CS 147
LOW-FIDELITY PROTOTYPE

NUTRI-GOOD
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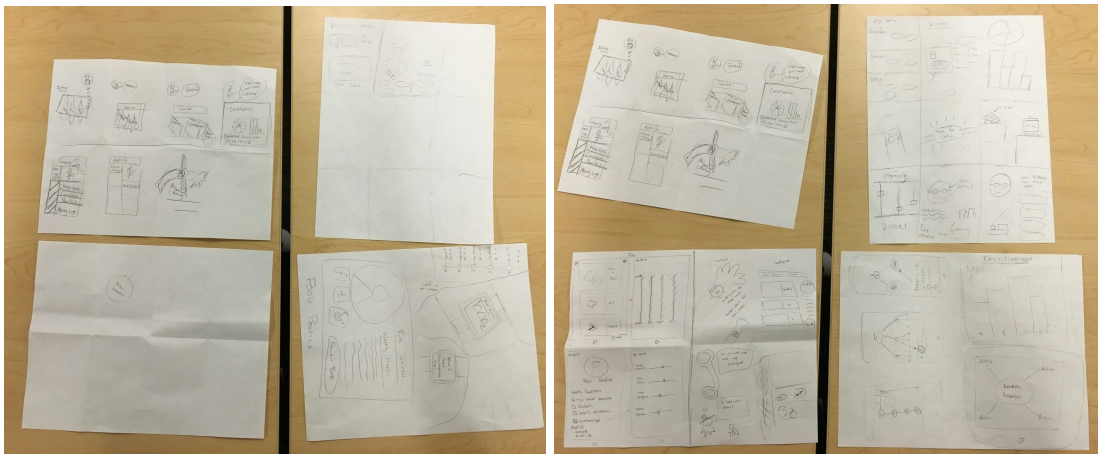
INTRODUCTION

Value Proposition - *"Nutri-Good: Independent Nutrition, Delivered."*

Problem - Food and nutrition management is an important component of personal health. Further, poor nutritional intake can lead to chronic illnesses, obesity and diseases that cost individuals their health, and society its resources (Bhattacharya et al., 2014). As we age, it becomes only increasingly important to manage our eating habits, as the body begins to wear down. The population lacks a concise, easily-understandable source of nutritional information that they trust, and the effort cost required to maintain healthy intake can prove to be a significant barrier to uptake and maintenance (Wansink, 2006).

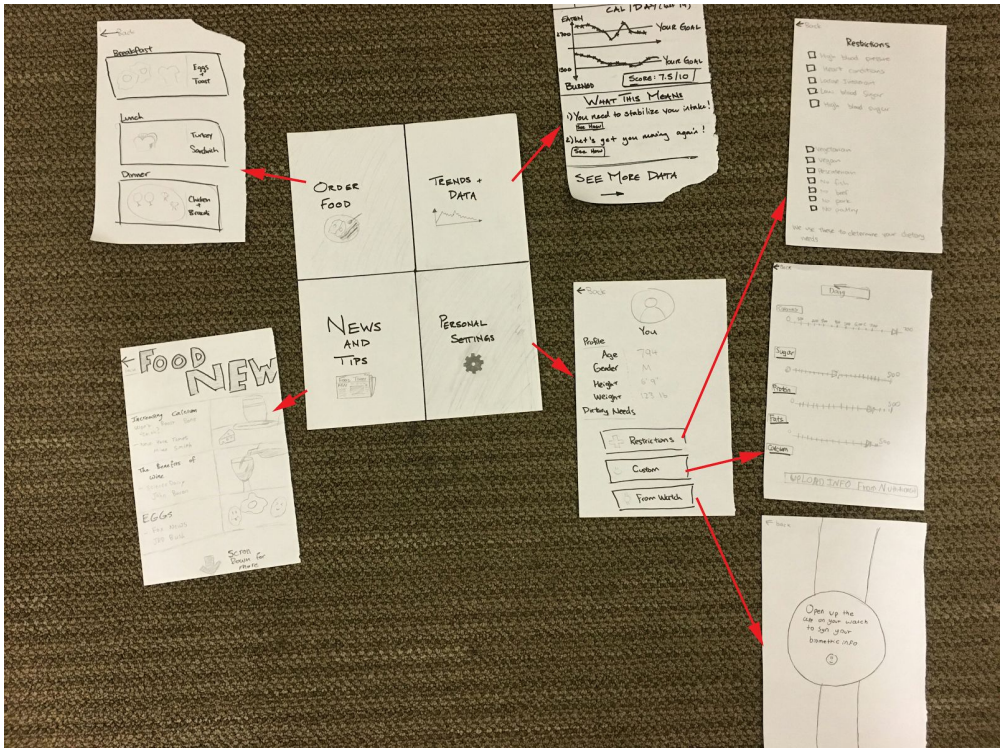
Solution Mission - We are trying to help the elderly maintain healthy eating habits and preserve the independence they experience while cooking, by delivering them ingredients and recipes to make the food preparation process easier. Rather than implementing complex food-tracking software which obliges continued and laborious efforts from the user and has been shown to decrease maintenance (Consolvo et al., 2012), we intend to integrate the food delivery and nutritional analysis processes into a single program, allowing for the development of blood-glucose monitoring in wearable technology (Guzman, 2015).

