Be Fit Pro

Presented in partial fulfillment of the requirements for Bachelor degree in Computer Engineering

Faculty of Engineering and Information Technology | Computer Engineering Department

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Software Project

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Disclaimer

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Nomenclature

Abbreviations

Abbreviation	Definition
WHO	World Health Organization
API	Application programming interface
REST	Representational State Transfer
SQL	Structured Query Language
OS	Operating System
JSON	JavaScript Object Notation
CLI	Command-line interface
UML	Unified Modeling Language

Abstract

In the twentieth century there was an awakening about the importance of staying active and healthy. So, BeFit Pro was developed to provide a modern and user-friendly platform, that encourages people to reach their goals and live a better and healthier life. It will help people in counting their calories, give them a variety of healthy recipes, suggest workouts and provide a chat bot that answers specified questions. BeFit Pro was developed using node.js, react.js, react native, python and MySQL database. Similar projects are in the market, but they either lack user-friendliness, need payment or have limited information.

1 Introduction

1.1. Problem

Obesity in the Arab world, the Middle East and North Africa, is a notable health issue. Out of the fifteen fattest nations in the world as of 2014 ,according to the World Health Organization [WHO], 5 were located in the Middle East and North Africa region.(Organization et al., 2014). Also being active was never a cultural thing as it is in the western countries.

So a solution was introduced which is to make an application that encourages people, especially middle eastern, to keep track of their calories, give them a variety of workouts and recipes to choose from. To help build healthy habits and healthy lifestyle.

1.2. Objectives

The main purpose of developing such application is the various benefits of keeping a healthy life style. A main factor is that living a healthier lifestyle means a lower risk of developing many illnesses, in addition to the physical benefits, regular exercise can lift the mood and help people feel better and have better mental health, eating junk food, smoking, and drinking sugary drinks or alcohol are all expensive habits, , and getting healthy helps people feel in control of their life.

1.3. Scope of The Work

Befit Pro was built using various programming languages, it was built using the principles of REST-full API, it's backend is written in node.js using express framework, it also integrates the googleFit API to get user's health details like daily steps, calories, etc. Python was used to build the recommendation system for the user's workouts.

As for the frontend was developed with react expo CLI, CSS

1.4. Significance of The Work

There might be other similar applications, but it was noticed that most lacked user friendliness and people could not use easily, not much of food in the list, or they had all the features but required a huge amount of money. So Befit Pro was developed to offer the best user experience, integration with google API, a recommendation system for workouts and with little to no price, since it's soul purpose is to help people stay active and fit.

1.5. Organization of The Report

The body of the report will start with the **The First Chapter, Introduction,** providing a background for the research. **The Second Chapter, Constraints and Earlier Coursework,** that shows project constraints, and who they were overcame and solved. Previously taken courses that were helpful in building this application in any step of its development.

Followed by **The Third Chapter, Literature Review,** which establishes familiarity and understanding of the current research and includes any similar project.

Then **The Fourth Chapter, Methodology,** that includes a systematic plan to resolve the problem, the process of building this robot, software tools, hardware equipment.

After comes **The Fifth Chapter, Results and Discussion,** to summarize the data collected, their statistical treatment and compare the results.

And finally **The Sixth Chapter, Conclusion and Recommendation,** will show the final project summary,with everything learnt in the journey of building it. Also, it'll introduce some of the features/subsystems that can be added in order to improve and enrich it.

2 Constraints and Earlier course work

2.1. Constraints

- The lack of a smart watch which runs on Wear OS, Google's operating system, that can be integrated and take the steps from it. As there is only an apple watch on hand and it is closed source. So the health details could not be taken from the smart watch, only from google Fit API.

- chat bot is not a free resource, only the first month of using it is free. So, it had to be made 3 times considering it was first developed alongside many other things, to be familiar with it. So it need payment or creating new chat bot every month.

- including chat bot in IOS requires ejection from expo and doing so will let the application lose a lot of it's features like google sign in in auth-sessions and the expo notifications.

- Time Limit: It has been implemented in a period of time being 3 months, which is considered a challenging amount of time to build this whole project in both web application and mobile application. Choosing the idea, deciding features, searching the topic, taking courses to learn node.js, react native, dealing with APIs writing the full code and assembling everything into the model.

2.2. Earlier Course Work

- **Database:** This course helped in building the relational database, gave a good introduction on to how to implement action handling and helped in formatting the SQL queries and requests.

