

FITABLE: A FREE CONVENIENT SOLUTION TO YOUR HEALTH GOALS

Wesley Fan¹, Eric Wasserman¹, Eiffel Vuong¹, Dylan Lazar¹,
Matthew Haase¹, and Yu Sun²

¹Portola High School, 1001 Cadence, Irvine, CA 92618

²California State Polytechnic University, Pomona, CA, 91768

ABSTRACT

In the recent decades, an increasing number of people become overweight, ranging from children to elders. Consequently, a series of diseases come along with obesity. How to control weight effectively is a big concern for most people. In order to improve the awareness of people's diets and calorie intake, this paper develops an application—Fitable, which can help users by calculating calories burned in a particular workout. The foods that Fitable recommends are all based on the lifestyle the user is aiming to achieve. Until now, the app is accessible to Android users.

KEYWORDS

Android, flutter, firebase, machine learning

1. INTRODUCTION

In 1995, only 28% of the adult population was considered obese [1]. In 2016, roughly two-thirds of adults and nearly 20% of children were overweight [2]. Today, approximately 160 million people are obese [3]. That means roughly one-in-forty people on Earth are overweight. Numerous people know that not exercising and genetics correlate to obesity, however, dieting is by far the most crucial aspect in maintaining a healthy lifestyle. Many people exercise and do not know what to eat to supplement their exercise routine. Some eat unhealthy foods after a heavy workout. After a few weeks, they do not see any improvement and thus give up, therefore, becoming overweight. Obesity tends to lead to Type 2 diabetes, high blood pressure, strokes, and other heart and health issues [4][5]. The Fitable team set out to reduce these issues by spreading awareness using a dieting app, thus creating Fitable. Today, people recommend playing sports, having a daily exercise routine, and counting their calorie intake. This app takes all of these into account and recommends healthy foods to encourage a healthy lifestyle. Our app combines the convenience of popular products, such as Fitbit and Apple watches with the nutritional benefits of calorie calculators to give users the best experience.

The remainder of this paper is organized as follows: in Section II, we provide our challenges for the app development, and in Section III, we present the app and our solution to these challenges. We introduce the app and describe how it works. In Section IV, we provide insight into future features for Fitable and conclude our paper with a summary.

Exercise and dieting are essential aspects of human life. Many people are suffering from obesity, sparking the development of Fitable. The popular products, Fitbit and Apple Watch, calculate the steps and the time spent on a workout. However, these products do not calculate the foods

people should eat to support their exercise, intensity, and the specific type of workout [6][7]. Fitable provides users with what they should be consuming to reach their goal (i.e., general, bulking, slimming) based on their workout and exercises. Fitable’s competition, Fitbit and Apple Watch, are considered luxuries, and not everyone can afford these luxuries. However, Fitable is free, which increases the potential number of users. Technology has been incorporated into the world more rapidly, and thus, we wanted to create an app that uses technology to help others. There are few, if any, apps that calculate the calories burned in a particular workout, and they do not suit the needs of potential users as accurately as Fitable. Additionally, the foods recommended by some websites and apps are absurdly high in sodium, cholesterol, and carbohydrates. The foods that Fitable recommends are all based on the lifestyle the user is aiming to achieve, no matter the goal. Fitable does not recommend foods that are high in sodium, cholesterol, or carbohydrates to any of their users.

The following map is a graph of obesity [8]. This graph shows the obesity population as recent as 2017. Since then, this number has gone up and is at an all-time high in 2019 [9].

