20,000 Subs

Nathaniel Kent, Matt Frohman, Matthew “MJ” Johnson, Hanna Choe

Overview

In case you’re not familiar with it already, SUBWAY® (Subway) is an American fast food franchise that primarily sells sandwiches. As you enter the restaurant, you are welcomed with an array of delicious ingredients in which you can choose from. From bread to meat to cheese to sauce, you have the opportunity to create a completely personalized meal. With so many different options, the possibilities are absolutely endless! In fact, there are so many different decisions to make that it can be difficult to make up your mind. Fear not! Our team has created an iOS app that has changed the game. You no longer have to worry about holding up the rest of the line while you battle with your indecisive nature, and risk making a sandwich that hasn’t reached its full potential.

At the very least, one simple click of a button will provide you with the ingredients for a delectable randomized sandwich. In addition, you can set preferences for ingredients that you would prefer to have on your sandwich, narrowing the scope more to your liking. If you can’t decide between tuna salad or ham, our app can decide for you. Even more, you can specify your dietary restrictions and we will do all the work for you. We will eliminate any and all ingredients that will violate your diet, still creating the perfect sandwich for you. In the end, all you really have to do is list off the ingredients from your phone when it comes your turn. The people in line behind you will thank you for your incredible brevity. Ultimately, our app will save you time and stress in the long run, making your life that much easier.

Goals

The primary goal of this app is to provide a simple means for our audience to generate a random sub in which they can order at any Subway establishment around the world. The user will specify which diets they follow, can remove ingredients they have specific objections to, and then the app will randomly create a sub which fits their preferences. The user can also directly specify ingredients they really want on their sub. The randomized sub is listed out to the user ingredient by ingredient, making it convenient for ordering purposes. The app also gives maximal customizability to the user, allowing them to, for instance, remove bread and other features which most would want on their sub, but some might have credible reasons to remove for dietary reasons. All in all, we want our users to have a smooth experience with our app and leave it feeling more than satisfied.

Impact

Our hope is that our app will have a massive positive impact on those with dietary restrictions. Society often does not cater (no pun intended) to these people and provide them with the resources they need to maintain their diets, which are often medically important, if not for conditions such as allergies then certainly for maintaining long term cardiovascular and respiratory health, which is currently a major issue in the United States. Nonetheless, businesses often lack the incentives to create resources for these people; Subway, to its credit, lists calories inside each of its restaurants, but these calories are based on standard toppings. Additionally, even if Subway were maximally thoughtful towards diets, they couldn't possibly accommodate every possible diet, simply due to the complexity of various diets. Our app will fill that niche by providing our consumers with access to maximal dietary discretion at what is, by some metrics, the largest fast food franchise in the world. The size and scope of Subway in turn assists our goal to provide this impact as far and wide as possible; because Subway is so popular, those wishing to diet properly will now have reasonable assurance that, no matter where they go, they can order a meal, using our app as a guide, which fits their dietary requirements.

We also want our app to inspire variety. Variety is, in some sense, antithetical to fast food, as the whole point of fast food franchises is to provide a standardized experience at any location around the world. However, this standardized experience can be exhausting to the customer, who can feel as though their food lacks any sort of interest; it is comfort food, but it's a hollow comfort. By randomizing sub options in our app, we hope to inspire people to be creative in their food choices, to think outside the box, and to enjoy unique experiences; after all, variety is the spice of life.

Our app has an ethical drive as well. While our app makes no specific requirements of the user's diet, it does provide support for diets, such as vegetarianism, veganism, and pescetarianism, which limit consumption of animals and animal byproducts. The animal meat industry has a massive harmful impact on millions of animals each year, and our hope is that, by helping those who would follow these diets, we will make such diets easier and more fashionable, thereby reducing animal suffering. Additionally, such diets are also more environmentally friendly, as animal meat carbon dioxide and methane outputs during production are considerably greater than those generated by crop growth, for instance. Given the major potential harms of climate change around the world in coastal regions, we hope that our app will help reduce carbon emissions in some small way.