- **Web Application:** Gave an introduction to dealing with web applications and how to use MySQL database.

- **Advanced Software:** This course was very helpful as it gave the details about RESTful architecture, encouraged learning react.js and node.js as an outside activity. And introduced several concepts that are useful.

- **Artificial Intelligence:** This course gave and introduction about dealing with neural networks and the basics of machine learning and artificial intelligence.

- **Distributed Operating Systems:** This course dug deeper into RESTful architecture and micro services, introduced APIs and how they are beneficial and how to integrate useful APIs in websites.

3 Literature Review

This application was developed in the need of a user-friendly, calorie-workout logger essentially in the middle east areas. The user logs his eaten calories in a day, and the workout he has done, he can also browse healthy recipes and workout videos , and his daily steps and burned calories will be collected through a google service.
The first step in building BeFit Pro was, deciding what features, technologies to use and study all the projects that relate to it.

MyFittnesPal was stumbled on while searching. It allows users to track the nutritional values of their diets, by either scanning in the bar code or searching an extensive database for their chosen food. It provides a view of total daily intake in the form of calorific, nutrient or macro nutrient values as easy-to-interpret graphs and pie charts, with warnings when preset calorie or nutrient limits are being approached.(Evans, 2017) [2]. The application is very useful but not user-friendly and this discourages people from using it.

While searching for similar e-solutions, plenty have been developed to perform meal planning, yet most of them lack a completely automated process and require domain expert intervention at different stages of the recommendation process. Hence, there is a need for an automated solution to produce a meal plan, based on a recommended caloric intake and considering multiple factors.

So the search got wider to include machine learning. MPG, an application that generate plans which fulfill a recommended caloric intake, given a set of available foods, while personalizing the plans following patient chosen factors (e.g., food preferences, variety, and compatibility), and evaluating the relevance of the produced plans following patient preferences.(Salloum and Tekli, 2022) [8]. MPG helped with the details of how to make a workout recommendation system but using another simpler algorithm.

Another paper assisted in the research in machine learning domain appropriately. As it discuss characterize adopted machine learning approaches, the use of big data technologies, identify types of machine learning algorithms and their application domains, and analyzes both main and alternative performance metrics. (Portugal, Alencar, and Cowan, 2018) [7].

To keep track of the user's activity, Google-Fit was suggested as it is an API that keeps track of fitness and health statistics. It is an open-source project provided by the Google team and it gives an estimate of the activities being performed as a percentage. (Javed et al., 2020) [3]. Although it is very helpful, it is not efficient, because, it provides different probabilities that specific activities are being performed with confidence ranging between 0 and 100 each time (i.e., 70% running, 40% walking, 10% still). Moreover, Google-Fit does not support agent-based collaboration (Menaspà, 2015) [5].

Now, after deciding the features of the application, the search for what technologies in the development process started. React Native was suggested to build a cross platform application, and with it's strong community, React Native was no doubt the best choice to start a cross-platform application from scratch.(Wu, 2018) [10].

while reading the documentation for react native and similar projects done using it, react expo got recommended since, it is built on top of react native, but saves the effort for the developer to write separate code for android and IOS since it does it automatically. Expo is an open-source framework for apps that run natively on Android, iOS, and the web. Expo brings together the best of mobile and the web and enables many important features for building and scaling an app. (Van, 2020) [9].

Since the details for the kind of database was not set just yet at the beginning, it was decided to choose REST architecture alongside Node.js in the backend. REST provides a great deal of flexibility. Data is not tied to resources or methods, so REST can handle multiple types of calls, return different data formats and even change structurally with the correct implementation of hypermedia. (Doglio, 2015) [1].

Later on it was decided to build a chat bot to help the user in keeping his enthusiasm in maintaining a healthy lifestyle. Many chat bot systems was discovered like Kommunicate API, but at the end it was implemented using React Native with Dialog-flow agent and integrated with the Firebase through the Google cloud functions. (Maduwantha and Vithana, 2021) [4].

4 Methodology

This chapter talks about the design of BeFit Pro, the components, tools and languages that were used to build it .

4.1. Design

4.1.1. Architectural Design

In the first steps of designing BeFit Pro, it was decided to make it scalable as such application is always on demand and there is always room for developing new features. So a good architectural styles needed to be followed that allows scalability.

