Nutrilize: Using Mobile Devices For Healthy Food Consumption

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Abstract

Although labels provide useful information about the nutritional content of food products, most consumers do not keep track of their intake aside from simply counting calories. To live healthier we must first understand how each food we eat holistically contributes to our diet. Our application helps users quantify their meals in terms of nutrients. Allowing users to visualize the contribution of each food before it is consumed gives them the opportunity to gauge what foods they need and which to avoid. By leveraging a cross platform mobile interface, our application is able to target both Android and iOS users. By focusing on building an intuitive user interface we hope to encourage each individual to meet their own daily nutritional goals.

Keywords: Nutrition, Mobile, Android, User Interface Design, Data Visualization, Heuristic Evaluation, Cognitive Walkthrough

1 Introduction

The Nutrilize App allows users to determine the healthiness of food products found in the supermarket based on their FDA approved nutrition label. Real time updates on nutrition intake can lead to smarter grocery shopping and better health. Leveraging several mobile platforms including iOS and Android, we intend to provide a tool that anyone can integrate into their daily lives.

As is evident from the obesity epidemic in the United States, a large problem is that people do not make healthy choices when eating. Most of the time, they are unaware that their diet is not balanced. A large factor is the advent of fast food and the convenience eating out. One solution is to encourage people to balance their diet and prepare more healthy meals at home. Our application allows users to conveniently scan or input foods they consume and keep a daily track record of what they eat versus what they need to eat.

By creating a Percent Daily Values profile, we can match each individual user with their nutritional requirements. Each meal is then counted in terms of calories, fat, cholesterol, sodium, carbohydrates, protein, vitamins and minerals consumed. This allows users to see deficiencies and recommend items that fulfill those daily requirements. The result is users who are more aware of their current nutritional intake, adopt smarter diets, develop a habit of staying nutritionally on track, and lead healthier lifestyles.

Our goal is to encourage users to reach personal nutrition goals. Our method is to create a clear and intuitive user interface that is focused on speed and ease-of-use. In the end, our mission is about allowing the user to reflect upon his current diet and make improvements as he/she sees fit.

We will first discuss similar existing technologies and compare and contrast them with our application in Section 2. In Section 3, we explain our methodology which describes our core task scenarios and describes the paper prototyping process. Next, we will discuss the experimental design and interface evaluation techniques performed in Section 4. Section 5 contains details on the implementation from paper-prototype to mobile application. Our results, conclusion and discussion of future works can be found in Section 6 and 7.

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2 Related Work

2.1 CalorieCounter (FatSecret) for iPhone and Android

The CalorieCounter application already has a large existing user-base. It provides users with features such as searching for food items or recipes by name or scaning the barcode on a food label. It displays nutrition information of the food items and lets users keep track of the food they eat. It also allows users to keep track of their weight and exercise. FatSecret - the developers of CalorieCounter - provide a REST API which we used to securely log into a FatSecret account and access their data on the CalorieCounter. Since our app uses this API, we are able to directly evaluate our app against CalorieCounter without introducing any differentiating factors other than the interface. Our app is completely usable by CalorieCounter's existing user base without having to setup a new account.

Our interface differs from CalorieCounter's in the way we present daily nutritional values to the user. We draw focus towards all parameters of nutrition as opposed to primarily calories. Another focus of our app is to make it easier for the user to see the nutritional contribution of a particular food item so they can decide whether or not to consume it.

2.2 MyFitnessPal for iPhone and Android

MyFitnessPal is another popular diet and excercise application. It has the largest food database of the applications we tested and has more users than CalorieCounter. It provides the same features as CalorieCounter but includes visualizations of some of the nutritional data, especially weight and weekly calorie consumption. While MyFitnessPal focuses primarily on calories, our application displays multiple nutritional parameters. MyFitnessPal can be used to gauge nutrition of a particular food item before consumption, but it shows the nutritional information textually. We want to to see the effect of giving the user the nutritional information in context of their nutritional intake for the day.

2.3 Fooducate for iPhone and Android

This is a mobile application primarily used to obtain peer ratings based on nutritional value of food. These ratings are in the form of grades on an A+ to F scale. Fooducate deals with shopping and products rather than meals and nutrition. The idea of allowing barcodes to be scanned was inspired, in part, by this application.

2.4 Epicurious for iPhone and Android

This is another food based app that allows users to choose various recipes by category. It aids in making culinary decisions. The similarity between this application and ours is the aspect of having favorite "meals" and having the search by category option. Instead of nutritional info and meals, their primary focus is on the ingredients and recipes.

2.5 Designing a better energy consumption indicator interface for the home

This was an application created by Erik Hinterbichler as his thesis for his Master's Degree at UIUC in 2008. The idea behind the project was to use the power of user interfaces to propel people to be more efficient about their energy usage. It involved a pilot study to understand the way it affected consumer behavior. The idea behind showcasing visualizations to affect the end user's decisions is essentially identical to our project.

