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At the Heart of South Leinster

## Final Report



## Diet Track

### Diet Tracker Application

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## **Abstract**

In today's lifestyle, society is changing, and people are more dedicated towards achieving a fit and healthy body. This drastic shift has changed the way of living in almost every household, most people now crave healthy and nutritious meals. This why healthy eating, nutritious meals and diet tracking have become an essential element in everyone's lifestyle in order to accomplish a healthy life and balanced diet in such a busy and strenuous environment. The purpose of this project is to develop an application that is used to monitor and track the user's diet. The application will track nutritional intake and manage diets for healthy eating, weight loss, weight maintenance, weight gain, and fitness.

This report will reflect on and assess my final year project, the creation of an application that will monitor and track the user's diet. Diet Track is the name I gave the program. This application's target audience will be who want to track nutritional intake and manage diets for healthy eating, weight loss, weight maintenance, weight gain, and fitness. The benefits of this application for the target audience include the ability to input count calories, search for recipes online, scan their food items and observe their weight progress. Additional user benefits include the opportunity to add goals, log your weight and count calories.

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## **1. Introduction**

The concept of this application was motivated by a market need for an application of this type, with many people manually documenting what they eat and measuring their calories inaccurately. People are frequently observed using a notepad and pen to plan their meals and document the food they have eaten, which might add extra time in the kitchen and daily life. The goal of the application is to track nutritional intake and manage diets for healthy eating, weight loss, weight maintenance, weight gain, and fitness. Similar apps are popular for comparable topics like calorie and exercise tracking.

The goal of this report is to present a summary of the development experience for the application Diet Track. This report will reflect on the development process of my application, concentrating on the first experience of discovering new technologies, adapting to using them, what may be better, and an overall assessment of the application generated.

The project description section will include a summary of Diet Track's development process and the technology utilized to create the application. The knowledge process part will go into technical and personal learning outcomes. Finally, the project review part will go through what was accomplished and what was not during the development process, the iterations, the challenges encountered while creating the application, and the divergence from my initial idea.

## **2. Project Description**

Diet tracking applications have become an integral part of a lot of people's lives, mainly because in today's lifestyle many people are now focusing on tracking their diets in order to have a fit and healthy body. The conventional methods for studying food intake or tracking diets were extremely inaccurate but since the introduction of smartphones and mobile devices these apps have made diet tracking significantly easier, convenient and much cheaper. The purpose of using these applications is for tracking nutritional intake and to manage diets for weight loss, weight maintenance, weight gain, healthy eating, fitness and so much more.

They are also used to monitor calories, the intake of carbohydrates, proteins, fats and many other nutrients, based on your diet these apps can also suggest healthy meals and recipes for users to prepare. Many diet apps are free, but some of them can be purchased and users can be charged subscription fees for full functionality.

The project description will include an explanation of the application Diet Track from the perspective of a user, followed by a summary of the program's development. This will be followed by a list of the technologies employed in the development of Diet Track.

## **2.1 Project Overview**

As previously said, this application is primarily aimed towards health and fitness enthusiasts of all levels of expertise. Although this is the intended demographic, the app may also be appealing to the typical gym goer looking to enhance their physique by tracking their diet.

Diet Tracks main menu has the following functions: 'Food Diary,' 'Meals,' 'Meals Planner,' 'Calorie Counting,' 'Weight Log,' 'Recipe Recommendations,' 'Goals Planner,' 'Integrated Barcode Scanner' and 'User Profile.'

The food diary feature is used to log meals and any food item consumed daily, the application will store the number of calories, carbs, protein and fats that has been consumed. The information obtained can be viewed by the user in order to track their diet. The food information is obtained from a nutrition database called Open Food Facts which is searchable and includes a wide variety of food. This feature also has an integrated barcode scanner which makes it easier for you to view and log the nutritional facts in packaged foods. The Meals feature enables user to add their own meals into the application in order to be used by the meal planner. The meal planning feature enables the user to add their own meals and plan what they will eat for breakfast, lunch, dinner and snacks. This will help the user alleviate the stress of looking for what to eat by following a strict plan. The calorie counter feature is vital and works with the food diary as it keeps track of the number of calories you have consumed daily so that you don't eat too many calories as a high calorie count will have a negative impact on your diet.

