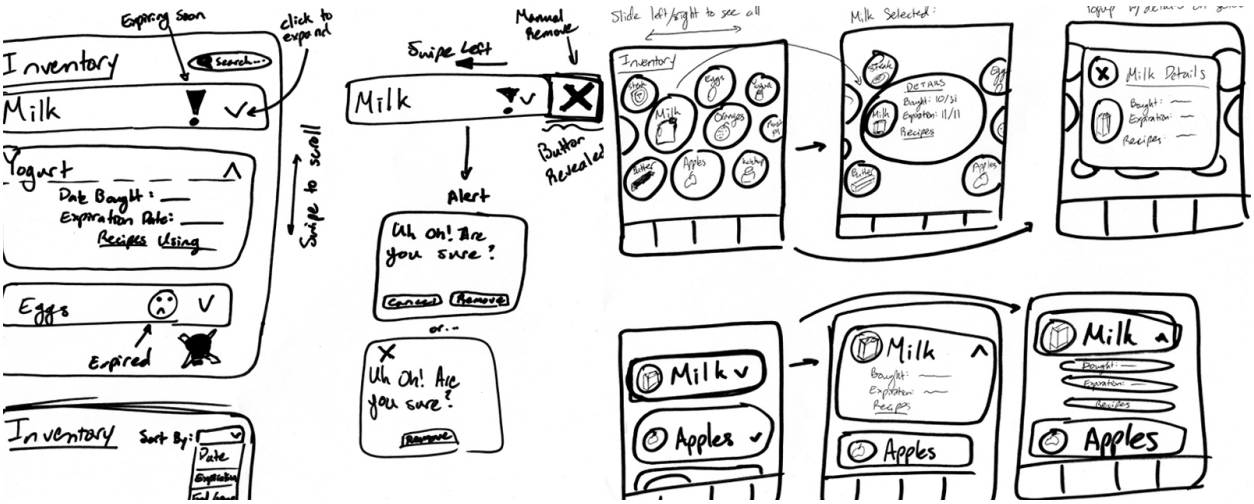

Figure 5: UI Sketch for Inventory List

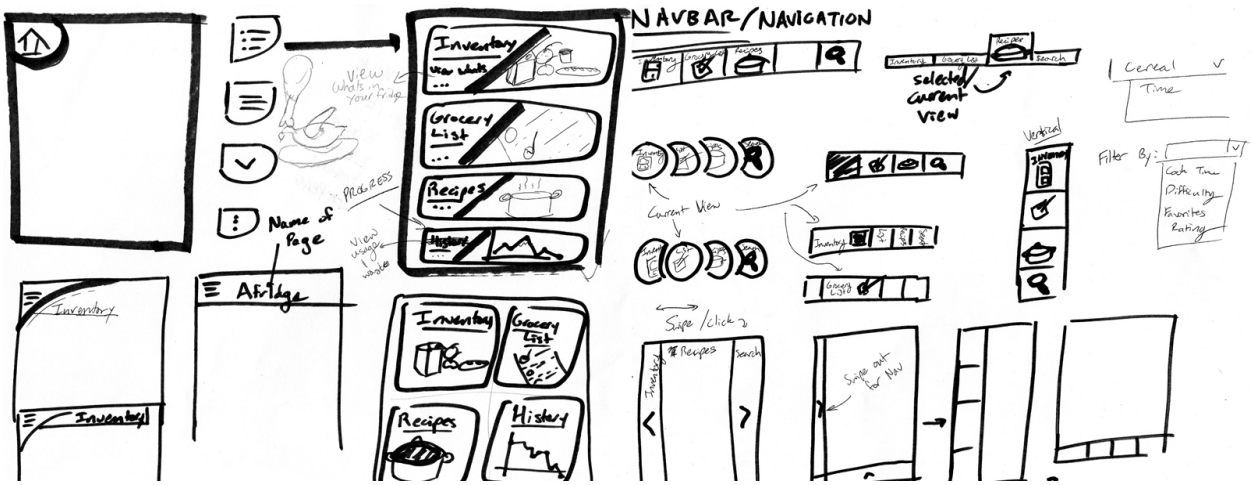

Figure 6: UI Sketch for Menu and Navigation Bar

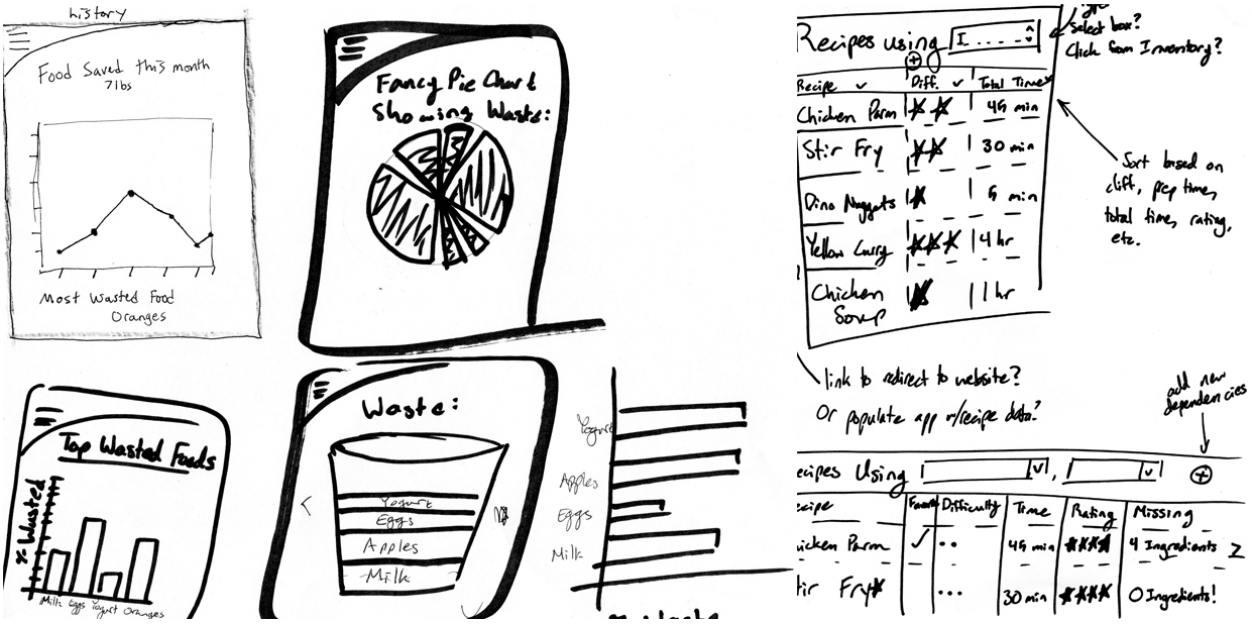

Figure 7: UI Sketch for Progress and Recipe Page

3 Selected Interface Design

We selected a set of interface designs from the sketch pool. We chose these designs for the following reasons:

Figure 8: Winning Design from Each Function Pool.
The upper row are UI for three tasks.
The lower row are UI for Popups and Menus.

- **Inventory**
  - UI is aesthetically appealing with circles compared a list or gridlocked items.
  - Their ball-like shapes lure users to tap and play around. First-time users can easily explore food details without App tutorial.
  - Thumbs tap big circles more easily.
  - Food display looks neater by compactly wrapping items.
  - Circles add potential for clustering, allowing more items to fit in a single page.
  - **Con:** Circles may not be intuitive compared to a standard list, and clustering could lead to cluttering.
- **Grocery List**
  - Users intuitively use "big plus" icon to add item.
  - The design shows check boxes, pictures of food, name and quantity in a clean way.
  - Swiping left to delete a list item is standard throughout mobile devices
  - **Con:** Normal checklist style is boring, although it is functional.
- **Progress**
  - A trash can represents the waste well.

  - A direct reflection on waste amount with drawing is easier to be understood than using a scientific chart.
  - Virtualization of real item can have larger impact.
  - **Con:** User has to scroll through multiple pages to see all of the data.

- **Recipe**
  - Utilize the space of screen well by only showing the name of dish, reducing cluttering.
  - List design allows for easier sorting and filtering in the future
  - **Con:** Ingredients not included in recipe details, instead outside linking which could be inconvenient although easier to draw and test.