3 Methodology

Our research involves testing whether our mobile application enables users to make better informed decisions when selecting meals or grocery shopping. Whether it is reminding them to eat an apple a day, cutting back on salty snacks, or choosing healthier forms of protein, the nutrition tracker will help users maintain a balanced and healthy diet.

3.1 Task Scenarios

The following task scenarios represent some of the important use cases of our application. These include keeping a food journal to record meals, making decisions based on nutrition labels and measuring nutritional intake against recommended personal values.

People who are conscientious of their diet may keep a food journal to record their daily meals. This journal provides them with a way to visualize how much they eat and allows them to make calculations on things such as caloric intake. Our interface provides a food log that accomplishes this task by allowing users to search for foods they wish to eat. These items can be added to their log and any nutritional values such as calories, fats, proteins etc. are automatically updated.

Looking at the nutrition label on food products is a way for people to decide which foods they should or should not eat to maintain their diet. Often times these values are cryptic and overwhelming as it is hard to keep track of the numerous categories of information provided on the back of food packaging. Our application simplifies the task of translating nutritional labels into meaningful visual data so users can make more informed decisions. We will provide multiple methods of selecting foods including text search, bar-code scanning, as well as the ability to add new foods that cannot be matched.

Often we choose our meals without considering the nutritional value of each food. To maintain a healthy balanced diet, it is important to meet our own nutritional intake goals. Many people don't realize that there are major deficiencies in their everyday diet. A lack of calcium or an excess of sodium can easily be resolved by keeping track of the nutritional contribution of each food consumed. Our application simplifies this process by translating these nutritional guidelines into intuitive graphs that show how much each food contributes to each nutrition category. With this information, users can build smarter meals by swapping in healthy alternatives.

3.2 Paper Prototyping

Through the process of paper prototyping, we were able to rapidly test potential interfaces and make changes based on our evaluation results obtained from cognitive analysis and heuristic walkthrough of the various task scenarios. Our first prototype included 3 screens (Search, Status, Setup) each focused on a specific task. The Search page allows users to find foods either by typing its name or scanning its barcode. The Status page displays a graph showing the current amount of each nutritional category consumed for that day. Finally, the Setup tab allows users to personalize their nutritional needs based on their physical traits (height, weight, lifestyle, etc.)

After several design iterations, it became clear that to differentiate our application with competing technologies we would have to focus our user interface towards a specific task scenario. We decided that allowing users to make decisions based on the nutritional contribution of foods was a unique feature that users would appreciate. Through this process, our interface was reduced to a single home page consisting of the nutrition graph and the user's meal plan. The calendar interface was enhanced to become a food log and the search options were expanded to include foods from the user's history as well as the ability to create foods that could not be matched.

4 Analysis and Experimental Design

4.1 Cognitive Walkthrough

Through performing the cognitive walkthrough evaluation, we were able to step through the main task scenarios of our application and identify usability problems by asking the following the questions.

1. Will the user be trying to produce the effect the action has?
2. Will the user see the control for the action?
3. Will the user recognize the control produces the desired effect?
4. After the action is taken, will the user understand the feedback and be able to proceed?

Although there are other possible use cases, theses scenarios were selected to represents the core functionality of our application.

Food Logging

User: User 1 is a busy college student who wants to maintain a balanced diet and stay healthy. He uses his smartphone to download a nutrition app to help him stay on track.

Task: Prepare a healthy breakfast that contains items high in calcium, protein, and vitamin C.

Action 1: Tap the yellow button to expand the meal plan menu. (put picture here)

Action 2: Tap the "Add Item" button to open up the Search menu.

Action 3: Type in the name of the desired food.

Action 4: Select the correct item from the list of results.

Action 5: Tap the add button to return to the home page. The meal plan will be updated with the selected food. The graph will be updated with the food's nutritional contribution.

Action 6: Add another item to the meal plan (repeat actions 2-4) Consider comparing food based on nutritional content i.e. percent Vitamin C.

Action 7: Check foods that you wish to consume.

Action 8: Tap Consume. Graph updates. Eat your actual meal plan.

Ingredient Replacement

User: User 2 is a residential hall chef who wants to prepare healthy entrees for students in the dinning hall. The application is used to organize and evaluate the nutritional content of any recipe.

Task: Modify a recipe by replacing some ingredients with healthier alternatives.

Action 1: Build a meal using items found in a recipe. Select "Add Recipe" in Meal Plan menu. Recipe appears as check box list of ingredients.

Action 2: Analyze the overall nutritional value of the recipe. Check or uncheck ingredients to see how they contribute nutritionally to the graph.

Action 3: Replace some ingredients with healthier alternatives. Tap and hold an ingredient from the list to look for alternatives. Compare the nutritional values and select the replacement.