The client-server architecture enables a separation of concerns, meaning, separating the client from the servers. This enhances the scalability of the server components, and the portability of the user interface across diverse platforms. The picture below describes the RESTfull architecture:

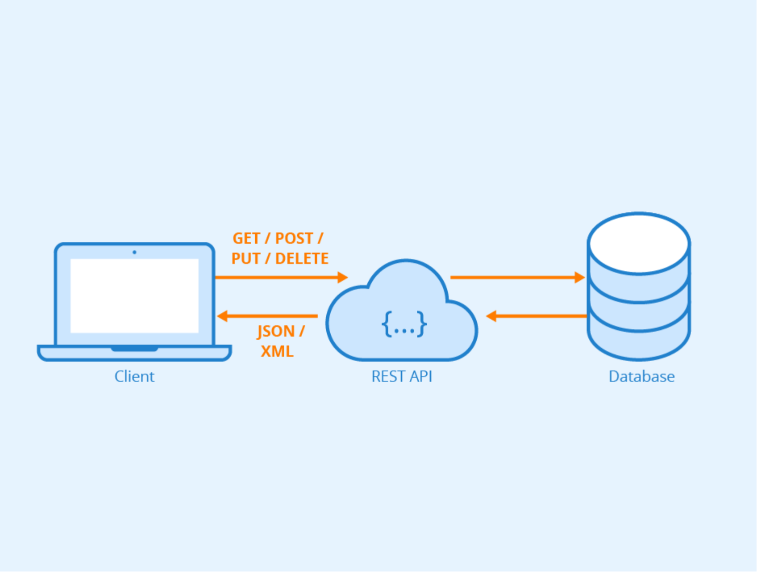


Figure 4.1: REST API architecture

It provide a great deal of flexibility. The user sends requests with:

- **GET** – Provides read-only access to a resource.
- **PUT** – Creates a new resource.
- **DELETE** – Removes a resource.
- **POST** – Updates an existing resource or creates a new resource.

And awaits the response from the server-side, which comes in json format.

Since REST architecture was chosen, it was needed to choose a language for the client-side and the server-side. According to stack overflow Node.js and React where the most popular languages for year 2022, as shown in the figure below. So Node.js was used in building the server-side and react for the client-side.

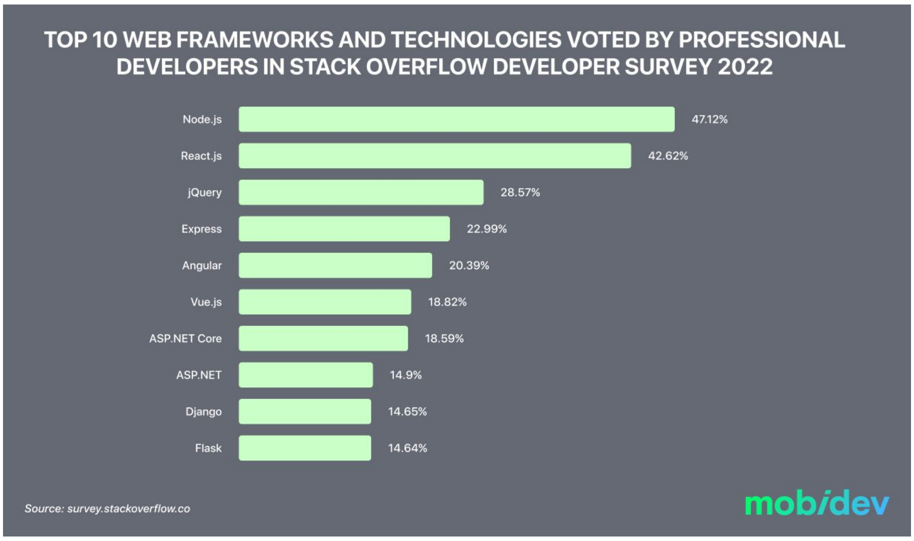


Figure 4.2: Top 10 frameworks in 2022

4.1.2. BeFit Pro UML Diagram

After establishing the design architecture, used languages and the application features. Building the UML Diagram began to build all the tables needed in the application.