- **Add Item & Food Detail**
  - The additional popup window helps the display pages look clean and concise.
  - Users can save effort on typing by talking to the program through the mic button.
  - **Con:** Popup model creates an extra few clicks to view information and then close out of the window.

- **Navigation Bar / Menu**
  - A concave shape of navigation at the corner of the screen uses the minimal space, leaving more room for display of important information.
  - Hidden navigation bar takes up less screen space.
  - The curve adds an aesthetic element.
  - The list items are arranged by their predicted usage frequency.
  - **Con:** Navigation bar that is hidden takes an extra click to access compared to a constant one that is on the bottom or side.

4 Prototype Description

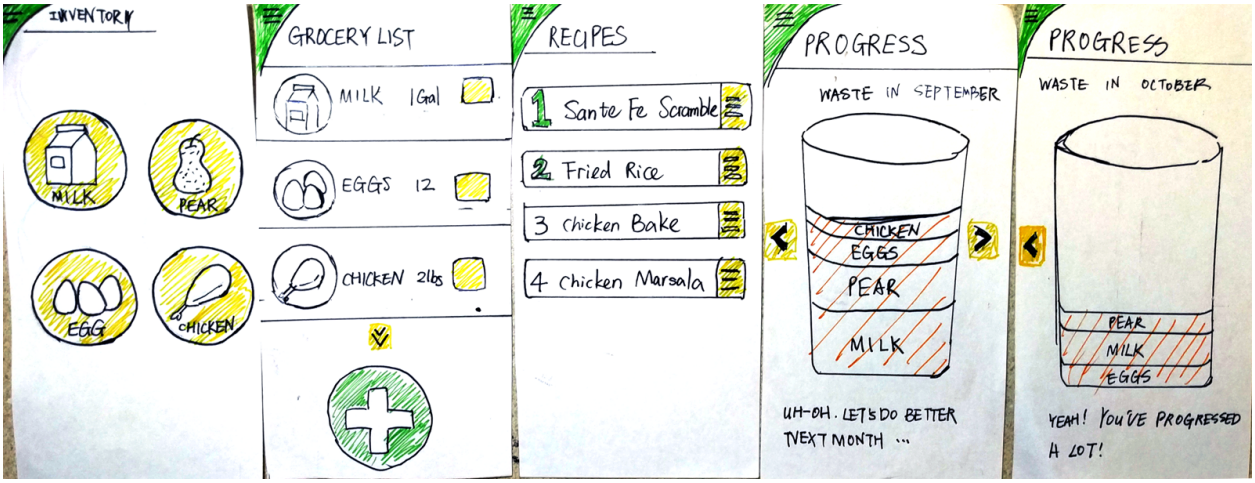

Figure 9: UI for Three Main Tasks

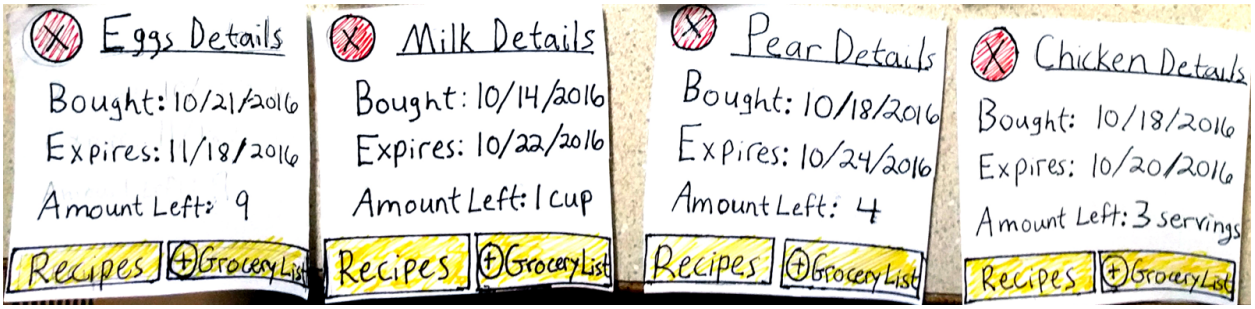

Figure 10: UI for Inventory Popups

Figure 11: UI for Recipe Popups and Item Adding Popups

We storyboarded the winning designs, and finished the set of UI design (Figure 9, 10, 11) for low-fi testing. A demo script is shown below.