Adding a New Food to the Database

User: User 3 is a stay at home mom who wants to learn about the nutritional value of her cooking. She has many favorite dishes that she prepares often and likes to have easy access to her recipes. She also enjoys unique foods that are not commonly found in most supermarkets.

Task 1: Save recipes so they can be accessed through "search history" .

Action 1: Add recipe ingredients to meal plan menu.

Action 2: Tap "Save Selected as Recipe" .

Action 3: Prompted to enter name of recipe.

Action 4: Tap add item.

Action 5: Tap the "History" tab to view items previously consumed.

Task 2: Enter new foods by inputting values found on the nutrition label.

Action 1: Tap "Add New Item" .

Action 2: Tap "Create" tab.

Action 3: Fill out form to create new food.

Action 4: Tap submit to add it to the food database.

4.2 Heuristic Evaluation

To inspect the usability of our application and identify problems in the user interface design, we chose to follow Jakob Nielsen's criteria for heuristic evaluation published in his book *Usability Engineering*. This is also a way to classify the severity of usability issues that might be found.

4.3 Action Analysis

By listing the actions for performing a task as they would be described to a typical user, we can multiply the number of steps by [2,3] seconds to obtain a range of [best, worst] performance.

5 Implementation

5.1 Institutional Review Board Process

All project investigators completed the online Institutional Review Board (IRB) training process. This involved Social and Behavioral Research training conducted by CITI and Human Subjects training by the IRB of the University of Illinois.

Next, the application was completed, filling in details of the user study itself.

A consent form that would be given to all users participating in the study was added and attached. An interview that follows the study would be quantitatively and qualitatively studied with the help of a questionnaire.

5.2 Paper Prototyping

The preliminary application designs resulting from the paper prototyping process are shown in Figures 1-8.

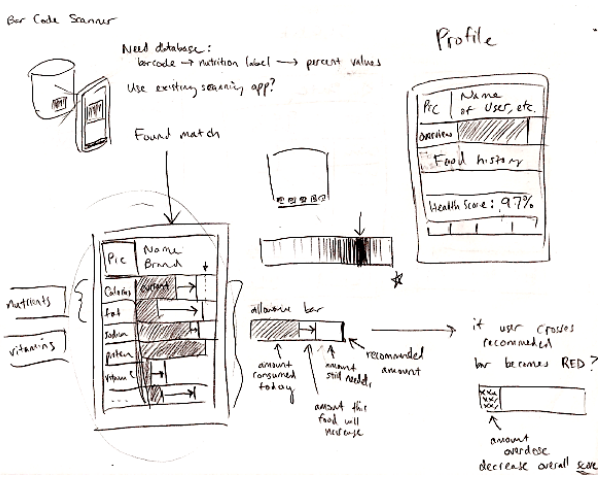

Figure 1: *Initial prototype of nutrition graph includes information on the amount conusmed, the amount the current food will contribute, and the optimal ammount for each category. Initial sketch of bar-code scanner describes the nutrition information retrieval process Exploring ideas for visual queues when user consumes too much of something.*

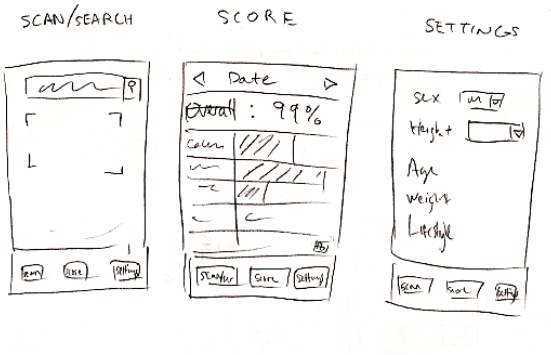

Figure 2: *Shows intial prototype including 3 main screens. The scan/search screen allows users to find foods based on text or barcode input. The score screen shows the graph of the user's nutrition intake and an overall score based on how close they are to their goal. The settings screen includes forms that are used to generate a user's personal nutritional requirements.*

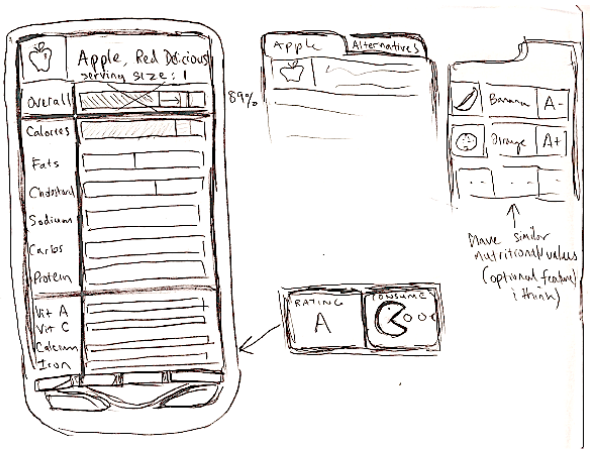

Figure 4: *A prototype that illustrates the use of food ratings that provide a quick intuitive idea of healthiness.*

