Not a Calorie Counter™

Project Members:

Noah Watson - The Idea Guy

- Conceived the concept, devised app Layou, and added health plans.

Eli Nordan - Chief Digital Architect

- Main app developer, integrated API, decided on most data structures

Farah “Style” Khashman - Executive Designer

- Refinements on UI and implementation of data visualization

Problem Statement

Currently, individuals do not have a free platform in which they can access nutrition plans that correspond with their medical diagnoses/health needs nor the ability to monitor their adherence to that plan. When a patient is diagnosed with a certain medical condition, they are redirected to a nutritionist or are to research for themselves and create a suitable dietary plan. Unfortunately, the former tends to be costly and ineffective due to the dynamic nature of health and lack of monitoring, while the latter can potentially lead to the adoption of dangerous habits due to the saturation of misinformation online. Nutrition plans tend to be generic plans that target specific conditions, as opposed to personalized plans that address all the different medical conditions and health needs of each individual - this is further exacerbated by the decentralization of the patient’s profile across their different specialized healthcare providers. Additionally, the market is currently saturated with calorie tracking applications that promote and increase the risk of eating disorders and generally fail to act in a preventative manner.

Solution Statement

Each of us is passionate about creating a viable product to monitor our nutritional intake and better our health literacy, whether it be due to health conditions like diabetes or in conjunction with physical training for professional advancement. Thus, this has led to our group’s conception of the ‘Not a Calorie Counter™’ application. Not a Calorie Counter™ is a nutrition tracking application that works to increase patient participation in their nutrition intake and overall health monitoring. This experience allows for greater medical/health literacy and more personalized nutrition plans according to one’s holistic medical profile. The application allows an individual to track their nutritional intake as they populate their profile with the food/drink items consumed. This is then presented to the user as part of their progress towards their personalized or preset nutritional health plans. The data visualization shows the user the breakdown of what nutrients they have consumed. This can warn them that they are lacking a certain nutrient or consuming too much of one. Thus, overall, an individual can create goals for themselves, monitor their intake, further their understanding of their health through provided visualizations, and take preventative measures to maintain a healthy lifestyle. Additionally, the application can nudge an individual to ensure their adherence to the plan, gamify the experiences, and potentially notify their primary healthcare provider of any abnormalities.

Design Choices

The application was built using the Flutter/Dart framework. This was chosen particularly for its powerful UI engine and its diverse data visualization features. Class demos and the general support from the developer community were also important considerations as they softened the learning curve. Flutter is also universal, fast, and importantly, cross-platform. This ensures that the development process would be streamlined and the audience pool to be much larger.

Solution Features

The application consists of three main pages: (1) searchable database of food/drink items, (2) expanded nutritional information per food/drink item, (3) visualization of user's nutritional intake according to a set plan.