The weight log feature enables users to input their weight every week for them to view their progress. They will be able compare their weight across several weeks to see if they are gaining, losing or maintaining their weight. The integrated barcode scanner feature works with the food diary and will enable users to scan a food item in order to show them all the nutritional facts, which makes it easier to view and log food items consumed daily. The goal planner feature enables the user can to set goals and try and beat the goals by the selected timeframe. Finally, the recipe recommendations feature enables users to search for recipes to inspire a healthy meal option. The recipe and all its nutritional facts will be saved onto the database, which is helpful as if the user needs to prepare the same meal again all the facts will be available to the user without them having to search the recipe again.

## **2.2 Technical Project Overview**

This section will provide a technical overview of Diet Track, delving into the specifics of each function.

## **2.3 Technologies and Architecture**

Diet Track uses the following technologies:

- Front-end: Android Studios
- Database: Firebase
- Server: Firebase

#### **Tools**

- GitHub
- Android Studios
- Firebase
- Open Food Facts
- Fluid UI
- Microsoft Excel
- Figma
- Edamam

### **3. Knowledge Process**

The knowledge process will cover both the technical and human learning results of the application's development. The learning procedures included all stages of application development, from conception to completion, exposing fourth-year students to all facets of the process. This technique supplemented the information received through a Software Development degree by providing first-hand experience. Personal interest aided in the drive and creation of Diet Track. This application allows for further in-depth research on the development of an app from start to finish, as well as the art of diet tracking.

#### **3.1 Technical Learning Outcomes**

This project exposed me to a variety of different languages and platforms. The project allowed me to acquire expertise with Java. This language was difficult for me as it was unfamiliar to me, but one advantage was the excellent documentation, which is easily accessible, this helped decrease the amount time that was required to master the language skills. The project also allowed me to experiment with and gain knowledge with the Firebase and NOSQL platforms. These platforms were difficult to learn since they were unfamiliar to me, but the benefits of adopting them included the ability to design a well-structured backend and the ability to employ Firebase native features. Deploying the application enabled fresh experience and information to be obtained during the development lifetime of an application.

Throughout the application's development, technology was a significant priority. This was verified when I had to restart my project two months in since the language and platform I had selected were

no longer functional. When deciding which technologies to use, one should consider the learning process and the time required to adjust to a new technology. A lack of prior knowledge and minimal resources added significantly to the time required to construct the application as a learning effect of the technologies utilized.

Another learning outcome was the requirement to evaluate one's abilities. This was accomplished through the application's technology selection. This learning outcome resulted from my inability to develop the original application specification using the smart watch technology. The correct choice of technologies ensures that sufficient progress and the desired results are achievable, saving time and resulting in a higher functioning application.

New technologies, such as Openfoodfacts, Figma and Edamam were employed in conjunction with technologies that I was familiar with throughout this project. The capacity to use existing resources to obtain knowledge in new sectors of technology was developed as a learning result of the usage of new technologies. This enhanced the ability to examine and critique a problem in order to arrive at a more functional answer.

### **3.2 Firebase**

Diet Track's back-end server was built with Firebase. As part of the deployment procedure, Firebase was also employed. Firestore was utilized as Diet Track's database. Firebase was an altogether new platform to me because we had not encountered it throughout our degree, but a large array of materials was publicly available online, which tremendously aided me. Firebase was convenient for our project since it allowed us to create a Google sign-in and cloud security. Working with Firebase and Firestore presented challenges when it came to providing UIDs to users because it was an entirely new manner of arranging data. Another difficulty was the antiquated nature of the information accessible for this specific topic. Overall, Firebase and Firestore were useful for my project. Furthermore, because Android Studio is so well linked with Firebase, the utilization of Firebase aided my project.