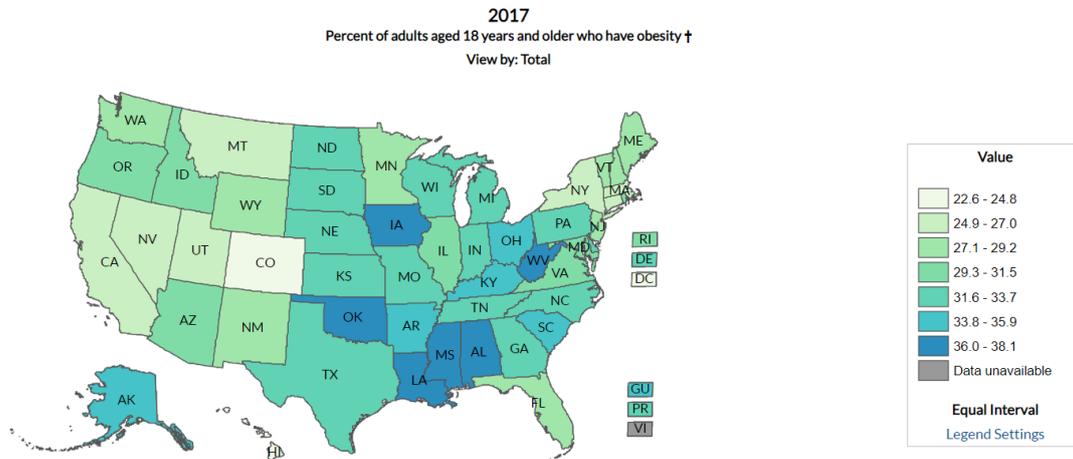


Table 1. Fitable vs. Competitors

Benefits	Apple Watch	Fitbit	Calorie Calculators [10]	Fitable
Recommended Calories Intake			✓	✓
Food Recommendation			✓	✓
Convenient	✓	✓		✓
Specific Exercises		✓		✓
Cheap			✓	✓
Private	✓	✓	✓	✓

In the customization of Fitable, the color scheme and aesthetics were an essential part of the process. We wanted a color scheme that would be suitable for all users, regardless of gender or race. The logo is an integral part of the development of any app, along with something that immediately catches the user's eye. It also has to relate to the primary purpose and intertwine with the color scheme; so, therefore, we designed a logo with a character running.

2. CHALLENGES

2.1. Challenge 1

Through the development of the app, we collected nutrition information on food items. Nutrition information is recorded per serving size, and serving size does not have universal metrics for all foods, which created the tedious job of determining the next most common metric. For example, the NLEA serving size -- or the amount of food that is generally consumed in a sitting -- for apples was present, whereas in some other foods (coconut, steak, etc.,) the NLEA serving size was absent, thus creating the challenge of determining the next most common metric [11]. This made the nutrition calculation, and therefore, food recommendation, very difficult.

2.2. Challenge 2

Calculating the number of calories burned depends on the time played and the intensity of the sport. Playing golf at an intensity of five for one hour would burn fewer calories than if you played soccer at an intensity of five for one hour. For each sport, a different formula had to be created, dependent on the intensity of that sport.

2.3. Challenge 3

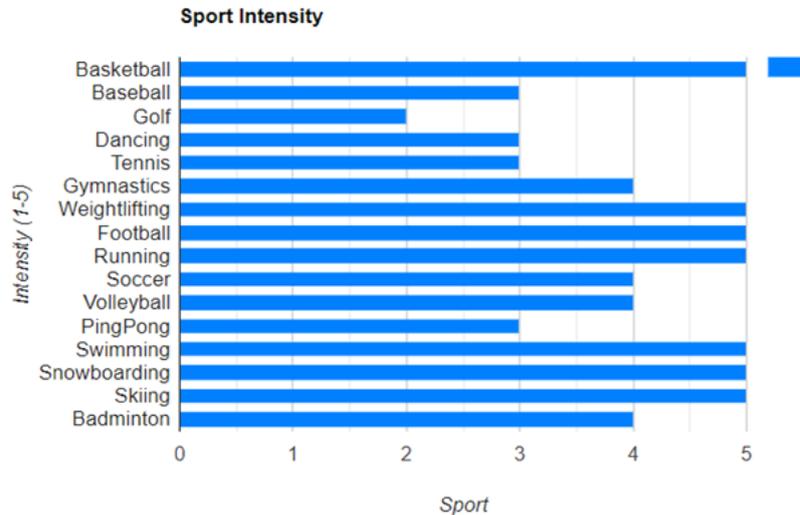
Author names are to be written in 13 pt. Times New Roman format, centered and followed by a 12pt. paragraph spacing. If necessary, use superscripts to link individual authors with institutions as shown above. Author affiliations are to be written in 12 pt. Times New Roman, centered, with email addresses, in 10 pt. Courier New, on the line following. The last email address will have an 18 pt. (paragraph) spacing following.