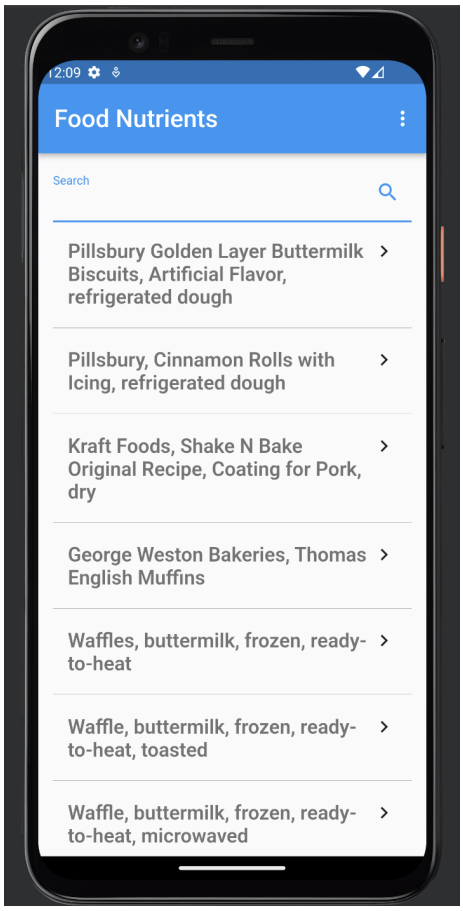

Figure 1. Home Screen

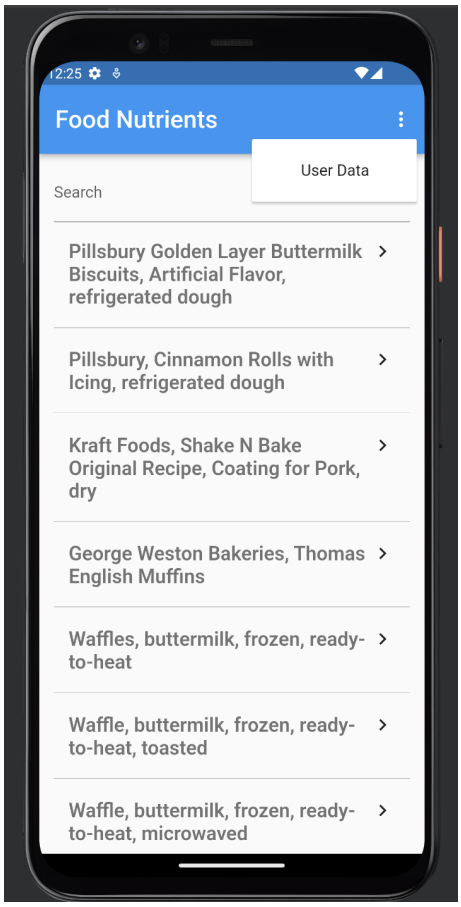

Figure 2. Pop-up Menu from Home Screen

Two different CSVs, food.csv and food_portion.csv, were able to be downloaded directly from the USDA website and added under the assets folder. The first file, food.csv, contains a list of over 14,000 legacy foods and their fdcIds, which is a unique identifier used by the USDA

database for each food item. The second file, food_portion.csv, contains the different portion sizes of each food item, specifically the fdcId, portion description, and the weight of the portion in grams. In opening the app, both CSVs are loaded in to 2d lists. Then, the list resulting from food.csv is displayed to the home screen as shown in Figure 1. If a food item in this list is clicked on, it reroutes to the detail screen and makes an API call to the USDA website based on the fdcId. This API call returns the amount of nutrients in the food item per 100g.

While the list is scrollable, a conventional search bar was added at the top to allow the user a more efficient experience. The search bar dynamically rebuilds the list matching its content to the inputted value - this is done proactively with each letter typed similar to autofill functionality. The UI has also been modified after receiving feedback to ensure that the view is not too cluttered and affordances are visible (i.e. arrow per row indicates an ability to tap on the food item to navigate to a different page). The home page includes a sticky appbar that includes the title of the page and a pop-up menu to navigate to the user's data profile, as seen in Figure 2.