SKETCHES



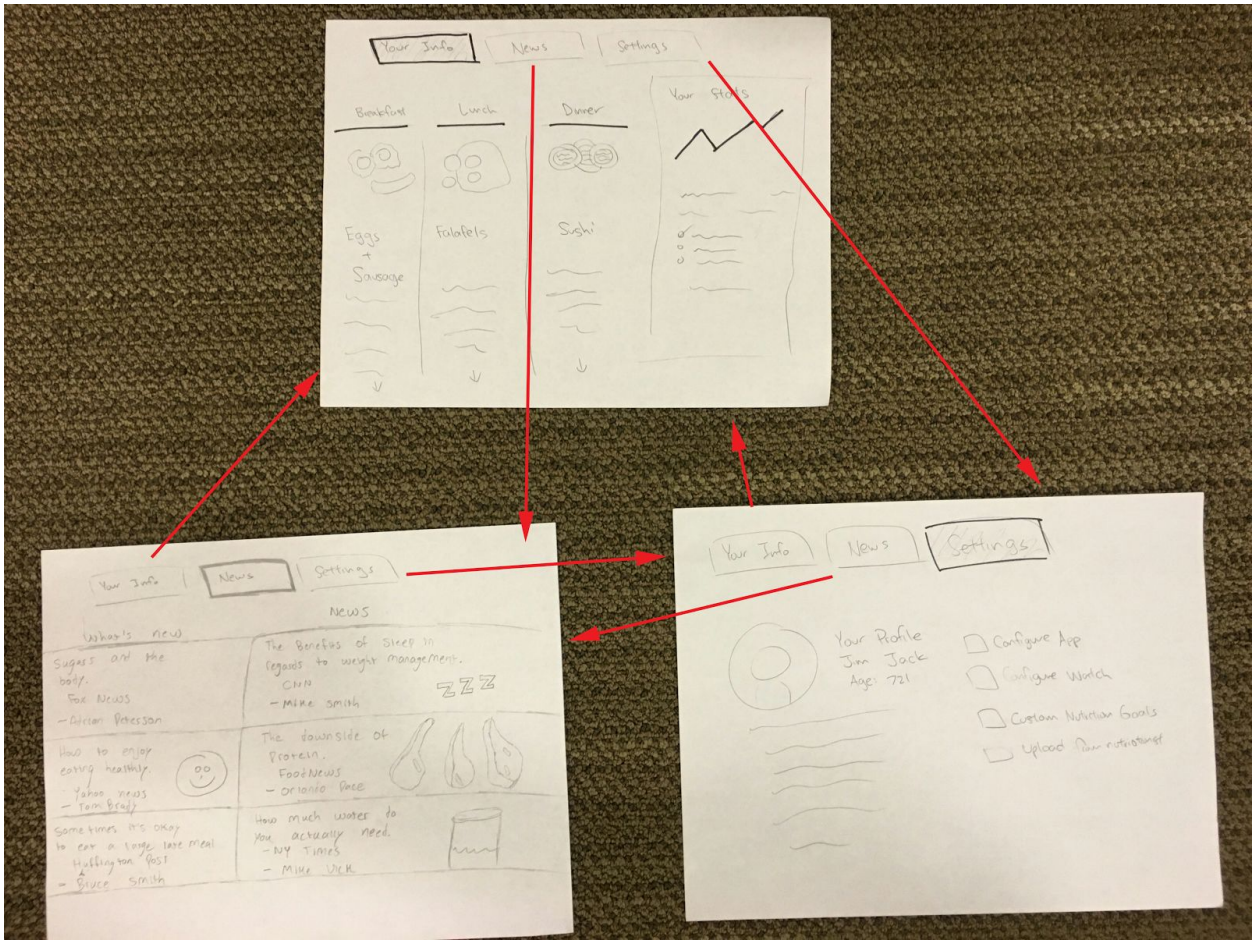
An overview of our initial sketches for different UI implementations

Storyboard A - Phone/Tablet Paired with Wearable



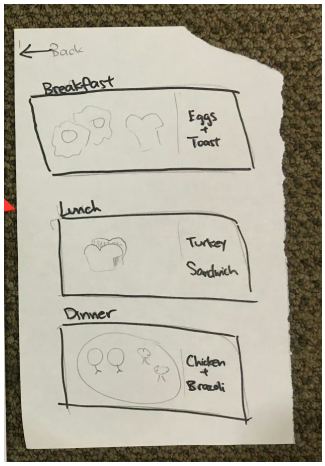
Our first storyboard idea: This storyboard depicts the user interface possible within our Phone/Tablet implementation. The main screen is in the middle, which provides easy access to the other components of the app. For further details on this design, please see the rest of the report.

Storyboard B - Website



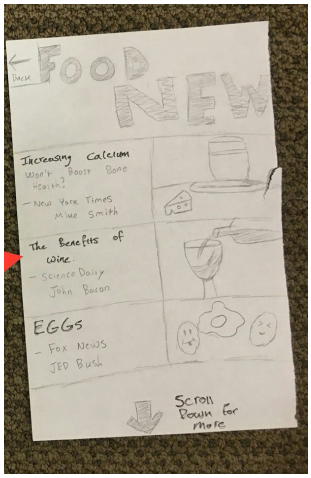
Our second storyboard idea: A web implementation that, through classic tab navigation, provides the user with access to rough sketched ideas for a profile design, data tracking, meal settings and nutritional news and information. It is quite possible that later iterations of our product will include a website companion for the application UI.

