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HEALTHDIARY: FITNESS AND DIET APPLICATION

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Abstract

Health is a very important aspect of human life. It is the second most basic level in Maslow's Hierarchy of Needs. Especially now, in the year 2022 with the global pandemic behind us, being physically healthy can make a lot of difference. Although healthy living is a popular trend, a large proportion of the population still suffers from health problems that can lead to death. More than 40 million global deaths were due to such diseases in 2015. Some can be avoided or even reversed by everyday choices that serve us well rather than harm us. This application aims to help those who want to lose weight or adopt a healthy lifestyle.

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LIST OF ABBREVIATIONS

i.e.	Id est (Latin: this means)
e.g.	Exempli gratia (Latin: for example)
MAP	Maximum a posteriori
MSE	Mean Squared Error
BMI	Body Mass Index
API	Application Programming Interface
SQL	Structured Query Language
UML	Unified Modeling Language
MFP	MyFitnessPal
SDK	Software Development Kit

1 Introduction

The prevalence of obesity is increasing day by day in our country, as in other countries in the world. According to the preliminary study report of the "Turkey Nutrition and Health Research-2010" conducted by our Ministry, the prevalence of obesity in Turkey was found to be 30.3% in total[1]. Increasing obesity and the diseases that come with obesity cardiovascular disease, various types of cancer, diabetes and other chronic diseases have fueled interest in identifying effective ways to promote healthy eating and weight control[2]. There is a growing interest in the use of smartphone apps to promote healthy eating and support weight loss. Smartphone platforms lowered costs, reduced the burden of participants, and overcame traditional face-to-face behavioral weight loss programs[3]. Interventions for weight loss require intense care and are a factor that creates barriers to full participation and widespread distribution. Smartphone apps provide a convenient and low-cost way to disseminate information about proper nutrition and nutrition to the general population and certain at-risk groups[3].

There are various applications related to weight control, nutrition and diet on major smartphone platforms such as Android, iPhone, BlackBerry and Nokia. Common techniques include goal setting for healthy eating, self-monitoring of energy and nutrient intake, providing feedback, grocery or restaurant decision making and weight tracking[4]. A significant number of healthcare professionals also use apps, and many apps are designed solely to meet their professional needs. In response to this type of health information seeking behavior, large numbers of software professionals, medical professionals, and healthcare organizations have been driven to create and develop apps for many health-related topics[5].

The aim of the thesis is divided into two. Firstly, find out what it means to be physically healthy and how to lead a healthy lifestyle. This is done through a literature review. To get more perspective on the fitness app industry, some of the available apps in this category are reviewed and this provides information about the features implemented in one of the best apps in this category and also a healthy lifestyle is covered by different companies. The results of this research form the basis of the second part of the thesis, which is the development of an application that encourages people to change their bad habits, make healthy choices and live healthier in general.

2 Related Works

With the spread of smartphones, different mobile diet applications began to be developed over time. Before mobile apps, people worked with dietitians to lose weight or stay fit, manually calculating calories at home with precision scales.

After beginning of the Web 2.0 era, with the great development of smartphones over time, using diet applications they can easily calculate their daily calorie need, how many calories they consume or burn per day, according to their body mass index. Some of them is very simple, some of them can calculate up to the calories burned in workout or training. Examples of these mobile apps are MyFitnessPal, Lifesum, Noom and FitWell. All these applications will be explained separately in the next chapter and their contents will be analyzed.

2.1 MyFitnessPal

MFP is a smartphone application that provides self-monitoring and recording of calorie intake, physical activities and body measurements. It has become one of the most popular applications among similar applications with its calorie calculation, possible meal, technological features (inputting calories by reading the barcode of the packaged product from the camera), ease of user interface[6].

2.2 Lifesum

Lifesum is an affordable diet application where you can easily enter calories and create a diet list like other applications. As a disadvantage, there is no coaching service and you need to get outside help when you want to change your diet style[7].

2.3 Noom

Unlike other applications, Noom allows you to interact with other users and you can get coaching services. However, with the lack of a free trial version, the food database remains much weaker than other applications, which makes people think twice or switch to another application when buying a subscription[8].