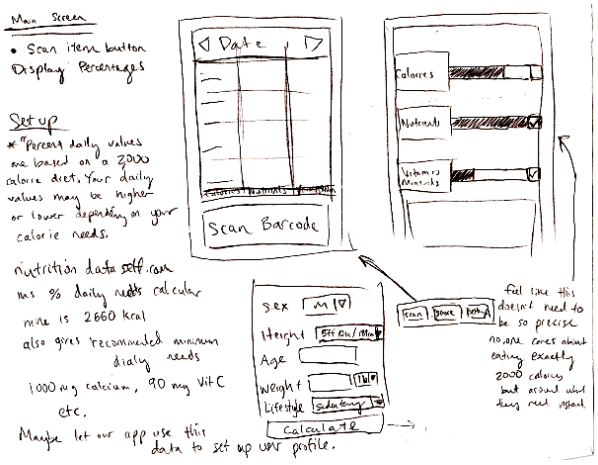

Figure 3: *The initial home screen included a compressed view of calories, nutrients, vitamins and minerals in the graph. However, we felt this didnt provide enough information. The setup menu was based on a form found on nutritiondata.self.com which has a way to calculate the percent daily values needed based on an individuals sex, height, age, weight, and lifestyle.*

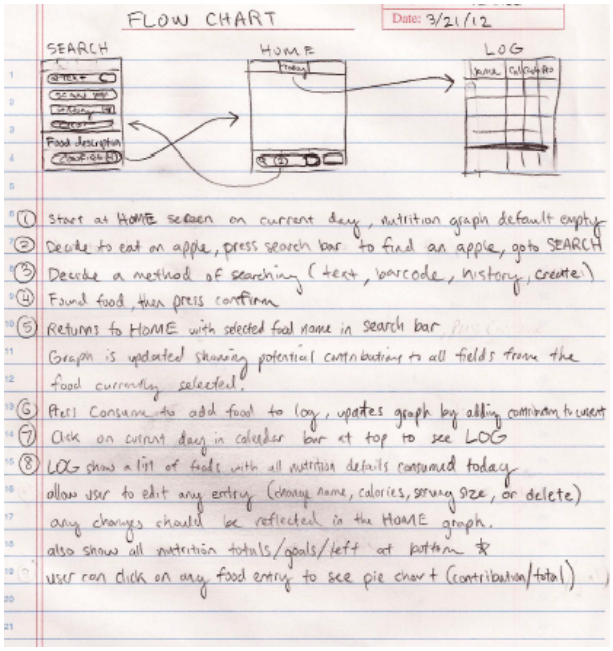

Figure 5: *A flow chart detailing the use case of consuming a food. The process includes searching for the item, viewing its contribution on the nutrition graph and populating the daily food log.*

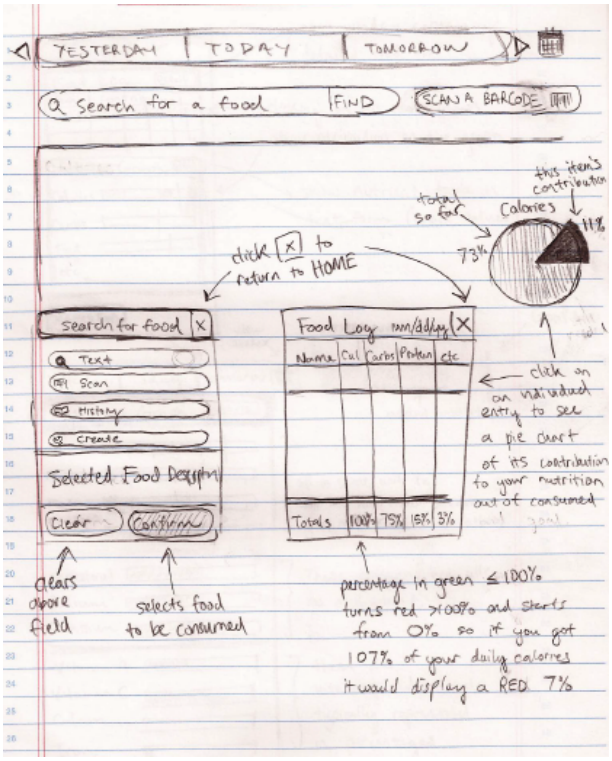

Figure 6: *The food log screen displays nutrition values in textual form. Percentages inform the user how close they are to their goal. Color coding the values in green or red indicates how close the values are to their optimal amount or how much the user has over consumed them.*