SELECTED INTERFACE DESIGN[1]



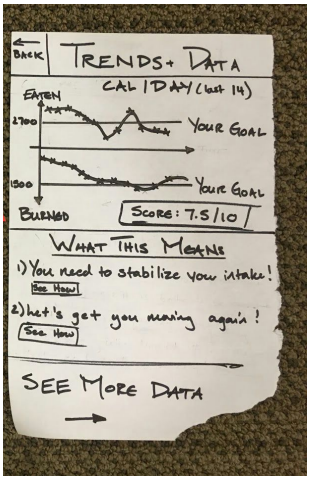
Function: **Meal Selection**

In this view, multiple meal options are shown. There are three options: one for breakfast, one for lunch, and one for dinner. Each of the meals are swipeable, and swiping left and right brings a different meal into the foreground.



Function: **News articles**

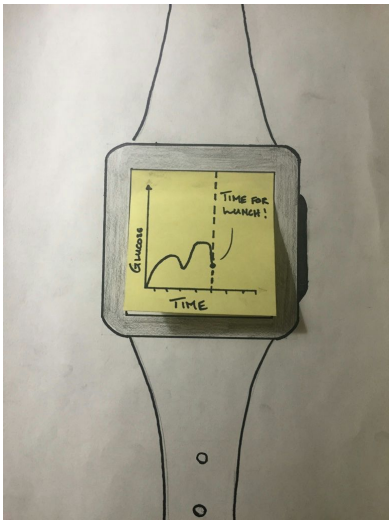
We will pull information from various reliable sources (New York Times, Health Journals, etc) to display a list of relevant articles. Each of the articles is shown with the title, a summary, and a cover photo.



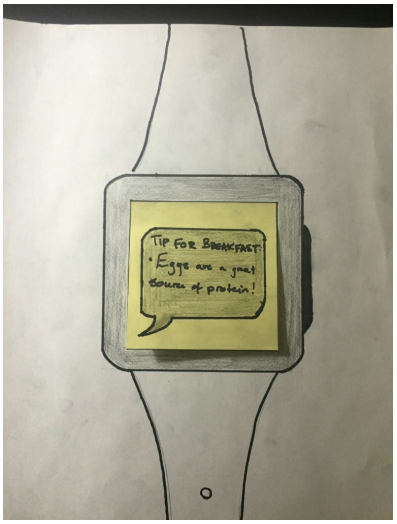
Function: Nutrition Reporting

In this view, we display graphs that represent the nutritional intake of our user. A quick glance of this graphic should let the user know how they're doing and what their daily consumption looks like.

Syncing biometric info
Gather information about the user: blood pressure, etc.



Reminders
Remind the user when it's time to eat



Tips
Offer timely and helpful tips about nutrition

[1] *More detailed storyboards can be found in the* Prototype Description *section, and the Appendix.*

Reasoning for Selection

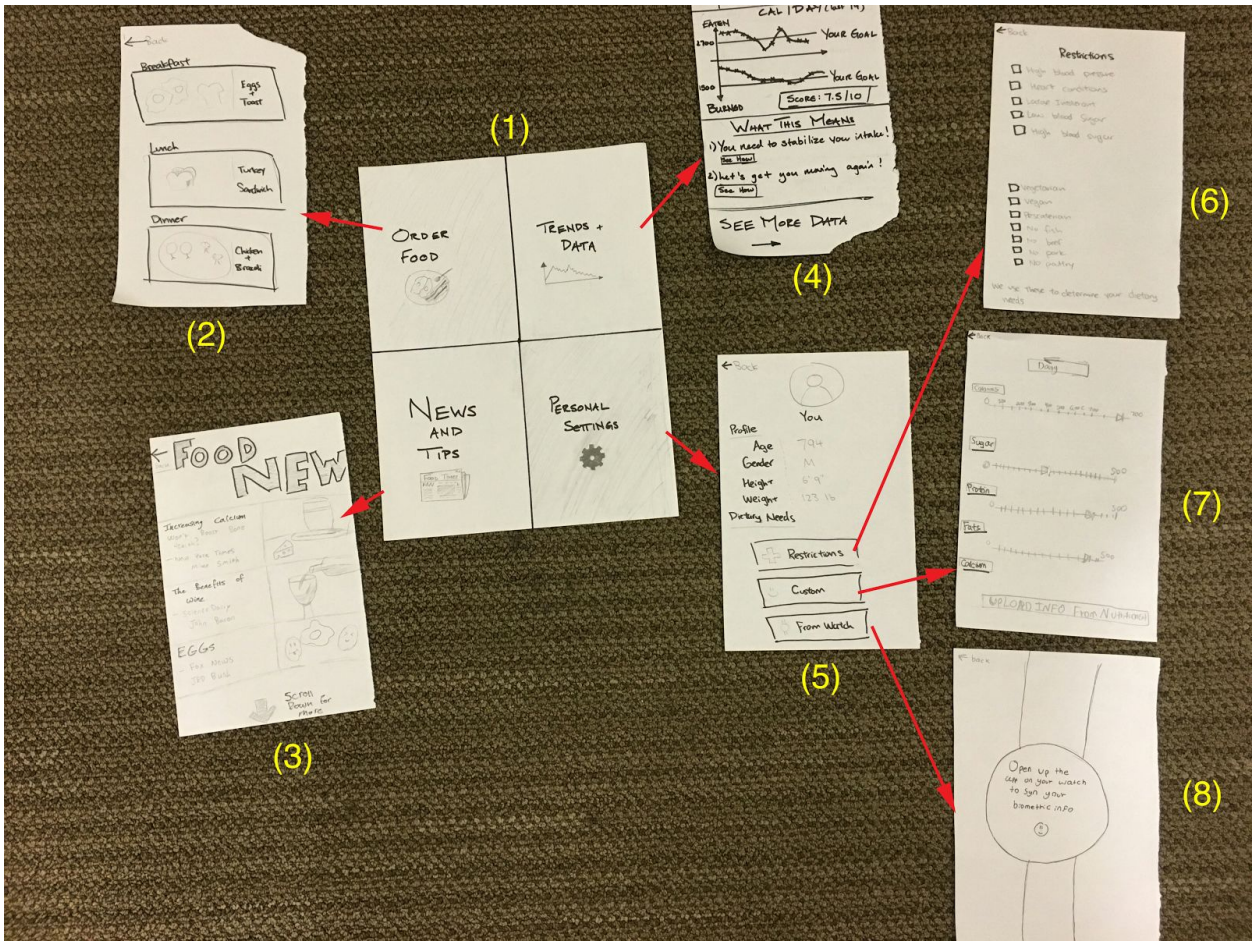
Since we are targeting the elderly, we wanted to avoid as many barriers to product usage as we could. The internet is teeming with nutritional websites, yet this information is too complex, diverse and overwhelming to parse through (Wansink, 2006). Not only is the application easier to find than a website, it is much easier to reach and maintain users through a mobile platform, since the usage rate is so much higher, and a well-designed application is more intuitive to use.