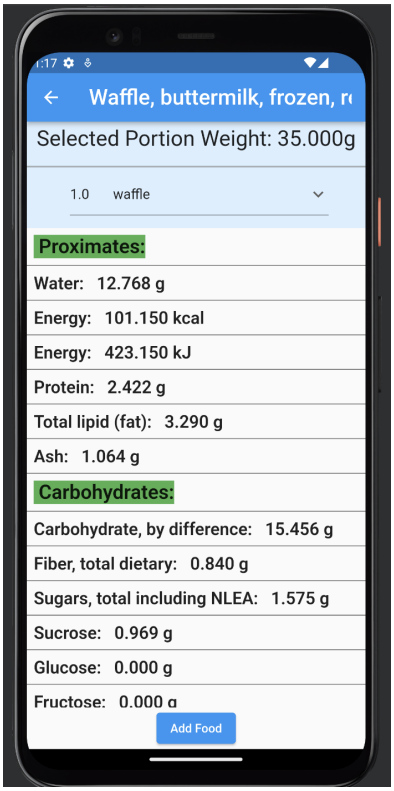

Figure 3. Nutritional Information for Chosen Waffle Item

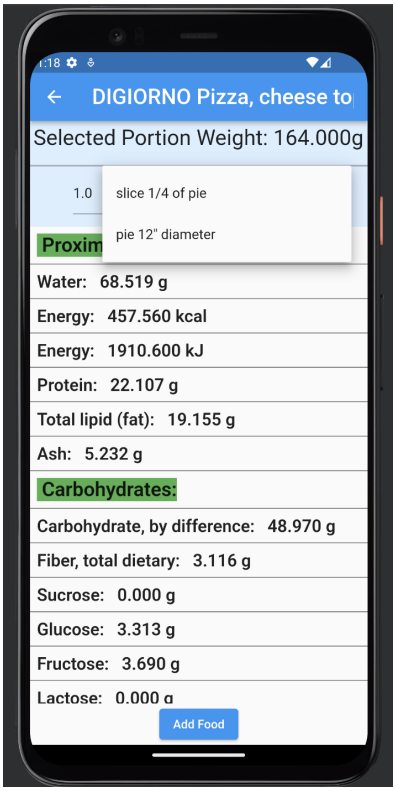

Figure 4. Modifiable Portion

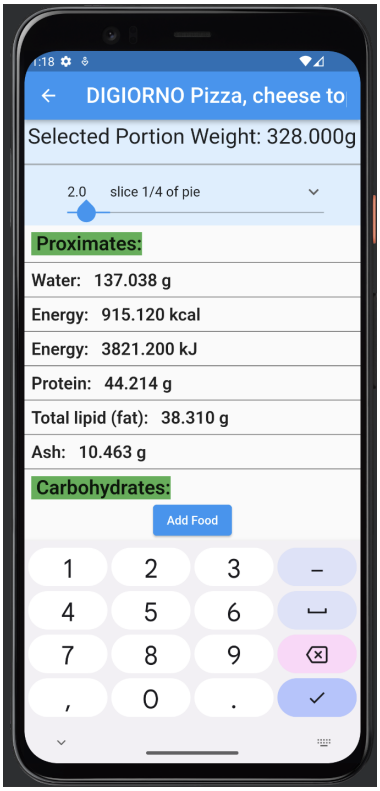

Figure 5. Modifiable Amount

As mentioned, once an item has been selected, the user is rerouted to a full scrollable page of nutritional information based on the API call as seen in Figure 3. The title at the top is scrollable for error prevention; thus, the user does not have to recall what item they had selected and can ensure that it is the correct item. The information provided on the page is extensive, but it allows the user to browse and find any information they might be curious about. This allows the user to have some agency and avoid 'dumbing down' the information – it allows the user to participate directly in their food intake and nutritional information. The nutrient information dynamically changes as the user edits the quantity at the top of the page. This takes the burden off of the user in calculating the nutrients depending on the amount they are (or will be) consuming (Figures 4 and 5). The portion dropdown button is populated with all the items from the list created by food_portion.csv that has a fdcId matching the current food item. The portion weight and nutrient amounts are a result of multiplying it by the gram weight from food_portion.csv divided by 100 grams, which is the default portion weight returned by the API call. The page includes a button at the bottom of the page so the user can add the item to their profile as part of the list of items consumed.