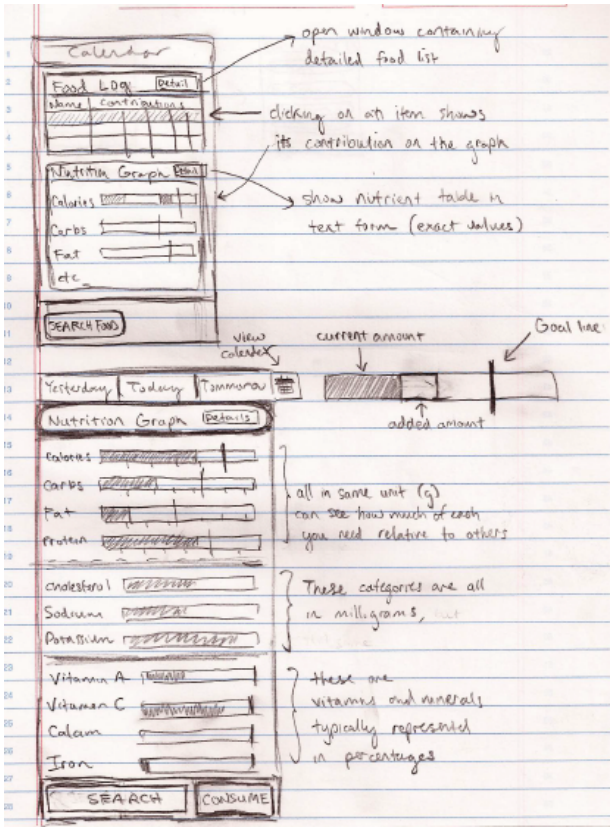

Figure 7: *The updated main screen features a simplied user interface that focuses on the nutrition graph. Each bar displays a dark colored bar indicating the current amount, a lighter colored bar indicating the added amount, and a bold line indicating the goal for each nutrition category.*

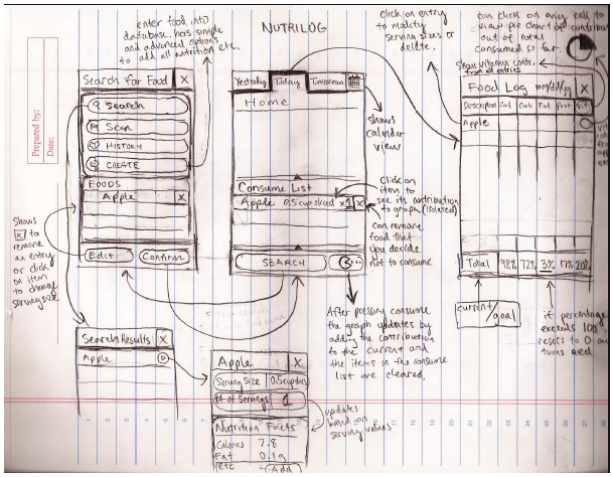

Figure 8: *A prototype flowchart that illustrates the "meal plan" feature or Consume List. Allows users to search for and add multiple items to create a meal. The user can then select which items to consume or remove based on their contributions to the graph. The "Search for Food" screen has 4 different search methods including text, bar-code, previously used, and custom inputs. Additionally, the food log displays percentages and nutrition facts on all the foods consumed by the user.*

5.3 PhoneGap

Using PhoneGap helps us give a standardized look and feel cross-platform and makes the application work on several different smartphones. This facilitates a much larger user base than developing for just one specific target mobile operating system.

5.4 FatSecret Food API

Used their data store to obtain food information, keep track of profiles, favorite recipes etc.

5.5 Building User Interface

The user interface was built using the JQuery Mobile framework. Instead of using the traditional Android XML Layouts, the user interface was built as a webview using html and javascript. This touch-optimized web framework allows us to deploy our application to smartphones and tablets regardless of platform. JQuery ThemeRoller was used to experiment with different colored themes. Screenshots of various parts of the application can be found in Figures 9-14.

Figure 9: *The settings screen allows the user to set up their profile and determine their personal nutrition guidelines.*

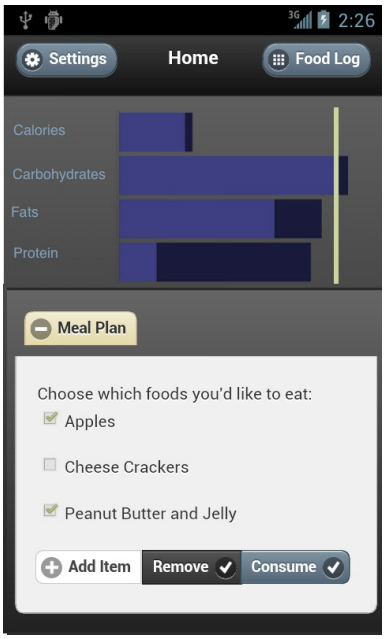

Figure 10: *The home screen includes the meal plan menu which allows the user to decide which foods they want to consume.*