In anticipation of rising research (Guzman, 2015) and trends in the technology sector, we hope that the user's biometric information will be downloadable using an augmented, non-invasive wearable component. Ideally, future iterations of the application would be able to sync that data onto the user's personal information page, to avoid the trouble of either requiring the user to complete an invasive measurement test, or use inaccurate calorie estimation algorithms (Zambelich, 2012).

In addition, we want to include a piece of technology that is simple and convenient for the elderly to use. It may prove too much of a hassle for users to continually depend on the phone to complete tasks (Consolvo et al., 2012). The watch will also serve as a source for daily health tips on eating better and learning how to cook a meal, and could include a built-in personal assistant that communicates with the user when prompted by rising or falling blood-glucose levels.

Although a realized version of this application would mandate pairing with a website, we feel that the constant maintenance and integration with the user through a wearable (when tactfully adjusted to avoid "nagging") will be far superior to the implementation of a website that depends on their interaction.

PROTOTYPE DESCRIPTION



Our low-fi prototype is a mock representation of an iPhone application that allows the user to navigate to different pages depending on the needs of the user. Each of the numbers in the photo above will be referenced and described below.

The main screen of our prototype (1) is the paper with the four quadrants. To navigate between pages, the user always starts from this home page. The idea behind this is that we've heard from many people that they get "lost" in the app, and they can't find anything after they're a few screens in. To fix this, we created this main menu that easily and simply lists out each of the functions of our app. We will make sure that this page will be reachable from any of the screens in our app so at any point, the user can jump back to this page.

The users would mainly interact with the app through touch and voice recognition, giving the user flexibility in terms of how they choose to get information from the application. Many of the pages would be organized around blocks of text and pictures, ensuring that users would not waste time finding hidden icons that would return them to the homepage.

The meal selection screen (2) boasts three swipeable views. This interaction is a bit different than the other pages, but it will allow us to house lists of foods without overwhelming the user. By swiping and tapping, the user can make a choice on their desired meal.

Another screen would present information from the news (3). The first thing that the user will see is a list of headlines of news articles with relevant images, with each pair of article and image enclosed in a box (similar to Windows 8 app icons) . These articles would provide the users with evidence and references that they could pursue to learn more about nutrition, and would be primarily concerned with health and nutrition that is most relevant to their personalized well-being, helping users to comb through the massive amount of data that is present online.

The data and analytics (4) is the page that evaluates the user's nutritional/food intake on a weekly, daily, or monthly basis. This page offers quick tidbits on what the user is doing well, what the user is not doing well, and what the user can do to improve. In addition, we want to include graphs and other images to help the user visualize the amounts of nutrition (calories, proteins, vitamins , etc.) that they are consuming. The user can specify the type of nutritional information that they want to track on the settings page.

In the settings page (5), we ask the user to input personal information so that we can custom tailor their meal based on their age, gender, height, and weight. Beyond this, there could be other needs that could affect their dietary needs. Screens (6), (7), and (8) are three different ways in which the user can configure these advanced parameters.

One way to configure these additional needs is by checking things off a checklist. In the restrictions page (6), the user can mark off medical conditions or personal traits that apply to them. We use these factors to figure out the best meals for them.

Another way of configuring is to manually adjust their desired intake levels of calories, fats, sugars, and carbs.(7) This information could come from a nutritionist, and it allows for some fine-grained tuning.

Lastly, we want to embrace the use of wearable technology. We envision a wrist-based device that can easily sync biometric information about the subject. This watch would be able to get details such as blood sugar levels and perhaps blood pressure. If the user possesses such a device, this information should be automatically synced. Screen (8) just informs the user that such a feature exists.