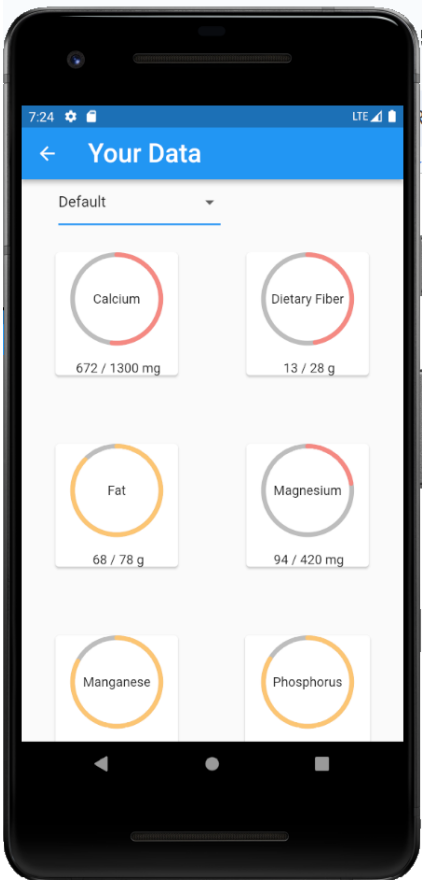

Figure 6. User Data Page

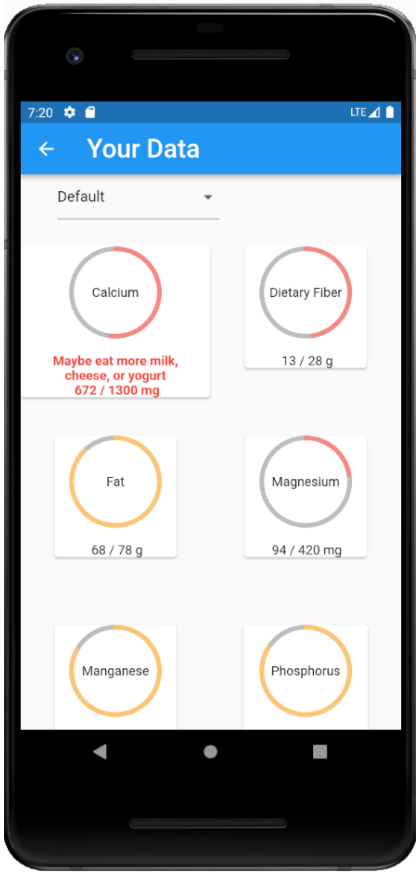

Figure 7. Food Recommendation

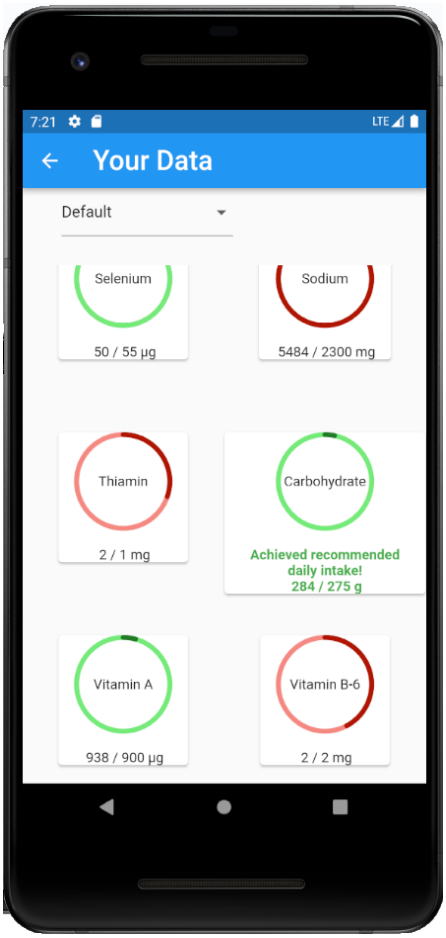

Figure 8. Achieved Goal Message

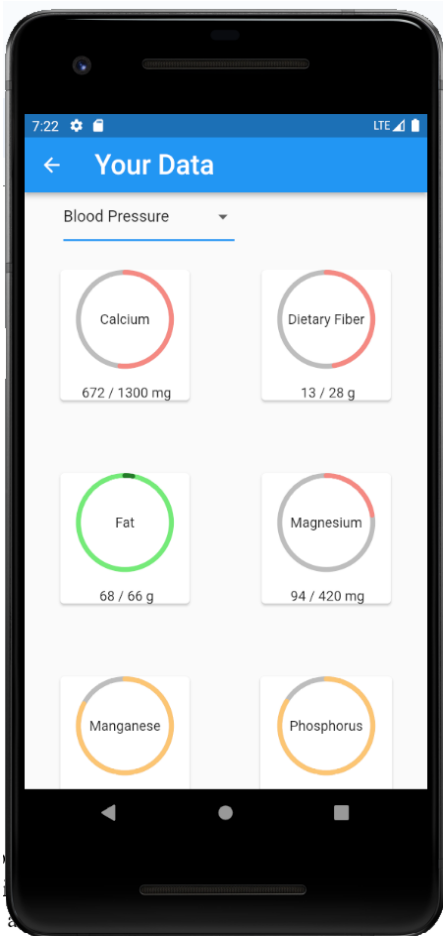

Figure 9. Other Nutritional Plan

Finally, the user data page (Figure 6) provides visualizations of the user's nutrient intake according to their logged meals. The visualization takes the form of circular progress graphs to provide the user with an intuitive and digestible layout. The colors are also important signifiers indicating how much over/more is their intake in comparison to the recommended value. If the amount of a specific nutrient consumed is outside of 25% of the recommended daily value, the progress graph appears as red. If the amount consumed is between 75% and 90% or 110% and 125% of the recommended daily value, the progress graph appears as yellow. Finally, if it is within 10% of the recommended daily value, the progress graph appears as green. This change is meant to deter both over consumption and under consumption, as earlier we only showed the graph as red if the amount of nutrient consumed was over the daily recommended value. The 10% and 25% buffers also allows for instances in which a person may not hit their goal exactly, as it would be somewhat impossible and unnecessary to exactly hit a specific value for the amount of a nutrient consumed. These different colors can be seen in Figures 6-9.

After receiving feedback from the class, we also added a nudge recommending the user to eat more/less of specific food to align with their nutritional plan, as seen in Figure 7. This prompt is visible when the user taps on the specific nutrient they would like to explore. In addition to making this recommendation whenever the user is not at their daily nutrient consumption goal, it also prints a short message congratulating them if they have reached their goal for a specific nutrient, as shown in Figure 8. The user data