XAMPP was used to build the MySQL database and create the relations, forgin keys and elements data types. After finishing the database xampp was used to generate the UML diagram for BeFit Pro. It describes the classes in the database and the relations they have together. which can be shown in the figure below:

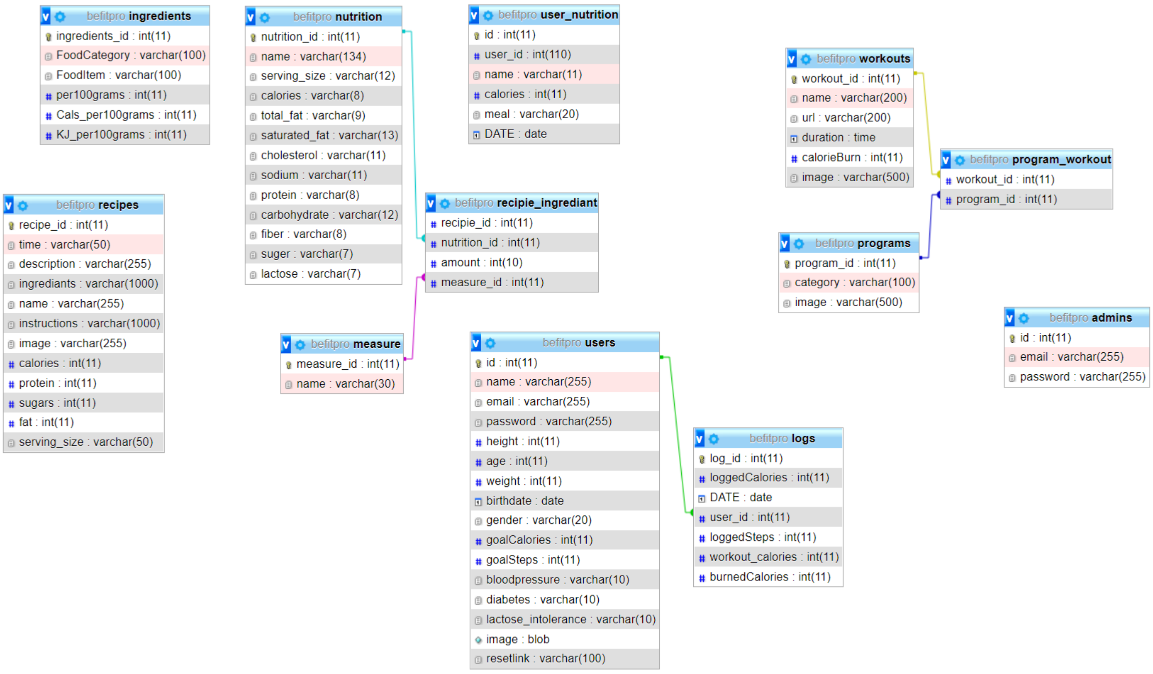


Figure 4.3: BeFit Pro UML Diagram

4.2. Tools, Programming Languages, APIs Technologies

4.2.1. Programming Languages

1. Mobile Application

- **React Native:**
  The mobile application was built using React native because there is no need to create separate codes for different platforms (Android and iOS), 90% of the code can be reused between the two platforms, React Native supports "live reloading" which allows developers to see the changes that made to the code in another live preview window at the same time. Because of the real-time feedback, it gave developers a significant advantage, in addition to, React native gives Strong performance for mobile environments, Time and cost-effective, Flexibility, Comprehensive libraries.

- **Node JS:**
  The back-end for both the mobile application and website was built with Node js and express. Node JS makes a good back-end for applications, providing server-less architecture and real-time communication support. And express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications.

- **Python:**
  Python was used as a recommendation system to suggest workouts to users according to the calories burned to the workout and the category it belongs to.

2. **Web Application**

   - **React JS:**
     The admin side website was built using React js it's an amazing JavaScript framework that has made the development process much easier. it provides quality assurance React js interface, and easy to adopt.

4.2.2. Tools

- **GitHub**
  It is a code hosting platform for version control and collaboration. It was used to share the code between the team members to work together on the project from anywhere. there were three repositories, one for the Front-End, one for the Back-End, and the third one for the react js admin side.

- **Visual Studio Code:**
  Used to develop both the client-side, mobile and web, and the server-side applications.

- **Expo Go:**
  Expo is an open-source platform for making universal native apps for Android, iOS, and the web with JavaScript and React. It was used to test the application features in the development process.

- **XAMPP:**
  XAMPP is a software distribution which provides the Apache web server, MySQL database all in one package. It is available for Windows, MAC and Linux systems.Xampp was used for building the database.