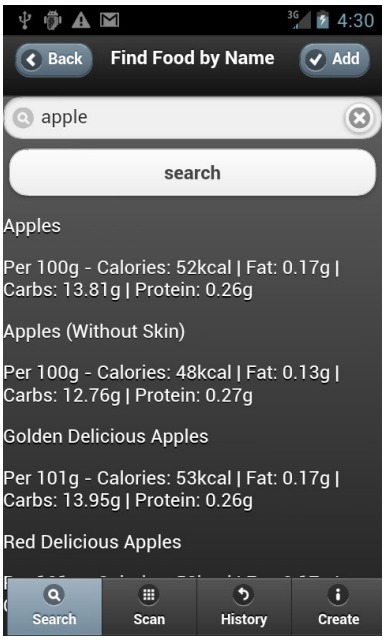

Figure 11: *Users are able to search for food items or meals by name.*

Figure 12: *The camera search is another way for users to match items using the bar-codes found on food labels.*

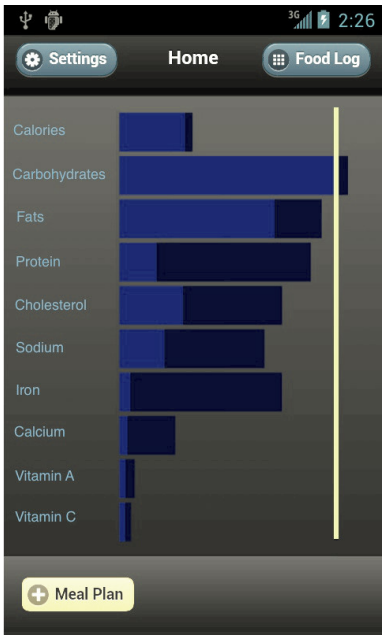

Figure 14: *The graph displays all the important nutrition data so users can meet their daily goals in everything from calories to protein, and even vitamins.*

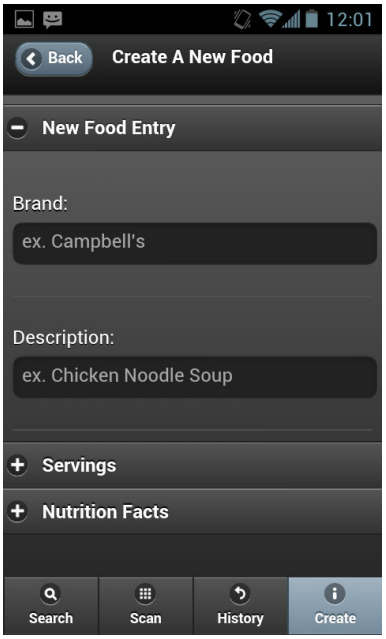

Figure 13: *Custom food creation allows users to specify new items if they cannot be found in the database.*

5.6 Nutrition Graph

A graphical visualization tool called d3.js is used to display the nutritional information. It also shows the additional nutritional contribution of the foods about to be consumed to facilitate fast and easy comparisons between multiple food products.

6 Results

6.1 Measurements

How well does our user interface do compared to other competing technologies? As we can see from the Action Analysis, the two applications CalorieCounter and Nutrilize have similar performance when it comes to simply adding an item. However, when comparing items in terms of nutrition values seems faster using our interface. This is due to the design of the Meal Plan which allows the user to consider multiple items and view their nutrition contributions updated on the graph. On the other hand, CalorieCounter's nutrition data is less accessible and the user needs to spend extra time navigating to more detailed nutrition details.

6.1.1 Heuristic Evaluation

Visibility of system status:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
The healthiness of the food is not represented to the user	2: This issue could be addressed by providing a health rating next to foods which is calculated based on their nutritional content
The graph does not indicate when it is being updated	1: Show the contribution in a different color. When the food has been consumed, use animation to fill the contribution so that it becomes part of the overall current value
User cannot see their food log while viewing the nutrition graph	2: Segment the graph bars to represent individuals items that have contributed to it, click on any bar to open up the a detailed view of the foods in that category
User could accidentally press consume on an undesired food	1: Allow users to delete undesired entries from the food log. This will reflect in the nutrition graph as well.