METHOD

Participants

We interviewed four individuals all over the age of 60 (our target demographic). Participants 1 & 2 were a couple in their early 60's. Both were highly active and regularly run. The man uses a Jawbone UP to track his physical activity, whereas his wife was more concerned with nutrition and caloric intake.

Participant 3 was an elderly gentleman, between 70 and 80 years old. His exposure to technology was much more limited than our first two participants. Participant 4 was an elderly woman between 60 and 70 years old. We approached the participants based on their age and appearance. Since a key component of our U/I challenge will be designing an interface that encourages use from an elderly demographic, we wanted to test with representative participants. No compensation was issued for completion of the test.

An overview of some of the participants, the UI and the testing environment

Environment

All participants were interviewed on Tuesday afternoon, at the Rodin Sculpture Garden, outside of the Cantor Arts Center. It was a warm day, and many of the participants were interviewed in the shade.

Tasks

We asked our participants to complete four tasks each, which are specified further in the *Selected Interface Design* section, and the Appendix. These tasks were:

- Change your breakfast option (see Appendix 1, Figure A2)
- Connect to the wearable (Figure A5)
- Enter personal/dietary information (Figure A4)
- Select a news article (Figure A2)

Testing procedure

We used POP to simulate the UI of a mobile phone application, which proved to be incredibly simple and helpful. As a result, we were able to carry out interviews without the use of a human-simulated computer.

A transcript of the test brief is included in the Appendix. To briefly summarize, we introduced ourselves as a Stanford group testing out our low-fi prototype; we gave a quick description and short overview of the application (for the simple reason that the paper UI was much easier to explain by demonstrating how it looked); we went through our sequence of tasks, then gave a more complete debriefing of the application and our hopes for its full implementation. We also asked for their feedback and what they thought could be improved.

Test Measures

While running the tests, we wanted to see how comfortable our participants were working with the prototype. More specifically, we wanted to see if there was anything that they found to be difficult or counter-intuitive. We asked them to think aloud (see the Appendix for the test script), and to describe what they were doing as they did it.

We recorded some results about the general speed at which the participants completed the activities, their feedback and the number of issues they encountered while completing the tasks. We made note whenever our participants wrinkled their brow or paused, as these indicators are

symptoms of confusion and misunderstanding. A summary of these results can be found in Appendix 3.

RESULTS & DISCUSSION

The four participants completed all tasks with relative ease and speed. Errors were limited, as the design of the application was simple and clean. However, on the meal selection page, there was confusion over the use of the "swipe" interface to change meal options.

Additionally, it seemed that the purpose of the application was not clear to some participants. One even suggested that we "give options for the type of egg [they] will be eating." Another mentioned "we don't eat out often, this app might not be for us."

Lastly, it was suggested that the data page be made simpler and cleaner, as one individual found the information to be cluttered and unclear.

Proposed Alterations

Every participant initially tapped the "eggs" option when trying to alter their breakfast selection, which leads us to believe that tapping my be a more desirable option than swiping for changing said selection. In our meeting following the interviews, we specified a tapping menu UI to be tested in the medium-fidelity prototype. This menu will enable the user to select from a number of visible options presented aesthetically on the screen when they tap one of the meal selections.

Additionally, a "welcome" screen or tutorial of some variety might be necessary, to help clarify and distinguish the product's purpose. This is not of huge concern, since from conception, we have discussed the importance of including recipes with the ingredients, so there is no need for the end-user to do any work on their own other than cook.

Finally, following the comment that the data section looked cluttered, we will focus on presenting a more streamlined and approachable "Trends and Data" section in our medium-fidelity prototype.

Reflection and Potential Drawbacks

Our tests and results focused mainly on basic functionality: our U/I was simple, by deliberate design, since the purpose of this low-fidelity prototype was to introduce a basic functional implementation of an idea.

From a design perspective, our main reasoning was that overwhelming or complex interaction would present a barrier to uptake or maintenance of application usage. As a result, our tasks were not difficult to complete for the user, which perhaps robbed us of an early opportunity to evaluate more involved user-interaction.

It is also clear that we need to define the aim and distinction of our product more significantly. The quoted feedback from the participants suggests that they believe we will be delivering prepared or cooked food, or that the application does not suit people who predominantly eat at home, which, unfortunately, exactly contradicts one of the goals of Nutri-GOOD - to maintain the experience of independence while cooking.

We take this feedback as a learning experience, and we are confident that this low-fidelity prototype more than served its purpose in testing basic functionality, while still leaving us room to expand on and hone in on more involved tasks.

CITATIONS

Bhattacharya, Jay; Hyde, Timothy; Tu, Peter. "Section VII: Behavioral Health Economics." Health Economics, 2014, New York: Palgrave Macmillan, pp. 496-542.

Consolvo, Sunny, et al. *"Designing for healthy lifestyles: Design considerations for mobile technologies to encourage consumer health and wellness."* Human–Computer Interaction 6.3-4 (2012): 167-315.

Guzman, Zack. *"Monitor Your Blood Sugar, Courtesy of Google."* CNBC. CNBC.com, 13 Aug. 2015. Web. 23 Oct. 2015. <http://www.cnbc.com/2015/08/13/google-developing-bandage-sized-glucose-monitor.html>.