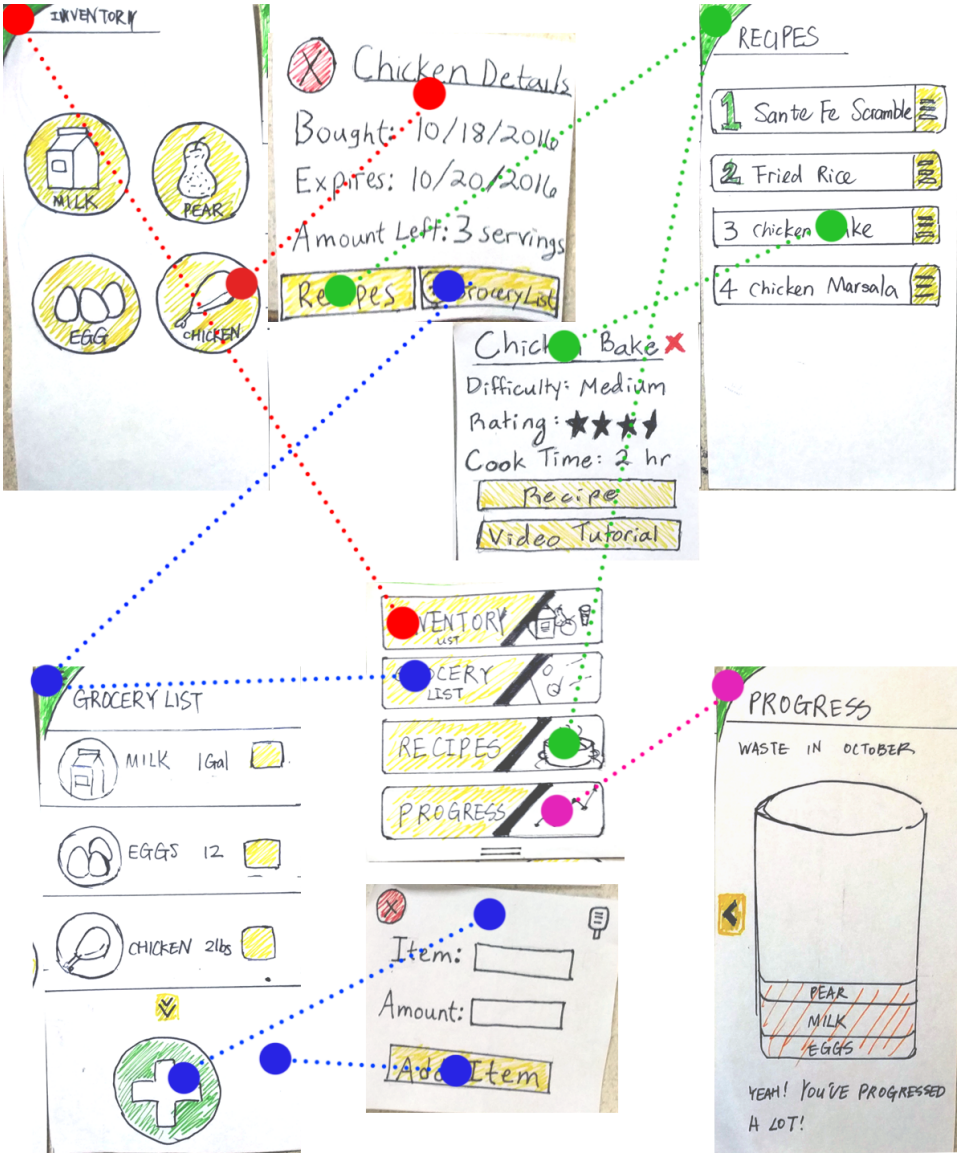

Figure 12: Demo of App

- **Start screen:** App shows the user menu covering the top half of the screen on the top layer, and the inventory page underneath. Users can swipe up to go to the inventory view, or tap on any view to navigate the app and remove the menu.