2.4 Fitwell

Fitwell is one of the most solution-oriented and widest options among diet and training applications. Unlike gyms and personal coaches, the subscription is very affordable and you save time. With new meals added to the list, new content in training videos, and training options that increase as they do, it has become one of the applications with the most users, preventing users from getting bored of doing the same things. In addition, training videos have taken a new dimension in diet applications[9].

All of there are good projects, and they help people who don't have time or money to stay healthy, but there a few things that could be improved upon. Based on the common point of all of them, calculating the daily calorie needs according to BMI and choosing the option to gain or lose weight and enter calories. Applications such as FitWell and MyFitnessPal can also provide you with a diet list. This is a feature, but besides these, it is necessary to create a sample list by entering the foods that the user does not like or are allergic to. It is like offering a lactose-intolerant user alternatives to dairy products. With the development of technology, more options can be added to these. Even if these are small details, the user will like it and will increase their desire.

3 Methodology

The proposed application, the design that the user sees on the screen, namely the user interface, contains the database layers to retrieve the data, hold the stock data and store the data. The user interface part is called the front-end, and the front-end includes the design of an application under construction and includes many elements from the font to the layout of the content. The front-end is connected to the backend with the help of an API. When the front-end makes the request through the API, the service executes the required functions and connects to the database and performs the requested task, then send the result of the request back to the front-end. This application will be a mobile application developed through Java with Android Studio and will perform operations with the help of API.

3.1 Front-end

An easy-to-use interface will be designed for front-end, where users can easily find everything they are looking for in the application.

Since most of the users do not want to open new accounts in games, health, etc. applications, the login has been decided as "Log in with Google account" only.

The login page will look like:

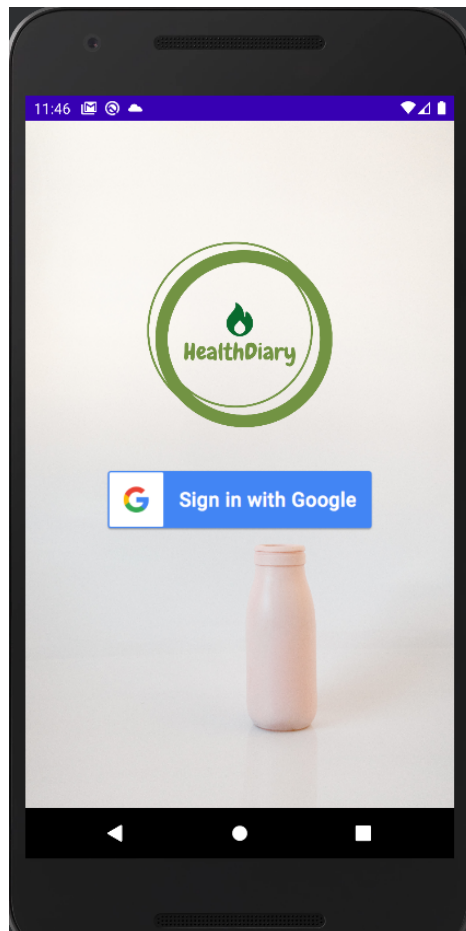


Figure 1: Login Page

The profile screen will look like:

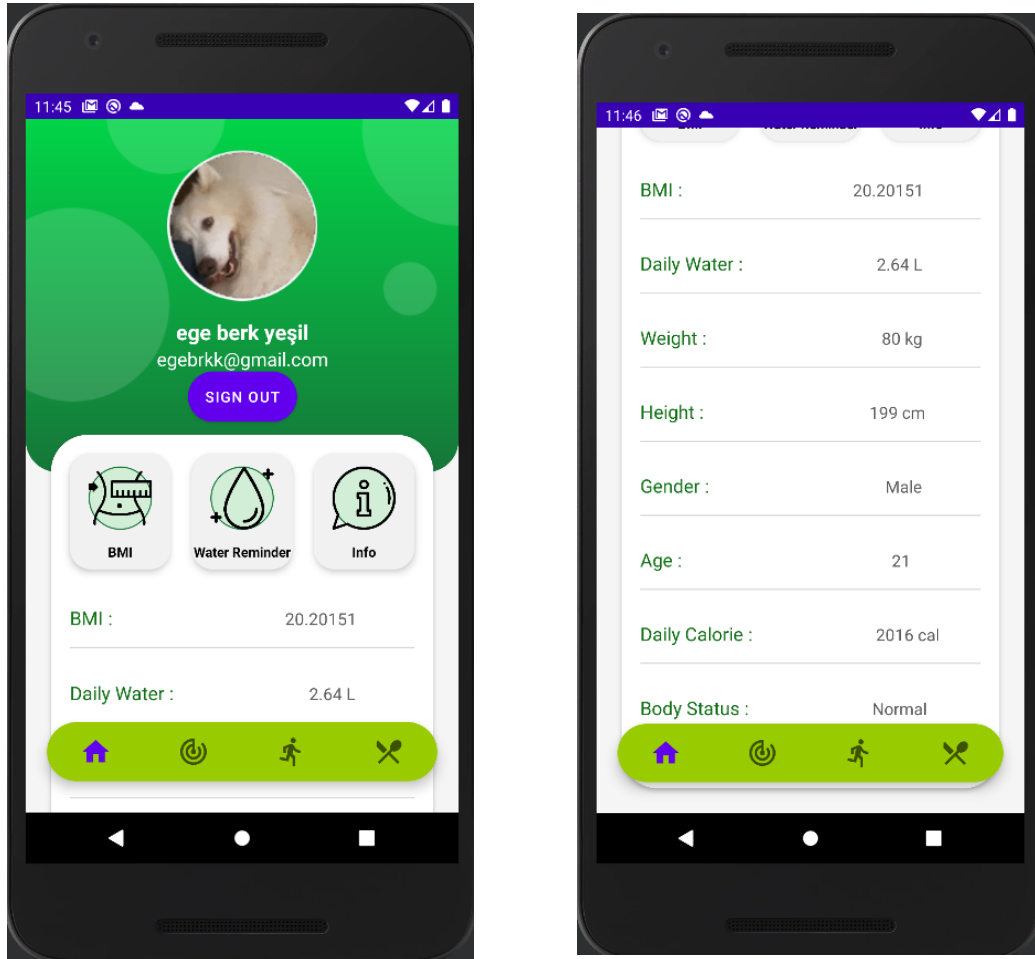


Figure 2: Profile Page

3.1.1 Mobile Application

Java has been on the rise in mobile application for a long time, it also brings powerful and useful application making. With the Android Studio, it offers an easier GUI construction and a responsive application.

3.1.2 Java

Java is a programming language and computing platform first released by Sun Microsystems in 1995. It has evolved from humble beginnings to power a large share of today's digital world, by providing the reliable platform upon which many services and applications are built. New, innovative products and digital services designed for the future continue to rely on Java, as well[10].

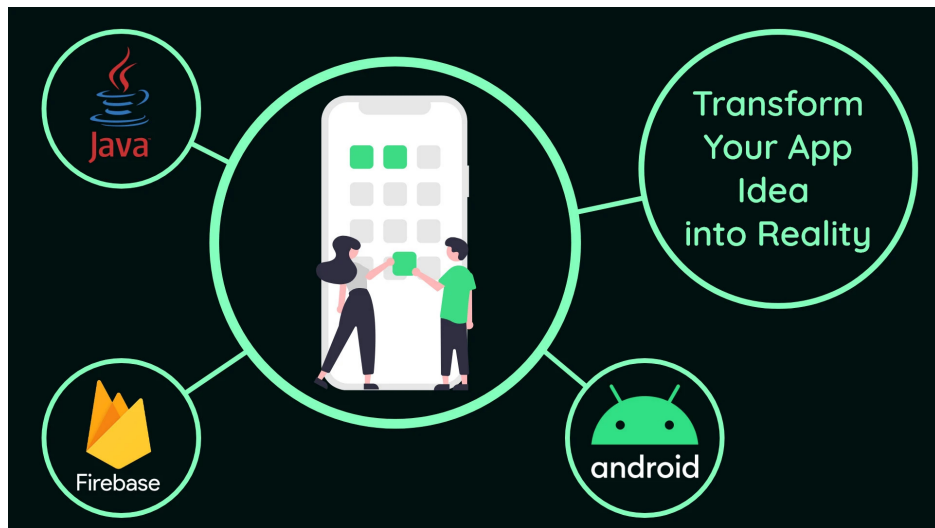


Figure 3: How Java transformed to a Application[10]