Match between system and the real world:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
Unfamiliar interface for non-mobile device users	3: Keep interface simple and intuitive. Cross platform helps users seamlessly transition between devices
Graph interface may be confusing to first time users who are accustomed to text based nutrition labels	2: Include text based nutrition values in the food log as an alternative view
Important buttons may be difficult to find or understand	1: Use simple terminology for crucial actions such as “add food” , “consume selected” .
Specific foods may not be found or be represented correctly in the database	3: Allow users to create their own food entries or modify existing ones

User control and freedom:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User might want to eat before searching in the app	1: User can always enter food at anytime, however they will not benefit from seeing the graph before consuming
User may want to eat more than they are recommended	2: The graph shows all nutritional contributions and distinguishes those that are in excess in red

Consistency and standards:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may not know what specific icons do	2: Use Jquery icons so users have a familiar interface across all platforms
User may be unsure what hardware buttons do	1: PhoneGap focuses on cross-platform compatibility so all features will be implemented independent from device hardware
User may not understand where to find certain features	3: Create tool-tips so that user can find what they are looking for

Error prevention:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may not want to consume an item they have already added to the graph	1: Allow items to be deleted from the food log

Recognition rather than recall:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may become frustrated when trying to search for uncommon food items	2: Allow users to create their own food entries
User may not remember the nutritional content of the food they selected to compare it to alternative	3: Create a comparison interface tab for the graph that puts the checked items side by side for comparison (calculates the differences)
User may be impatient when trying to set up their meal plan	1: Save commonly used meals so that users can quickly add meals with

Flexibility and efficiency of use:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may not remember to consistently use the application before eating	2: Automatically send alerts prior to user at estimated meals times to remind user to plan their meals before eating

Aesthetic and minimalist design:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may avoid using application or disregard it if there is too much clutter	3: Focus application on simplicity of use and put intuitive visualization at the forefront. User should feel satisfaction when meeting nutritional goals

Help users recognize, diagnose, and recover from errors:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may press consume instead of clear from the meal plan	1: Have a confirmation prompt so that users can recover from their mistake
Users may want to create a new food but input incorrect information that they want to modify	2: Allow custom foods to be modified or deleted from the database

Help and documentation:

Usability Issue	Severity (0=insignificant, 4=catastrophe)
User may not know what to do on a certain screen	1: Provide a context sensitive menu for every screen

Through the process of Heuristic Evaluation, we were able to make iterations to our application to avoid various usability issues.

6.1.2 Action Analysis

The tasks we have chosen are the most common uses of our application. Task 1 lets you choose a particular food to add to your list of food items to consume. Task 2 allows you to make an informed decision while choosing between two products.

Task 1: Add an apple

CalorieCounter

1. Open the CalorieCounter application
2. Tap the Search option under the Find Food Section
3. Type in “apple”
4. Press “Search”
5. Select Apples from the list of Results
6. Press “Save”

Nutrilize

1. Open the Nutrilize application
2. Tap the Meal Plan button
3. Tap“Add item”
4. Type in “apple”
5. Add Apples from the list of Results
6. Tap the Consume button

Task 2: Compare apples to oranges (Want to get most Vitamin C)

CalorieCounter

1. Open the CalorieCounter application
2. Tap the Search option under the Find Food Section
3. Type in “apple”
4. Tap “Search” button
5. Select Apples from the list of Results
6. Tap“Save” button
7. Tap “Add Food” button
8. Tap“Search” button
9. Type in “orange”
10. Tap “Search” button
11. Select Oranges from the list of results
12. Tap “Save” button
13. Tap Apple entry
14. Tap Nutrition Info Section
15. Remember Vitamin C content is 10%
16. Tap Back Button
17. Tap Orange entry
18. Tap Nutrition Info section
19. Remember Vitamin C content is 116%
20. Tap Apple entry
21. Tap Delete button

Nutrilize

1. Open the Nutrilize application
2. Tap the Meal Plan button
3. Tap Add Item
4. Type in “apple”
5. Add Apples from the list of Results
6. Tap “Add Item”
7. Type in “orange”
8. Add Oranges from the list of Results
9. Select only apple
10. Look at vitamin C value on graph - 10%
11. Select only orange
12. Look at vitamin C value on graph - 116%
13. Check only orange
14. Tap Consume

Action	CalorieCounter	Nutrilize
Add an Apple	12-18 seconds	12-18 seconds
Compare Apples to Oranges	42-63 seconds	28-42 seconds

Nutrilize took the same amount of time as CalorieCounter for completion of Task 1. It was 50% faster on Task 2.

6.2 Design Insights

The visual representation of daily and weekly food intake makes people recognize the presence issues pertaining to their diets. It has a much more immediate impact than showing numerical data in aggregate form.

The incremental portion of the nutritional contribution of food about to be consumed allowed people to make more informed decisions regarding their immediate consumption.

The incorporation of a scoring system makes it more competitive, but at the same time, allows users to build a sense of community with other users of the application.

6.3 Dietary changes

In what way does our application change user diet?

The graphical depiction of nutritional information facilitates advanced planning while selecting meals. It also enables fast and accurate comparison between different food items using the individual nutrient contribution visualizer to facilitate healthier dietary choices.