Deciding which foods to recommend in which categories. Along with the nutrition information already collected, we also needed to collect vitamin content, protein content, and carbohydrate content. These factors contributed to placing the foods in their respective categories. For example, a lot of meat and eggs were put in bulking, since meat is full of protein, which is crucial to the bulking process. However, foods with fewer calories and protein content were placed in slimming.

3. SOLUTIONS

These are the solutions to the previous challenges, respectively. The solution of not having a universal metric was to find the next most common metric (i.e., 100 grams, or 1 cup). This works fine now as a placeholder, but ideally, there will become an NLEA for all foods, so that Fitable can become consistent throughout. We solved the challenge of normalizing calories dependent on the sport. We recorded calories burned dependent on each sport; for example, we found that athletes burn more calories in tennis than in golf. Using this data, we calculated the number of calories burned per minute, which we would then be able to convert into the amount of time the user inputs into the app. In the diagram below, you can see we rated each sport based on the intensity and difficulty of the sport.

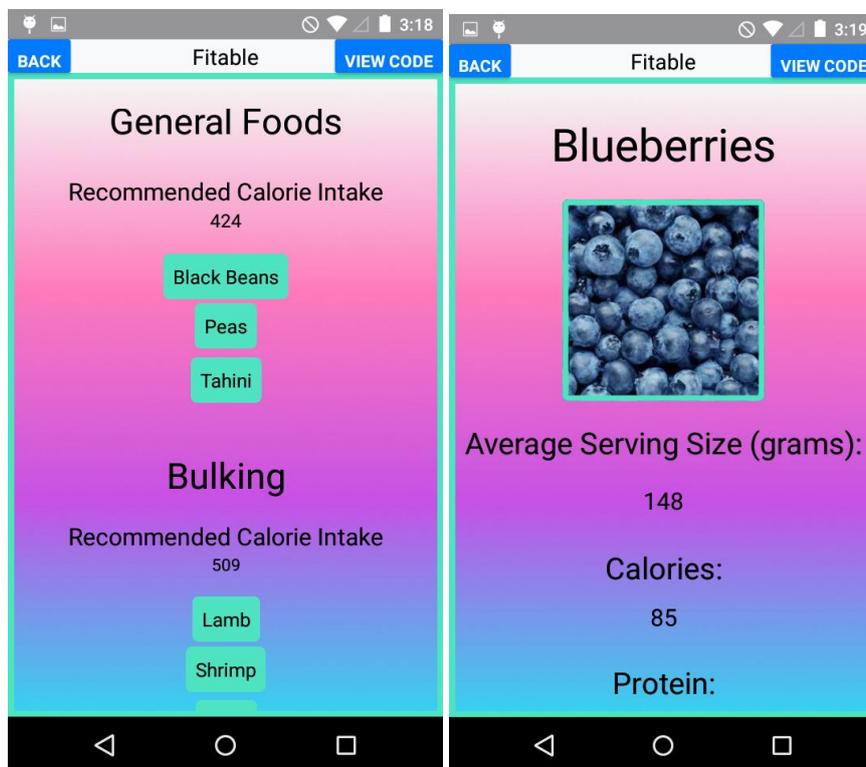
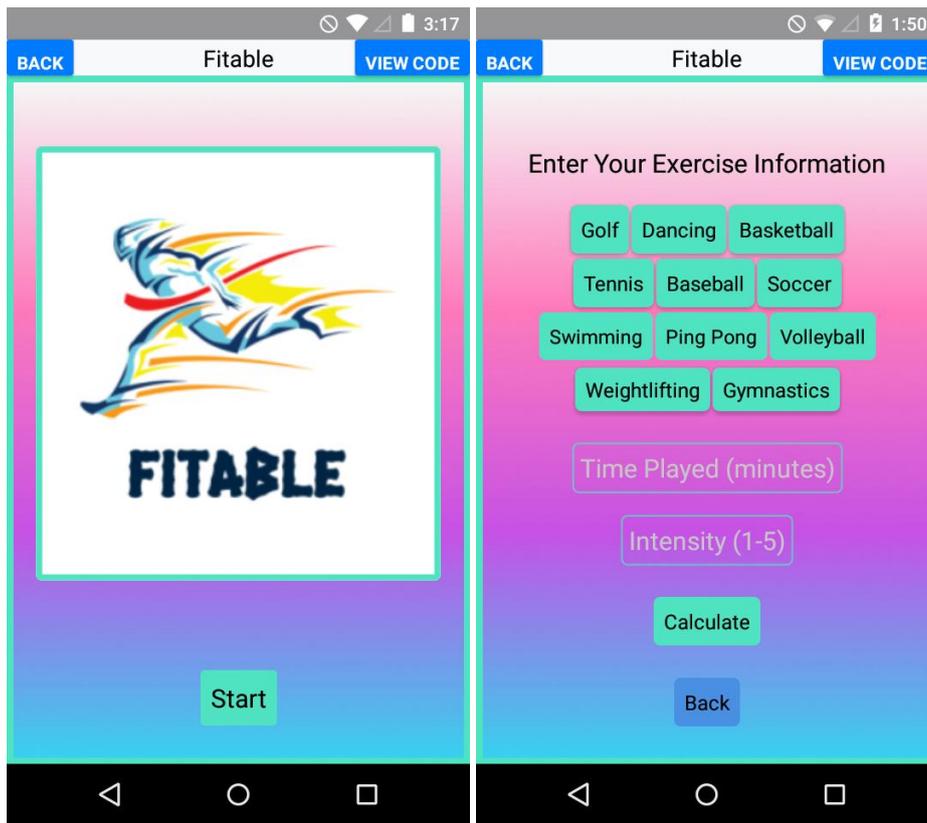
Table 2. Sports Intensity, as referenced in the Fitable app.