page includes a dropdown menu at the top from which the user can select their desired nutritional plan. At the current iteration, the plans are pre-set according to specific health concerns. Figure 9 shows the user data page with the "Blood Pressure" nutritional plan selected instead of the default. One key difference between the default and blood pressure plans is that the blood pressure plan has a lower fat intake, which can be seen in how fat is shown in green in Figure 9 but yellow in Figure 6 despite the intake being 68g in both.

Challenges

Even with some of the support available through class demos and online documentation, the dart learning curve was steep. The flutter documentation website seemed to have been out of date and we were unable to run some of the examples to learn. More specifically, the overall layout and styling logic was very different to the CSS process we were familiar with - this affected the UI style. The use of the APIs was quite a challenge as well. There were certain limitations that we were only able to overcome once we've located the CSV resources.

Future Expansions

In accordance with many of the suggestions provided in class, we were able to make some modifications to the last iteration of our application. This included some small UI modifications and the addition of food recommendations according to the specified nutrition plan. Due to the time constraints, we were unable to expand the product further but below is a list of features that we hope would advance our application.

1. Add a line chart to show user progress over time.
2. Add a fun fact link or glossary link to be more educational
3. Add notifications to remind users at meal times to add their food
4. Add scanner functionality to scan food items and automatically add them to the user's profile.
5. Add recent meals tab for ease of access
6. Data processing to account for meeting quotas over an extended period (ex. cheat days)
7. Add separate views according to role (doctors and patients).