3.2 Backend

The backend usually consists of a server, an application, and a database. The program takes the information the user type into the website or application and stores it in a database that is set up on the server. Back-end is the part that the users cannot see in the application, but the whole operation is provided. To illustrate how the back-end works simply, consider the following examples: Application stores a piece of data in a server-side database life.

3.2.1 API

An API, or application programming interface, is a set of defined rules that enable different applications to communicate with each other. It acts as an intermediary layer that processes data transfers between systems, letting companies open their application data and functionality to external third-party developers, business partners, and internal departments within their companies.

The definitions and protocols within an API help businesses connect the many different applications they use in day-to-day operations, which saves employees time and breaks down silos that hinder collaboration and innovation. For developers, API documentation provides the interface for communication between applications, simplifying application integration[11].

The Nutrition API extracts nutrition information from text using natural language processing. From food blogs to menus to recipes, it can read any text and calculate the corresponding nutrition data.

After all the research was done, it was decided to use API Ninjas – Nutrition API. An intelligent feature of this API is custom portioning: if your text specifies quantities of individual food items or ingredients, the algorithm will automatically scale the nutrition data in the result accordingly. It receives feedback by sending an HTTP request. And also stores the datas on API so no need to any database for now.

Returns a list of nutrition information extracted from given text. Nutrition data for each food item is scaled to 100g unless a quantity is specified within the query parameter[12].

```
[
  {
    "name": "brisket",
    "calories": 1312.3,
    "serving_size_g": 453.592,
    "fat_total_g": 82.9,
    "fat_saturated_g": 33.2,
    "protein_g": 132,
    "sodium_mg": 217,
    "potassium_mg": 781,
    "cholesterol_mg": 487,
    "carbohydrates_total_g": 0,
    "fiber_g": 0,
    "sugar_g": 0
  },
  {
    "name": "fries",
    "calories": 317.7,
    "serving_size_g": 100,
    "fat_total_g": 14.8,
    "fat_saturated_g": 2.3,
    "protein_g": 3.4,
    "sodium_mg": 212,
    "potassium_mg": 124,
    "cholesterol_mg": 0,
    "carbohydrates_total_g": 41.1,
    "fiber_g": 3.8,
    "sugar_g": 0.3
  }
]
```

Figure 4: Sample Response of Nutrition API⁹[12]

4 Application Design

Based on the application review, several requirements for implementation have been established. To better present the features, the application is divided into four main parts. Goals and measurements, diet tracking, physical activity tracking and challenges. Based on the main features and their components, the structure of the application was drawn out Figure 2 presents the structure of the app.