7 Conclusions and Future Work

Using Heuristic Evaluation, many potential usability issues were found and corrected.
By stepping through the application in different use-cases in the form of a cognitive walkthrough, the overall flow of the application was optimized to minimize errors and wait-times.
The results of Action Analysis indicate that our interface took the same amount of time as CalorieCounter to complete Task 1 and was 50% faster on Task 2.
We wish to conduct Emperical User Studies to get appropriate user feedback on the application. This will enable us to measure usability with better precision, compare our results to our initial goals and identify, prioritize and correct usability issues.

7.1 Empirical User Study

The metrics for comparison between the interfaces for every task and every user would be:

- Task Completion Time

  This is the amount of time it takes from when the user starts the task to when it is established as "completed". Tasked will be timed using a stopwatch and the level of precision will be 0.1 seconds.

- Number of Errors

  The number of times the user clicked something unintentionally and the weight of the error will be measured by the number of extra clicks required to get to the target state as compared to the original number of clicks. This will be after reviewing the video that was shot while the interface was being used.

- Overall Satisfaction

  This corresponds to how accurately the user was able to complete the intended task. This would follow directly from the Questionnaire that the user filled out after the interview.

Moving forward, we want to connect to a more extensive database so that results would be more personalized.
We would have more visualizations pertaining to calendar views for the day, week and month.
Adding a community aspect to the food database would provide an additional avenue of quality-based food suggestions. Assigning a grade A+ to F would enable users to quickly sort by healthiness, taste and other parameters.
We also want to implement a food substitute feature that takes existing recipes with high ratings and substitutes their ingredients for different ones. This could be useful for vegetarians attempting to cook dishes that have meat as their primary ingredient, or for people allergic to certain foods to still enjoy the dish containing things they cannot eat.
One aspect that could be studied and improved upon in the future is providing more universal access to this application. Not all people who have poor dietary habits are native English speakers or smartphone users.
The effect of the application on the long-term health of the users provides another avenue for future research.
We also want to do a longitudinal study to see how long people use the application regularly and (if applicable) study their reasons for stopping their use of the application.
The visualization tool makes it easier for users whose native language is not English to obtain relevant data quickly.

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References

D3.JS, 2012. Data Driven Documents. [Online]. Available at: http://mbostock.github.com/d3/.

DIX, A., FINLAY, J., ABOWD, G., AND BEALE, R. 1993. *Human-Computer Interaction*. Prentice Hall.

EPICURIOUS, 2012. For people who love to eat. [Online]. Available at: http://www.epicurious.com/.

FATSECRET, 2012. All Things Food and Diet. [Online]. Available at: http://fatsecret.com/.

FATSECRET, 2012. FatSecret API. [Online]. Available at: http://platform.fatsecret.com/.

FOODUCATE, 2012. Eat a bit better. [Online]. Available at: http://www.fooducate.com/.

HINTERBICHLER, E. 2008. *Designing a Better Energy Consumption Indicator Interface for the Home*. Master's thesis, University of Illinois at Urbana Champaign. Available at: http://social.cs.uiuc.edu/papers/pdfs/thesis/hinterbichler-ms-thesis.pdf.

JQUERYMOBILE, 2011-2012. A Touch-Optimized UI Framework built with jQuery and HTML5. [Online]. Available at: http://jquerymobile.com/demos/1.1.0/.

LEWIS, C., AND RIEMAN, J. 1993. *Task-Centered User Interface Design*. Available at http://hcibib.org/tcuid/.

MOKDAD, A. H., SERDULA, M. K., DIETZ, W. H., BOWMAN, B. A., MARKS, J. S., AND KOPLAN, J. P. 1999. The spread of the obesity epidemic in the united states, 1991-1998. In *Journal of the American Medical Association*, AMA, AMA.

MYFITNESSPAL, 2012. Lose weight the healthy way. [Online]. Available at: http://www.myfitnesspal.com/.

NIELSEN, J., AND MOLICH, R. 1990. Heuristic evaluation of user interfaces. In *Proceedings of SIGCHI 1990*, ACM Press / ACM SIGCHI, ACM.

NORMAN, D. 1988. *The Design of Everyday Things*.

PARK, S. W., LINSEN, L., KREYLOS, O., OWENS, J. D., AND HAMANN, B. What is a food journal. *http://www.livestrong.com/article/133204-what-is-food-journal/*.

PHONEGAP, 2011-2012. How PhoneGap Works. [Online]. Available at: http://phonegap.com/start.

SNYDER, C. 2003. *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*.

THEMEROLLER, 2012. ThemeRoller for jQuery Mobile. [Online]. Available at: http://jquerymobile.com/themeroller/index.php.

WHARTON, C., RIEMAN, J., LEWIS, C., AND POLSON, P. 1994. The cognitive walkthrough method: A practitioner's guide. University of Colorado, University of Colorado.