Wansink, Brian. *“Mindless Eating: Why We Eat More than We Think.”* 2006, New York: Bantam.

Zambelich, Ariel. *"Why Fitness Tracker Calorie Counts Are All Over the Map."* Wired.com. Conde Nast Digital, 17 Aug. 2012. Web. 23 Oct. 2015. <http://www.wired.com/2012/08/fitness-trackers/>.

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Word Count: 2,495

APPENDIX

A1 - UI Descriptions

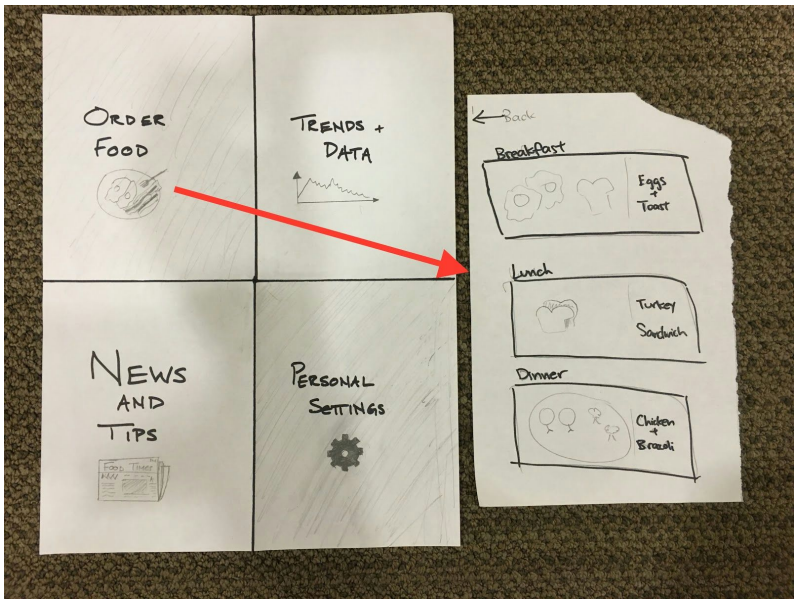

Figure A1

The UI flow for ordering food. This is a part of our **complex task**, getting the user to choose a well-balanced meal.

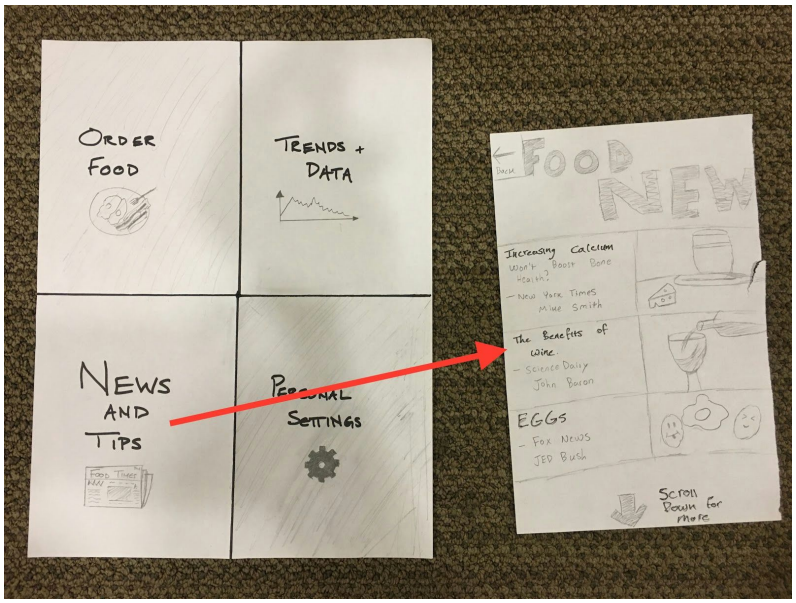

Figure A2

The UI Flow for checking out the latest nutritional news. This is part of our **medium task**, maintaining independence. By allowing the user to look up info about nutrition, they can empower themselves.

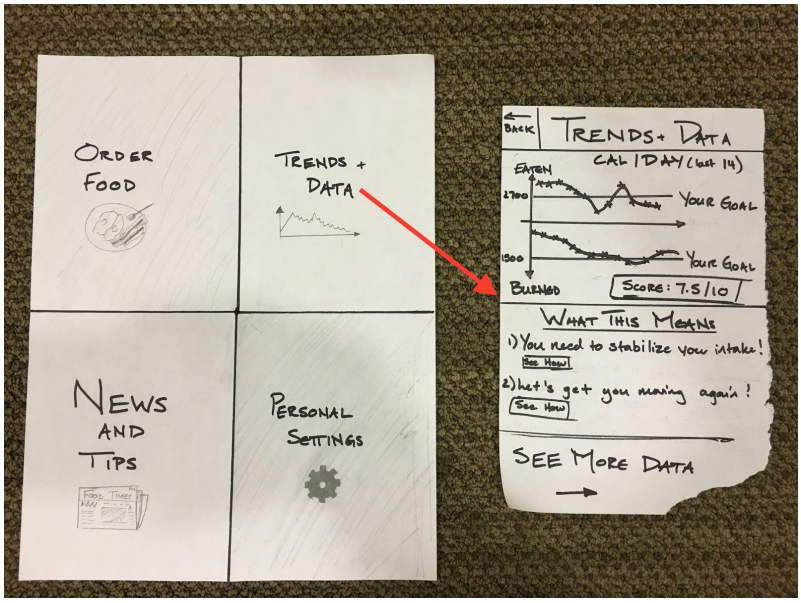

Figure A3

The flowchart for accessing one's nutritional data. This is the instantiation of our **simple task** - knowing what nutritional value you get from your meals.