Figure 13: Start screen

- **Inventory:** Users can tap on any circle to check that food's detail. In the detail popup, users can either check recipes using this food item, or add it to grocery list if they are running low or the expiration date is approaching.
- **Grocery list:** Users can enter this page through the menu. Users can add new items other than the automatically generated ones by tapping on plus button, which will open up a popup that will allow users to enter in the item and amount. Users can check off the check box at the grocery store upon buying the food item.
- **Recipes:** Users can enter this page from either the food detail popups or menu option. Recipes are sorted with a ranking. By tapping on the dish, users get a popup window with details on cook time, rating, and difficulty, as well as links to the written recipe and video tutorial if it is available.
- **Progress:** Users can navigate to this page through the menu. This view displays the current month's waste,and users can swipe left or right to see their waste records for previous month's.

5 Method

- **Participants:**

  1. Participant 1 is a 27-year-old man, working as a programmer at a game company in Bay Area. He was recruited through a personal connection and was tested in Florence Moore Dining Hall.
  2. Participant 2 is a sophomore at Stanford, Sophie's coworker at SCPD. He was tested in the SCPD control room.
  3. Participant 3 is a software engineer who lives right next to a grocery store, often making nightly trips to get ingredients for meals. He was recruited through previous outside work and was tested in his apartment.

- **Tasks:**

  1. **Simple:** Navigation through the four main views of the application via the menu
  2. **Medium:** Editing the grocery list using the check boxes, adding button, and swiping deletion
  3. **Difficult:** Discovery of popups via unlabeled items in inventory and navigation to other windows through these popups

- **Procedure:**

  1. Initial background is given to the user, explaining the purpose of the app and what we hope to achieve with it. We explain that we'd like them to click through the app without any guidance, with us switching the paper views according to clicks, and that they should verbalize their thoughts as much as possible, explaining why they press certain things and express what they expect the outcome and purpose to be.
  2. User is first presented as if they just opened the app, with the navigation menu on top of the inventory view.
  3. The user is expected to click on an option in the menu or swipe up to remove the menu and view the inventory, from which we take the menu away, and hand the user the corresponding view.
  4. Depending on the view the user is in, clicking on certain items leads us to placing popups on top of the current view that display information or ask for input.
  5. If the user taps the main view in the background or on the "x", we remove the popup.
  6. If the user tap on the nav icon on the left corner of the screen, we place the menu paper over the view.
  7. Within the "add item" popup, the user can either press the recording button and say :"I want xx xxx...", leading us to respond responded:"Ok, xx xxx added", or pretend to manually type in the item.
  8. Upon verbalizing what they will add to the list, we quickly write the food item down on a strip of paper and manually insert it into the list by placing it on the paper view.
  9. In the progress view, the user is expected to explore the back and forward arrows on the side, for which we will switch out the current view for the previous month's view.
  10. After the user fully explores the application, we will ask them to go back to places where they were confused and discuss more what the issue was with that page.

- **Test Measures:** The goal of our testing was to measure how intuitive our UI was for new users. Thus, what we mainly looked for were points of ambiguity and confusion in our design, and points of disappointment when they expected features that weren't included in our functionality. Verbal cues, facial expressions, and body language upon attempting tasks were noted.