To place foods in the correct categories, we looked at their nutrition information. As stated earlier, foods with higher calories, carbohydrates, and protein content were placed into the bulking category. On the other hand, foods with fewer calories and carbohydrates were placed into the slimming category.

On the screen on the left, is the logo.

The screen on the right is where users enter their exercise information, including time played, sport, and intensity. Intensity is on a scale of one to five, where one is the weakest, and five is the strongest. The intensity of the exercises factor into the food's users receive. Users click calculate to collect their results. *The screen on the right has been updated, and more sports have been added.



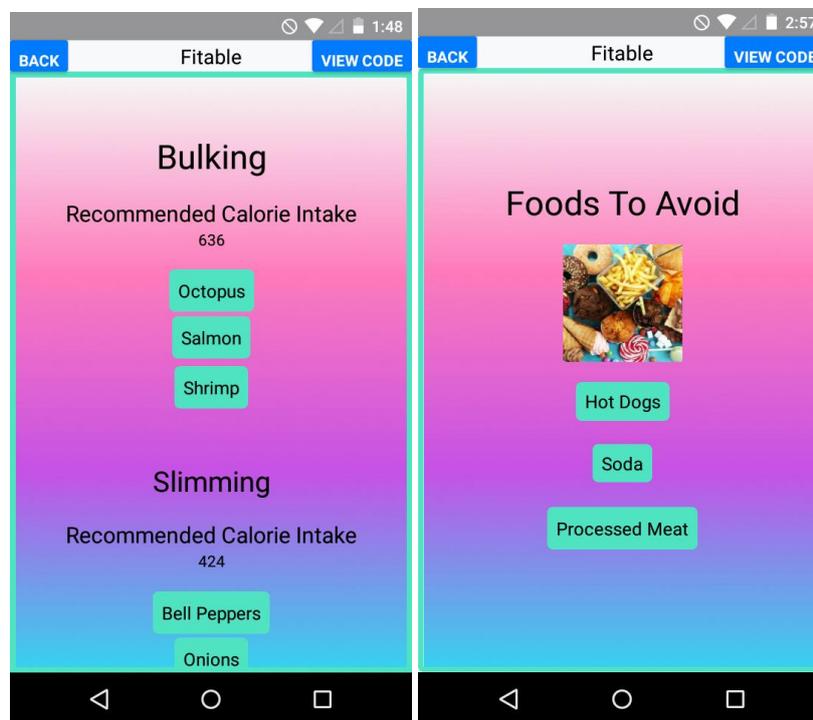
The screen on the left is where users receive recommended foods based on the information they enter. There are three categories, general, bulking, and slimming. The recommended calorie intake is the number of calories we suggest that users consume to reach the desired results. Once