Finally, our app has an educational mission as well. Many people are scared by the notion of starting a diet, and are uncertain of how to maintain a healthy lifestyle. The hope of our app is that, by providing an easily understandable interface for controlling their food intake, we reduce that uncertainty and give them more control over their lives. This will have a positive impact on their long term health prospects,

reducing their caloric intake and hopefully providing them better health outcomes, which is very important in the increasingly sedentary world we find ourselves in. We can even see our app having potential for teaching children in elementary school about the importance of dieting and nutrition, with various diets the students learn about being demonstrated via our app in a tangible way that improves the students' long term knowledge of nutritional health. Because our app is easy to use, it would be easy for these students to intuit as well, which would make them an effective educational tool.

Development

Our group did a fantastic job delegating tasks, communicating, and reaching deadlines. We set up weekly Zoom meetings to discuss what work needed to be completed for each milestone. On top of that, we created a group chat to be able to communicate with each other easily. To work the most efficiently, we divided our group into two subcommittees. MJ and Hanna worked on the back end while Matt and Nate worked on the front end.

For our first milestone, our goal was to get the very basics of the app working. We created Diets and Ingredients to be represented by Swift classes so that we would be able to manipulate the preferences more easily. By doing so, we developed and implemented a robust API for the front end to pull from. The hardest part about this was finding the nutritional information for all of the Subway ingredients. Despite this obstacle, we were able to hardcode virtually all of the Subway ingredients into our app. After creating these classes, we started to make methods that could be employed by the front end to be able to personalize a sandwich for the user. We created a Generator class that had a list of lists of ingredients for each category of topping, as in breads, meats, cheeses, etc. We then created methods within that class that would manipulate those lists. We created a function called dietType() that takes in a diet specified by the user and in turn updates the lists of ingredients to adhere to that diet. For example, if you are a vegan and you specify your diet as "vegan", then we will remove all ingredients that contain any animal products! We then created a method called randomize() where the majority of the work is performed. This is the function that creates a randomized sandwich based on the preferences specified by the user. On the front end, the team added a Generate button for generating a random sub, and a Preferences button where the user could specify what they would like on their sandwich. Upon clicking the Preferences button, the user would be welcomed with several lists where they could choose specific ingredients they would like on their sandwich - to narrow the scope more towards their liking. Upon clicking the generate button, a screen displaying the list of ingredients would appear, based on the preferences that were specified by the user.

For our second milestone, the back end updated our API to accommodate developments on the front end, including inclusion of mandatory ingredients the user could specify. This meant changing a significant amount of our randomize() function to be able to take explicit ingredients specified by the user, and adding them to the list of ingredients of the randomized sandwich. Then, we had to change the rest of the randomize function to be able to account for the ingredients specified by the user, so as to not provide a product that is overloaded with an excessive amount of ingredients. We also added an option to choose a temperature for your sandwich. On the front end, we added more functionality and views that correspond to our backend code. A home screen was added that welcomes the user to the app. It has a logical flow of transitioning from specifying your preferences to generating the sandwich. At this point in time, the back and front ends aligned very well.

For the third and last milestone, the only thing the back end needed to do was to adjust some of the parameters that are taken in our functions. The front end ran into some complications with the randomize function due to the fact that it returns a list of Ingredients - which is a type that we defined - when they receive the preferences from the user as Strings. To fix this issue on the front end would have required a lot of revisions to the code, and altering the code on the back end seemed like the better option. So, we converted types from Ingredient to String in a few places and adjusted our calorie count to fix the problem and it worked out perfectly. Another issue that we ran into was that we found some duplicative ingredients in the final product. This was a very simple fix to make sure that the next ingredient that was generated had not already been generated. On the front end of things, some issues such as navigation and transfer of data between views was fixed. We added a calories and diet picker and fine tuned the preferences view. All in all, milestone 3 consisted of fine tuning the UI to make it more user friendly and visually appealing.

Revisions

Over the course of our project, we've been forced to change, modify, and reconceive a number of the plans we initially had for our app. For instance, our initial hope that our app might be able to place an order at a Subway franchise ultimately was too great of an issue, and involves such complexities such as handling of sensitive financial information and potentially coordinating with Subway itself that offer little benefit to the end user while being maximally difficult to implement and maintain. Additionally, we did not want our app to simply become an arm of Subway, where we simply promote whatever active deals are going on with little regard for the user's preferences and dietary considerations. Thus, in the end, we decided our app should simply provide the user with an advisement, and the user must themselves order via a separate service, be it ordering online, calling the restaurant, or going in person.