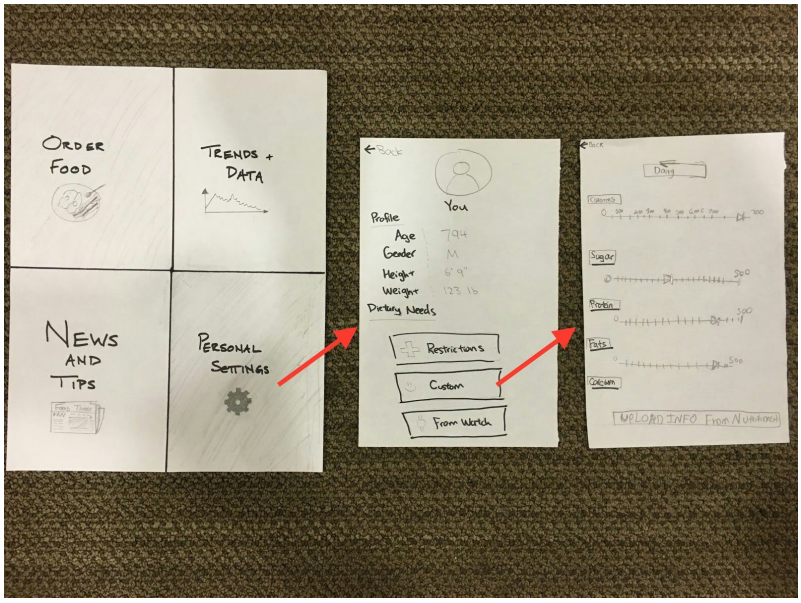

Figure A4

The user interface flow for getting into settings and setting custom dietary needs.

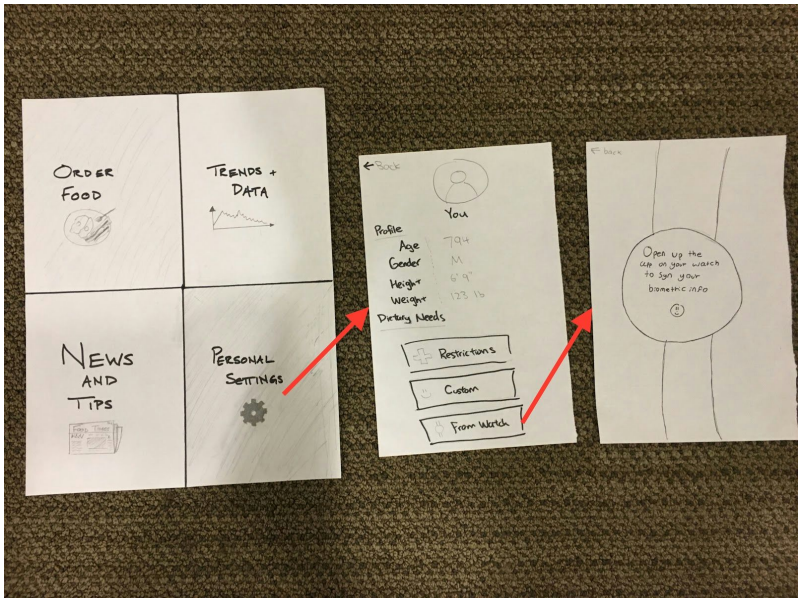

Figure A5

The user interface flow for connecting the base application (iPad, iPhone) to the biometric information from wearable.

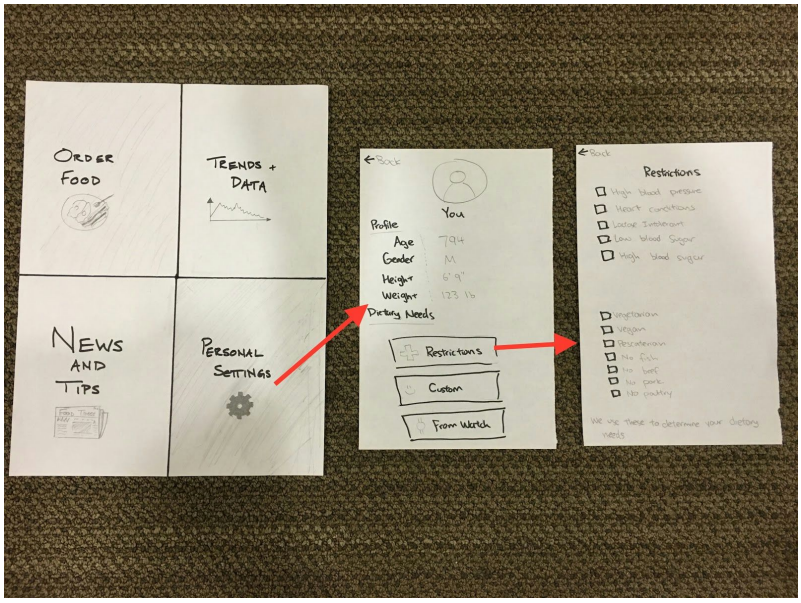

Figure A6

The user interface flow for getting into settings and having the user check boxes to determine their dietary needs