### **3.3 Android Studios and Java**

Diet Tracks front-end was built with Java using the Android Studios IDE. Java is the official language for developing Android applications, and because I had some prior familiarity with Java, it was not difficult for me to learn the language. For this project, Java was selected as it is the official language used for developing native Android applications. The IDE used was Android Studios which has a huge number of plugins, features and libraries. Android Studio also comes with Firebase integration which made the connection to firebase effortless. Android Studios enables the user to create a wide range of Android apps with vast functionalities.

### **3.4 Open Food Facts and Edamam**

Open Food Facts is a free eating product database that can help you make better food decisions. At the time of writing, the database had about 1.3 million goods, including food information such as ingredients, allergies, nutrition statistics, and other miscellaneous information found on product labels. The barcode scanner will get all the food/product data from this API and show it to the user for the food diary option of the application. This API is used by the food diary in order to search and scan for food items.

The Edamam Food and Grocery Database API is a REST-based API service that allows you to seek up nutrition and diet data for food goods. The API provides nutrition and diet data for generic foods, packaged foods, and restaurant meals to its customers. It allows you to look for a food item by keyword, name, or UPC/Barcode. The API gives the end user nutritional information for the input food item, such as macro and micronutrients, as well as labels such as allergy, lifestyle, and health. It also allows you to search for food goods under a certain brand name. This API is used by the recipe recommendations feature in order to search and display recipe ingredients and calories to the user.

### **3.5 Deployment**

The project's deployment step was split into two sections: the deployment of a Progressive Web App and the deployment of an Android Application Pack. Firebase was utilized to deliver the Progressive Web App since it was already integrated in the application's backend, making the deployment process go easily. Initial configuration difficulties resulting from a lack of knowledge with the procedure posed a hurdle in the usage of Firebase; nevertheless, this challenge was overcome since a wide variety of resources were accessible to assist. The above-mentioned Capacitor was used to deploy the Android Application Pack.

## **4. Personal Learning Outcomes**

This project provided an opportunity to learn a variety of new personal skills and information. This part will examine personal learning outcomes in diet tracking, personal interest growth, and time management skills. Because diet tracking was the focus of the application, extensive study into the regime was possible, both scientifically and commercially. The project provided an opportunity for me to ponder on and identify parts of growth that are particularly appealing to me. Finally, one of the most significant personal learning outcomes of Diet Track's development was self-reflection, adaptability, and time management.

### **4.1 Diet Tracking**

I have a personal passion for health and fitness which meant the foundational study on the subject matter of this project, diet tracking, was more fun and in-depth as a result. Deeper study into the



regime enabled the development of new concepts and application features, such as expanding the recipe recommendations by allowing users share their own recipes and import recipes from the internet. This study helped me to hone my analytical, critical thinking, and report writing abilities. When reading an article, I had to evaluate the source of the data, the author's reliability, and the piece's intended audience. When deciding which functionalities to include in my app, I had to use critical thinking to determine which features would be most popular with the app's target audience, what kind of goals should be included in the 'Goal Setting' function. When putting up my research data report, I had to examine the major points in the data, the conclusions drawn from the data, and how these findings will impact my project.

#### **4.2 Personal Interest**

This project exposed me to the whole development lifecycle, allowing for personal reflection on the amount of interest at each phase. The discovery and exposure to various elements of development culminated in my own discovery that the user interface stage of development piqued my attention. This finding will pave the way for more personal research and employment opportunities in the sector. I have always been interested in healthy eating and managing my diet which made development pleasurable. Personal hobbies are valuable because they can improve enjoyment, motivation, and success. This learning result will be included into my future planning.

#### **4.3 Self-Reflection and Time Management**

This project's personal learning outcomes included self-reflection, time management, and planning. My time became increasingly necessary to manage as a result of a change in project title that reduced the time to accomplish this project. Effectively planning the progress that would be required each week in order to meet the project deadline was a crucial skill to master, and it entailed a lot of self-reflection into both the pace at which I could work and the amount of time I would spend on the project each week. Self-reflection had a significant role in my choice to alter the title of my project halfway through the process. Self-evaluation and realistic expectations led me to the conclusion that I would not achieve the necessary improvement and that a change was required. Combining documentation and technical tasks required time management and progress evaluation. Planning well allows for self-assurance, drive, and achievement. This personal learning result will be useful as I begin and advance in my profession.