6 Results

1. **Participant 1:**
    - **Recipes:** The user was initially uninterested in pressing the video tutorial link, and when probed to do so, said that video tutorials "take to much time to watch." The rating portion of the detail popup was something that he hadn't seen before, therefore leaving him slightly puzzled as to its meaning.
    - **Grocery List:** Swiping left to delete was intuitive, but the check box aspect was also confusing to the user, not understanding the pages true function. When trying to add an item to the grocery list, he didn't understand the function of the recording icon in the popup.
    - **Popup Windows:** In general, this user was confused on how to close popup windows, not noticing the 'x' in the top corner and rather pressing on the background to return to the previous view.
2. **Participant 2:**
    - **Menu:** After completing his first task, he paused for a second before pressing on the menu icon to go back to the menu. He seemed confused on how to navigate back to the menu, as if the icon in the top left wasn't clear or intuitive for him.
    - **Grocery List:** This user wanted to edit items in the grocery list, and wasn't sure how to do that. He tried holding down the list item for a long time to edit, and the missing functionality left him disappointed. After checking off all of his items, he didn't know what the next step was, saying "now what?" as if there was something else to be done.
    - **Progress:** Upon viewing the menu, the user wasn't sure what the progress section was supposed to entail, not realizing that progress was for tracking waste. Once inside, however, the trashcan image and captions made the view's purpose clear, and he seemed surprised and happy to see it.
3. **Participant 3:**
    - **Menu:** This user was confused upon opening the app, not realizing that the first view was the menu on top of the inventory. He expressed disappointment and recommended that we have a home screen or just start on the inventory view without the menu open.
    - **Grocery List:** After checking the items, he pressed the plus at the bottom, expecting it to submit his checked items and remove them, and was confused when we placed the 'add item' popup in front of him. Also, the button for scrolling confused him, since he intuitively just swipes to scroll. He also was disappointed that he couldn't view the AI suggestions separately from the items that he added manually.
    - **Recipes:** He liked the option to view a video tutorial, but wanted to see information on exact ingredients in the popup. He assumed that the recipes generated were all ready to make based on his current inventory, or would otherwise like to be able to see explicitly what he is missing from each and add that to his grocery list. He also wished he could see which recipes used food that was supposed to expire soon.
    - **Progress:** Upon opening the page, the user expressed excitement, saying he liked being complemented by his phone. After clicking to scroll to last months waste report, he seemed disappointed, wishing he could view a more side-by-side or overlaid comparison so he didn't have to flip back and forth.

7 Discussion

Through the feedback of our three participants, we found some common themes of pieces of our UI that need to be tweaked and features that we should consider adding in order to be more intuitive to first-time users.

First, for the menu, some of the participants were confused either by its initial state or by how to return to it. One really didn't understand why the application opened with the menu overlaid on top of another view, leading us to believe that we need a home screen or need to just start on the inventory. He expressed that someone less "tech-savy" than him might not be able to figure out the initial state.

As for our popups, it is noteworthy that some of the participants pressed areas outside of popups in attempts to close them, rather than the 'x' provided in the top corner. Therefore, we should either base our functionality for closing popups on out-of-bounds taps and no 'x', or make the 'x' more noticeable.

From our findings, it seemed as if the grocery list page had the most room for improvement. Most importantly, the plus sign at the bottom confused users who were expecting to submit their checked boxes after finishing shopping rather than being used to add an item. It's placement at the bottom of the screen was causing confusion, so it should be moved up to the top right of the view. The button for scrolling was also unnecessary/confusing in the eyes of one of our users, who more intuitively just wanted to be able to swipe to scroll. In terms of submitting after checking off all the items you got, users expressed interest in a sanity check of sorts so that they could review what they had bought, either by moving checked items to the bottom of the list without deleting them or moving them out of the current list and into a "completed" list. Also, users expressed the desire to edit existing list items, so we are thinking that upon swiping left, two buttons will appear: one that allows users to delete the selected item, and another that allows users to edit that item.

On the recipes list, users wished that they could see the exact ingredients or instructions within the app, and actually categorize the recipes based on inventory, which is functionality that would definitely be smart to add. One user also expressed the desire to easily add all the items from a given recipe to his grocery list, which would be another very useful piece of functionality worth implementing. Another user also expressed some confusion on rating and the purpose of video tutorial links, but we concluded that this could have just been a single case of confusion, since the other two participants seemed excited about these features.

The progress page led one viewer to be disappointed because he was unable to directly compare last month's and this month's data on one page. Therefore, it would be a good idea to allow users to view progress side-by-side. One recommendation was to use a line graph for easy comparison from month to month, but we liked the image of a virtualized trash bin that filled up as more food was wasted.

8 Appendix

Consent Form

The AfrIdge application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of AfrIdge. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Tarek Abdelghany, Sophie Shan, Brian Rossi) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the AfrIdge experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name _____

Participant Number _____

Date _____

Signature_____

Witness name _____

Witness signature_____