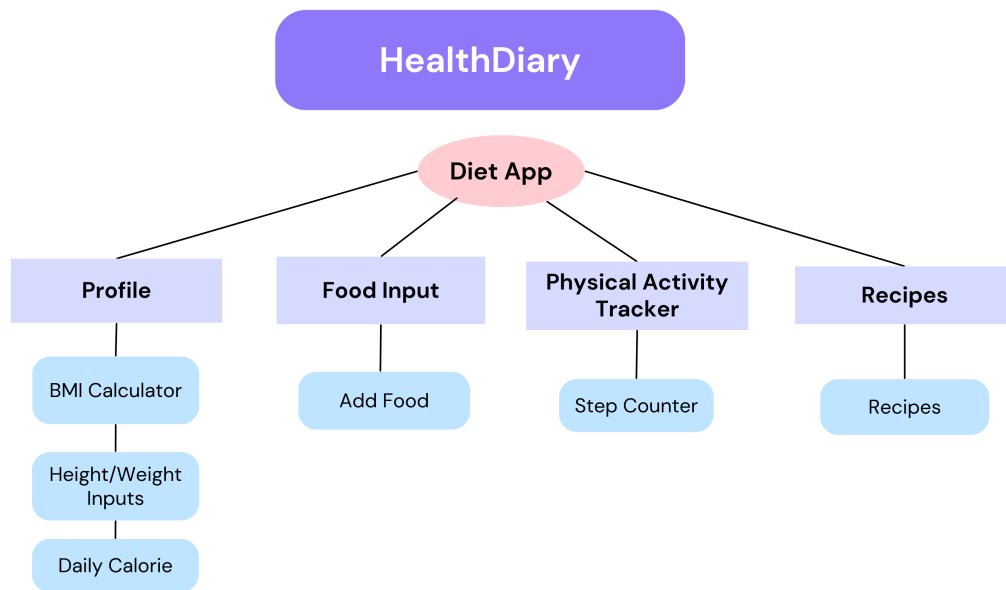


Figure 5: Structure of the app.

4.1 Goals and measurements

The core part of practice is goals and measurement. In this part of the app, users can set their own goals. Users can track their calorie intake and water regularly.

4.2 Diet Tracking

Here, the user will be able to record their own meals and plan their daily future meals with the help of calorie calculation. The user will be able to see the accumulated calories and nutrients for a given day.

4.3 Physical Activity Tracking

In this section, the user can track how much of their physical activity goal they have achieved in this section by adding the activities they have performed. For now, this app just includes step counter.

4.4 Recipes

In this section, users will be able to easily find healthy recipes from the entered data.