### **5. Project Review**

The project requirements developed and updated throughout the development of Diet Track. Those developments have resulted in several accomplishments and problems. This part will go through what

was accomplished, what was not accomplished, suggested adjustments, challenges encountered, and variations from the original idea.

## 5.1 Achievements

The following are some of the accomplishments made throughout the Diet Track development process:

- All functionality related to the Meals function, i.e., enabling a user to add their own meal by asking them for the meal name, ingredients, cooking method, calories, class of food and the no. of servings.
- All functionality related to the Meal Planner function, i.e., enabling a user to add their meals created into a meal planner for the following day or week, the user must input breakfast, lunch, dinner and snacks, this feature which would help a lot with diet tracking as users can plan their meals ahead of the day and not struggle to find what to eat daily as they have a meal plan to follow.
- All functionality related to the food diary section, i.e., enabling a user to scan or search for food items and add it to their food diary which in turn counts the calories of said food item and updates the calorie counter.
- All functionality related to the weight log section, i.e., enabling a user to add their weigh each week and the log will tell them if they are losing or gaining weight.
- All functionality related to the goals planner section, i.e., enabling a user to add their goals and set a time frame in which they want to complete the goal by.
- All functionality related to the recipe recommendations section, i.e., enabling a user to search for various recipes online in order to inspire and hone their cooking skills. Each recipe has its ingredients, cooking method and number of calories to display to the user.
- Android application.
- UI design and navigation developed.
- Deployment of the database and application using Firebase.
- Registering accounts with Googles Firebase Authentication.
- Login and account registration using Google Firebase Authentication.
- All inputs from the user are saved onto the device locally which is good for storage.

## 5.2 Not Achieved

Due to time constraints and a lack of technical competence in specific domains, the following features have not been completed: an authentication guard on the application and 'Body Mass Index Calculator.' To create a secure application, an authentication guard for the application was proposed

in compliance with the 2018 General Data Protection Regulations As previously stated, Body Mass Index was a capability intended to provide coaches access to their customers' progression data in order to track their development and design training programs. This method was unable to be implemented owing to concerns with my database structure, specifically the lack of all documents within the Firebase UID. Furthermore, due to a lack of time as the project deadline approached, automated testing was not performed. Instead, because to a lack of access to both people and gyms as a result of the Covid-19 epidemic limitations, usability testing on the program was done to a very basic level.

### **5.3 Possible Adaptations**

This section will go through the enhancements that would have been useful to Diet Track if the project could have been restarted. If the project could have been restarted, a lot more security features would have been introduced to the program. As cloud assaults become more common, it is critical to safeguard your application from malicious users in order to protect the users' data. Furthermore, further user testing and automated testing would have benefited the project's functionality and may have generated new ideas and adjustments to the program. Testing is an essential part of development and should always be done to a high degree. Finally, while Firebase provided numerous advantages, the choice NoSQL may have been more advantageous in the long run, eliminating the UID problem and saving time.

## **6. Problems Encountered**

### **6.1 Changes in Technology**

Changes in technology employed posed a significant obstacle throughout this endeavour. Initially, the improper selection of technology resulted in a project change and a significant amount of time squandered. This squandered time increased the amount of time pressure for the balance of the project's development. This issue was created by my usage of technologies in which I had no knowledge of, such as Xamarin and AWS. This difficulty was handled by switching from Xamarin and AWS to Java and Firebase.