A2 - Testing Script

Hi, my name is ((NAME_HERE))
Thank you for participating in this experiment. Our goal today is to find out how well this new app idea will help you manage your nutrition. You will be performing three main tasks with a mockup of our application, called Nutri-GOOD. These three tasks are tasks that users such as yourselves may face while planning . Perform each task to the best of your ability, and think aloud so we can get feedback on our design. For example, if you see a particular aspect of the design you think is really well made, say “Cool!” and if you dislike something, say “I don’t like how … etc”. We want to make our application better, so we encourage you to critique our methods and design. If at any time you are uncomfortable or find the material objectionable, please say so and we will stop the experiment. May we video record this session so that we may review footage of your interactions later? ((PAUSE, wait for response)) Okay, thanks, we will be setting up a camera for this purpose.

In this experiment, you will be performing three tasks using our Nutri-GOOD app. Here is the main user interface for the app. ((SHOW THE APP)) We have a main screen with different things you can do with the app. Let us start on this main screen. The first task you will do requires you to choose a breakfast for the day. The second task is for you to get more information about nutrition. The third task is for you to update the app with your own dietary needs. The last task is for you to view the nutritional statistics.

Because we want this experiment to be about your interactions, we will not be able to give any verbal or gestural help. Do you have any questions? ((PAUSE, wait for response)). Okay, we will now be starting the experiment.

(instruct them to perform each task in sequence and observe/measure)
(take a picture of them using the app)
(encourage to think aloud when they have not been talking for a minute)

A3 - Critical Log + Data

Participant 1 (Jawbone man):

- Expected the user information to sync automatically given a wearable, without having to deal with bluetooth pairing etc. (sev 2)
- On the food selection tab, user tapped instead of swiped (sev 3)
- Wanted things to be highlighted to indicate that they were selected (sev 2)
- Expected more details about food (sev 2)
- Wanted categorization of the food and then more specific options (sev 2)
- The participant was able to quickly get to the news and data pages
    - Within data, some of the things that were hoping to see included: calories, sleep, exercise information.
- Didn't eat out often. Thought the app was just delivery, not sending ingredients.
- Wanted to see ingredients in addition to the meal (so they can know how to prepare the meal)
- Talked about a holographic grandma that would talk to you as you cooked.

Participant 2 (fisherman-hat man):

- On the food selection tab, user tapped instead of swiped (sev 3)
- Wanted a better indication for actions to take (tap vs swipe). For example, an arrow to indicate swiping would be nice. (sev 2)
- Tried to swipe to go back instead of pressing back (sev 2)
- Wanted to see the nutritional data in the form of a bar graph rather than line graph (sev 1)

Participant 3 (elderly woman):

- On the food selection tab, user tapped instead of swiped (sev3)
- Expected the food option to expand when tapped so she could choose other breakfast options (sev 3)
- Thought the process to connect the wearable starts from the wearable, not from the application (sev 2)
- Wanted to see some more information in nutrition, in addition to calories: sugar, fat content, balancing of meals.

A4 - Consent/Briefing Form

Nutri-GOOD User Study

This informed consent form is for men and women who agree to participate in a pilot user study performed by team Nutri-GOOD of the Computer Science 147: Intro to Human Computer Interaction class, consisting of Andrew Barakat, Andrew Fang, Jorge Garcia, and Manny Cortes.

PART I: Information Sheet

Introduction
The study in which you will participate today is aimed to give us, the creators of the app, an outside look on how well our app works in a real environment, and how it can be improved. Please feel free to talk to us about the research we are doing and participate if you are willing and able to do so. Note that part of our study is to see what you understand and what you do not, so some questions may have to be answered at the end.

Purpose of the research
This application was created to help the elderly improve their dietary lifestyle.

Participant selection
We invited elderly individuals who may desire help with dietary planning or want to seek out more information about dietary planning. You were selected because you fit this target demographic group.

Voluntary Participation
Your participation in this research is entirely voluntary. It is your choice whether to participate or not.

Procedures and Protocol
We will first show you the application and take you through some of its basic features. Then, we will test to see if you know how to control the app and perform certain tasks.

B. Description of the Process
Duration
This experiment should only take about fifteen to twenty minutes.

Risks
By participating in this research, it is possible that you may be at greater risk than you otherwise be. There is, for example, a risk that using the mobile phone will lead to carpel tunnel

syndrome. We will try our best to reduce the risks that you encounter, but due to the nature of the activity, complete elimination of risks is not possible. We are not liable for any physical or mental duress that you experience while performing the procedure.

Benefits

If you participate in this research, you can get a good look at what could be the next big application that hits the market. Most of the benefits, due to the nature of this type of experiment, will be for us to improve our app so that in the future, users like yourself will benefit.

Confidentiality

Since this application is not yet out on the market, please keep the user interface and design of the application in confidentiality until we release the application. We'd like to limit the amount of competition we have before we launch.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose. It is your choice and all of your rights will still be respected.

Who to Contact

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact Andrew at abfang@stanford.edu.

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research. I agree not to sue any of the researchers for anything that may happen during the duration of this experiment. I assume all liability for my actions.

Print Name of Participant_____

Signature of Participant _____

Date _____