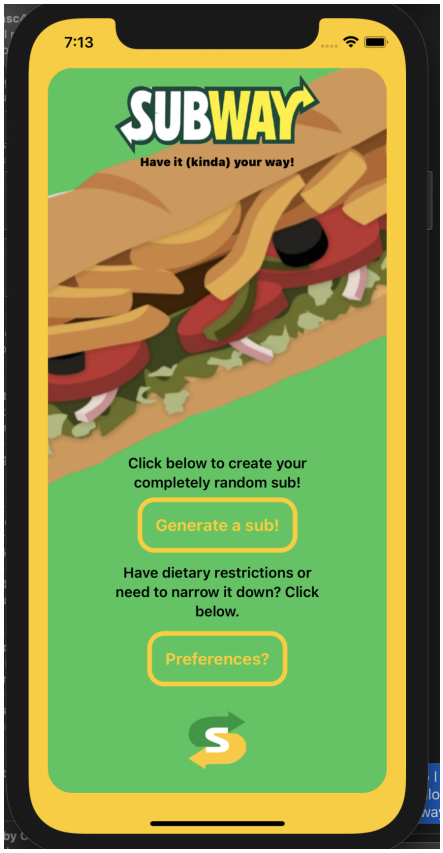
Another aspect of our app which we ended up changing was the manner in which we implemented diets. Initially, we planned on having the user specify a singular diet, and then generating a sub based on that. We very quickly realized, however, that people might have more than one diet: for instance, a vegetarian might have a nut allergy, or a Jewish person who only eats Kosher might wish to limit their sodium intake for fear for their cardiovascular health. As a result, we decided to implement diets in a constructive way; the user specifies their diets, and each one rules out particular ingredients, which are removed from consideration. This ultimately gives the user much finer-grained control over the sub they end up generating, hopefully increasing end user satisfaction and dietary success!

Future

If we're able to continue development on this app, we have a number of goals for future development. For one, we want to become more familiar with the Subway ingredients options, as they have a potential to vary considerably across different locations, as well as across time, with new ingredients being added or removed during promotions for new deals or subs. We also wish to add support for the various non-Sub foods at Subway; for instance, many Subway establishments in the US offer cookies, chips, and drinks as well as Subs, and our app has no way of randomly recommending such things as of yet.

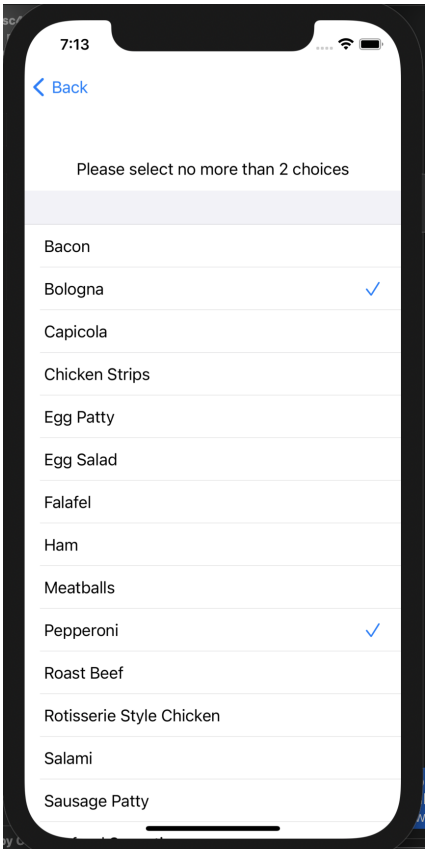
Finally, We hope to expand to other fast food franchises beyond Subway. Other franchises such as McDonalds, Burger King, and Starbucks are also ripe for an app which protects diets and incentivizes variety, and have the benefit of menus not nearly as customizable as Subway's. This would make such app extensions/spinoff apps much simpler to implement, and would expand the scope of our service with minimal cost to our development team, either initially or in the long term.