### **6.2 Time Administration**

As previously mentioned, shifting technologies increased the time pressure to finish the project. The issue of researching and acquiring abilities in a programming language and platform in a short period of time arose. The decision to study a familiar language was supposed to make my time management more effective, but it made me figure out I didn't really have much experience and that there was more to the language. In this scenario, 'on-the-job learning' was more effective. Due to increased time constraints, it was necessary to stick to a rigid plan. The problem of also having other subject

assignments, CA's and projects made time management harder. Due to the project being submitted at the end of the year it would always be pushed back. Despite this goal, various components of the project, such as additional security features, BMI calculator and automated testing, were not finished due to time constraints.

### **6.3 Making Use of an Unfamiliar Database Structure**

As previously stated, Firebase was a platform with which I was unfamiliar. Diet Track's server and backend were both powered by Firebase. The unstructured nature of Firebase's NoSQL, a real-time database, was foreign and required some time to learn to. This new database necessitated the practice of building, retrieving, adding, modifying, and removing tables and columns inside the database. This extra time may have been reduced if a database that I was comfortable with, such as SQL, had been utilized. The choice was made to utilize Firebase since it worked well with Java and Android Studios.

### **6.4 Deviation from the Project's Initial Specification**

Throughout the year, Diet Track evolved in a variety of ways. The most significant departure from the original project specification was a change in technology employed midway through the development process. At first I thought I could add in the aspect of a wearable device just to track a user's movement daily. Due to time constraints and challenges, the removal of the wearable element from the project provided a chance to reconsider the project requirements. The first project specification contained a proposal to use Bluetooth to stream data from the wearable into the application as the user walked or took part in any exercise activity in order to lessen the calorie count in the food diary. The goal was to display exercise information in real time, such as a user's heart rate and the number of steps a user accomplished daily.

Due to connection challenges with the sensors and time, it was decided to modify the project requirements. The project requirements grew more focused on diet tracking and food tracking. A food diary to store consumed food and a calorie counter graphical feedback for the user to see the number of calories consumed, and a weight log was introduced. This variation from the original design resulted from time constraints and the need for additional user-beneficial features. The addition of graphs to represent user progression data in the weight log arose from an emphasis on progress monitoring.

### **6.5 Integrated barcode Scanner and Recipe Recommendation**

The Integrated barcode scanner and recipe recommendations were very time-consuming connections to make using API calls as it took reading an immense amount of documentation to understand each data. The API's placed ingredients and food product data as an array inside an object of recipes and food products which made it very difficult to solve and use the API to get food products and recipe data.

## **7. Conclusion**

The goal of the application is to track nutritional intake and manage diets for healthy eating, weight loss, weight maintenance, weight gain, and fitness. The program completed now scans barcodes of food items and displays the calorie count to the user, users can add their weight to the weight log, users can add, create, update and delete meals, users can create, update and set a timeline for their goals. The user can also view recipes based on their health choices.

Finally, this endeavour featured both problems and accomplishments. Despite the hurdles, the project specification was mostly satisfied in terms of functionality. Challenges encountered during the program's development have resulted in learning experiences, although impeding the realization of certain intended Diet Track functionalities such as increased application security and 'BMI Calculator.' Among the accomplishments made while building Diet Track are the acquisition of new language and platform abilities, personal and technical learning experiences, and the creation of a finished application. The program contains effective progression monitoring, data feeding into graph format for ease of understanding, a successful barcode scanner, and successful computation to aid a person's diet tracking.

This initiative increased students' own knowledge in the disciplines of application development, diet tracking, and other technologies by exposing them to the complete product development lifecycle, from conception to completion. The project was a great experience that resulted in personal learning outcomes such as problem solving and time management abilities.

Diet Track might be adapted for usage in any country by adding more foods and recipes. Working on a project like this, which is intended to improve a user's diet tracking experience, has shown me why development is so essential and how it can improve our lives by making procedures more efficient.

## **8. Acknowledgements**

I'd like to thank my project supervisor, Dr Chris Staff, for his continual assistance and guidance throughout the project. Our weekly sessions were quite beneficial to me, and I felt properly informed and guided throughout the process. Chris did an excellent job of instructing me on the steps I needed to take each week. Chris struck me as pleasant and efficient. This project would not have been as smooth or effective without this support. Thank you so much, Chris.