they click a food, they are shown the screen on the right, where there is an image of the food, and its respective nutrition, such as average serving size, calories, protein, and carbohydrates.

*These screens are scrollable, meaning you cannot see the bottom half of the screen. On the left, along with the categories general and bulk, there is the slimming category. On the right, along with average serving size and calories, protein and carbohydrates are included.

Example:

Jimmy is a user. He has a slim body type and wants to start bulking. He just finished a workout of weightlifting for sixty minutes without stopping, thus achieving an intensity of five. He wants to know what type of foods and meals he should eat to achieve his goal of bulking. Jimmy opens Fitable and enters his information and receives a number and some suggested foods. The figure represents the recommended amount of calorie intake for him to achieve his goal.



We made a 'Foods to Avoid Page,' where no matter what goal users might have, they want to avoid these foods. This is a screenshot of what users might see. The foods listed here are high in sugar, cholesterol, such as soda, fast food, and donuts [12].

This formula was used to calculate the calories burned for a particular intensity, time, and difficulty of the sport. For example, if a user played soccer for sixty minutes and at an intensity of four, they would want to consume 271 calories ($0.3533 \cdot 4 \cdot 60 \cdot 4 \cdot 0.8$) to reach their slimming goal. Fitable then uses this number to recommend foods to the user.

$$cal = 0.35330.8intetimediff$$

- *inte* = intensity played at
- *time* = time played
- *diff* = difficulty of the sport
- *cal* = recommended number of calories to consume

4. CONCLUSION AND FUTURE WORK

In this paper, we have outlined and shown the purposes of Fitable. We have also displayed some features of our app and how potential users would use the app. Our app is motivated by the increasing number of people in the nation that are obese, a number that is close to 30% of the nation today [17]. The solutions to some of the challenges listed above have been implemented into our app. As future work, we hope to add more features, and hopefully, Fitable can be used to reduce the number of people who are obese in the nation.

The app's objective is to improve the awareness of people's diets and calorie intake. For this app to be more successful, we would like to add many aspects, some of which are recorded here.

As of now, the app is accessible to Android users but not Apple users. The goal is to publish the app into the Apple App Store, so both Android and Apple users can use it [11]. It will be free to the public, increasing the potential number of users. As of right now, we have it on Google, found here:

Personalize the user information, such as adding gender, height, weight, and body mass index or BMI, along with the sport played and intensity [15]. These features will allow our calculations to be more accurate, and therefore, recommend the best food suited for the user. This will also create the best rate of success for the user, regardless of their goals.

Another future feature is to add whole meals, rather than individual foods. This will allow the app to be much more user-friendly, giving users recommendations for easy to prepare meals, rather than forcing the user to think of meals by themselves. However, there are a variety of ways to make a specific meal, such as spaghetti, it is hard to track the number of calories in the meal [16]. Certain noodles will be healthier than others, and each noodle has different nutrition values.

Adding more sports, exercise routines, and food/meal options. This will allow a more diverse customer base, helping more people reach their exercise and weight goals.

In the future, we would recommend drinks, such as smoothies as another way to give users an idea of how to consume the recommended foods.

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