User Interface

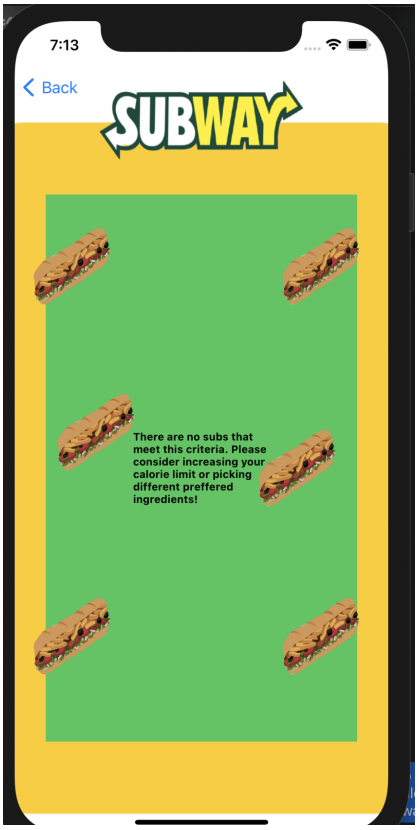


This is the screen you see when you open the app. You are welcomed with clean imagery and an intuitive user interface. There is a "generate" button that will generate a sandwich for you instantly, so long as you have no preferences.

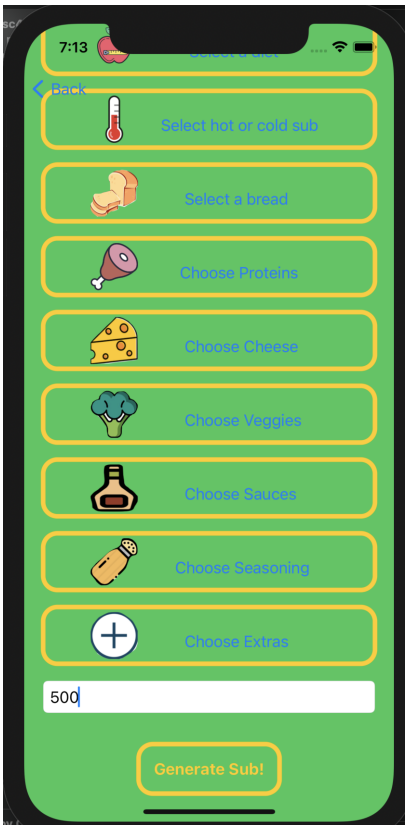
This is the view that appears when you click the "preferences" button. Here, you can specify your diet - whether that be halal, mediterranean, vegan, paleo, and so much more! All you have to do is select which diet you adhere to, and the app does the rest of the work for you! You can also specify specific items that you would like on your sandwich. You have an option for if you would like your sandwich hot or cold. You can choose between proteins, cheeses, breads, condiments, vegetables, seasonings, and some extras. This is where you can really make your sandwich customizable.



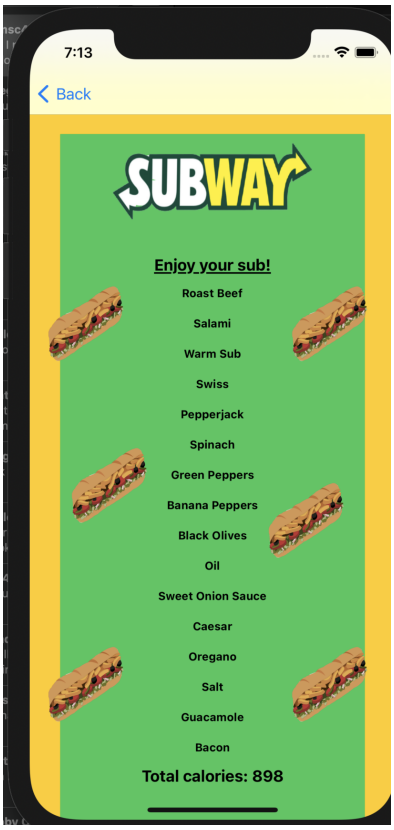
This is the sort of picker you see when you choose a type of topping to input your preferences. If you click "protein" to choose what kind of meats you would like to have on your sandwich, you will see this screen exactly. There are instructions at the top that will help you understand what you can and cannot choose.



In order to handle a case where the user specifies some preferences for specific ingredients and a calorie limit as well, this is the solution we have come up with. If there is a certain combination of ingredients the user input that does not stay under their calorie limit, this friendly message will pop up. This encourages our users to try again so that we can come up with something better!



This is the screen you will see at the bottom of the preferences tab. After scrolling down, you can find a box where you can enter a specific amount of calories that you would like to stay within. This is your opportunity to stick with your diet while also eating out!



This is the screen that you will see when you either generate from the home page or when you generate from the preferences page. (We have buttons to generate sandwiches on both pages so as to make the interface the simplest to use, without navigating around everywhere). It lists out all of the ingredients on the sandwich and also includes the calorie count on the bottom.