4.5 Flow Chart

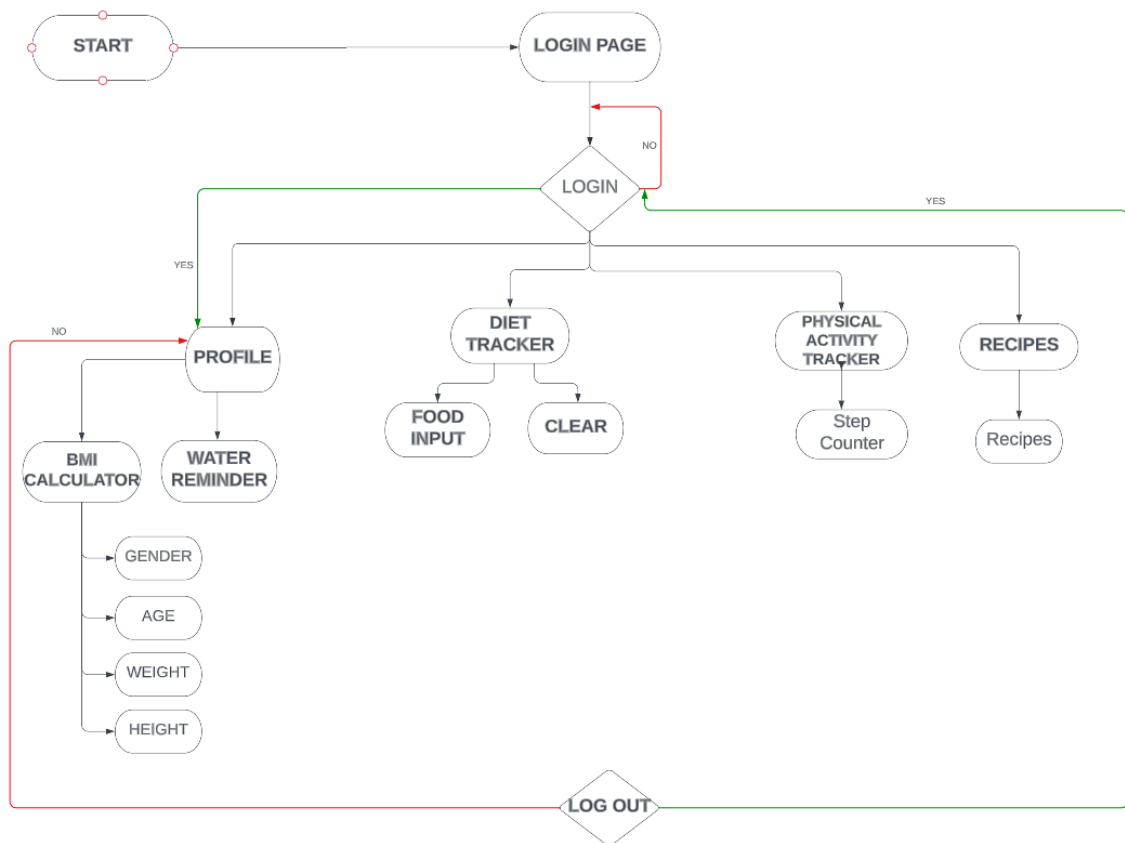


Figure 6: Flow Chart of the Application

4.6 Future Work

Many more options can be added in the future of this project. A larger calorie content, more recipes can be added with a large Firebase setup due to its efficient operation with Android Studio. In addition, most physical activities can be tracked with sensors specific to each device. In addition, with the help of artificial intelligence, an option to prepare a personalized meal can be offered by entering the food or ingredients that the user does not like or are allergenic to. In addition, by adding a barcode or QR code reader, you can learn how many calories are in a package of packaged foods.

5 Design Methodology

Agile is a software development methodology based on iterative development. It encourages transparency and accountability as well as self-organization of teams. Scrum is one of the Agile methodologies and a very productive one. Within the scope of the Scrum methodology, the roles within the team are conveyed very clearly and transparently. For this reason, it is both highly predictable and reassuring for the team. The Scrum framework seeks to address adaptive problems while creating high-value products and presenting them creatively. Generates adaptive solutions for seemingly complex problems.

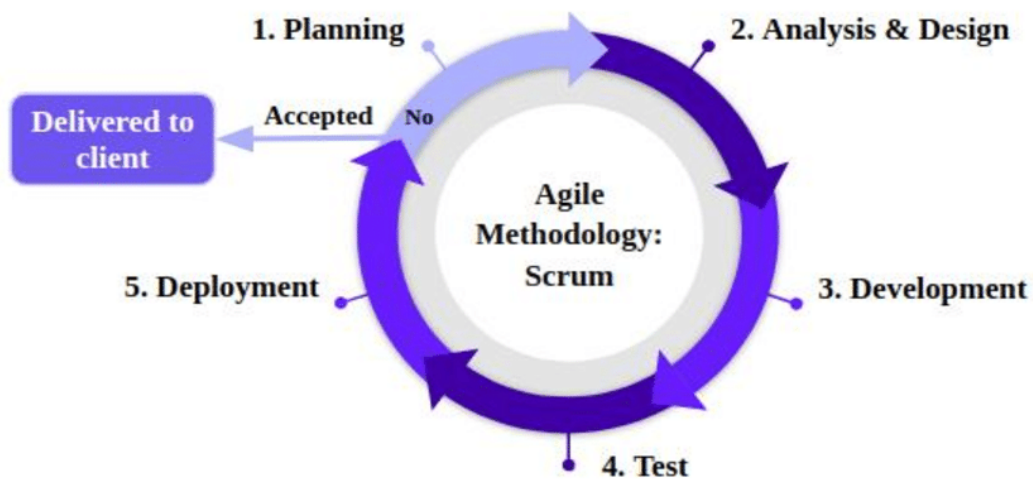


Figure 7: Scrum Framework[13]

With Scrum teams collaborate and analyze ideas from all of their mem-

bers, creativity is encouraged, and new ideas are more likely to emerge. That is why Scrum was chosen as the proposed solution. To track progress, 2-week sprints are planned[14].

6 Conclusion

The main purpose of this project is to provide free support to people who want to lose weight or stay in the form and to make them earn from both time and money. By using smart phone, the user can follow easily what have done. Thus, weight control and calorie control will be made more easily.

Our aim is to provide access to all kind of devices Android platform. Any user who wants will be able to use application for any purpose. The increase in the number of people in obesity every year in the world increases the importance of such practices. With this project, at least people are expected to take a step to be healthy. In fact, it will also show that motivation is where they can reach continuously and easily. In addition, the application has its own design and usage sections previously described As the user uses the application, the option will increase and suggestion will be made according to the content he selected completely.

As a result of this study, it is expected to benefit people to be healthy. Preventing the spread of fast-food culture and directing to healthy-life is one of the possible results of this practice.

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