- **Postman:**
  Postman is an API platform for building and using APIs. Postman simplifies each step of the API life-cycle and streamlines collaboration so you can create better APIs—faster. It was used to test the endpoint created in node. js before sending them to the client-side.

4.2.3. APIs

- **Google Fit Using Google Console:**
  Google Fit provides Android and REST APIs to help developers build smarter health and wellness apps. Google Fit APIs can help discover new insights users want to share with the developer. These insights were used in BeFit Pro to build valuable new features to help people train harder, eat healthier, stay calmer, and sleep better.

- **Dialogflow API:**
  Dialogflow is an API service, it's a conversation building tool. It was used in this project for building Chatbot, it takes the human language and cleverly splits it into intents and arguments. Important concepts such as Intents and Contexts are used to model the behavior of the chat-bot. The point is the user mapping between input and response or action to be taken by the bot. Intents are the predefined or developer-defined components of agents that process a user's request. An intent represents a mapping between what a user says and what action should be taken by your software. Intent interfaces have the following

sections:(User says,Response,Action,Contexts).

- **Cloudinary API:**
  Cloudinary is an API service that allows the storage of media such as images and videos. In this Application, Cloudinary was used for member Profile picture, also used for the pictures of Recipes. The files Stored in Cloudinary, and in turn Cloudinary provides a public URL to view the image, this URL is stored in the applications database.

4.3. Implementation

4.3.1. Frameworks:

- **React Native:**
  Expo was used for the mobile application, it's a free and open source framework that's used to build React native apps. It comes with a lot of native APIs out of the box for both iOS and Android. That makes the developers job of adding native features to the app fairly easy.
  It also provides a number of built-in Core Components ready to use in the app. some useful components was used in the application (ActivityIndicator, Alert, Animated, Dimensions, Modal, RefreshControl). The figure below shows the popularity of react native:

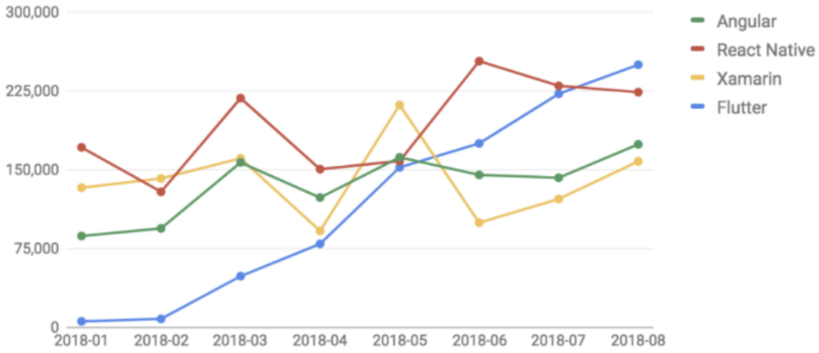


Figure 4.4: Framework's communities on Stack Overflow

- **React js:**
  The website was created for the admin side, The admin can observe the number of users, any changes that happen in users information, add and remove users.
  Admin can also perform CRUD operation on workouts, program, recipes and food tables with a very nice GUI. He can change the theme of his page between dark and light and change the colors.
  He can also see the insights of his website from the age groups of the users, and the traffic of users in each month. It was built using react js and node js for the Back-End .
- **Node js:**
  The server-side for both the admin side and the client side was implemented using node. js with express framework. The back-end provides all the endpoints needed to dynamically show the information for the client. It also handles the requests the user sends and send the right responses.

4.3.2. Application features

1. **Searching for foods with the number of calories and add them to the list of meals.**
   This application enables users to search for food meals from a huge database and add them to the daily food list, as each user has 4 food lists (breakfast, lunch, dinner, and snack). also, he can add foods to any list he chooses.

2. **Viewing a list of healthy food recipes.**
   The list of food recipes suggests a number of healthy recipes that contain a few calories. The user can browse Short explanation about the chosen meal, the instructions, ingredients, Fat, Protein, and sugar. In addition he can add this meal to the daily food list.

3. **Send notification when reach the goal.**
   when user reach his goal of calories and steps, He will receive a notification to alert him.

4. **Suggests a list of workout Videos**
   In workout page the user will get 6 programs of workouts, the application provides a simple explanation for each chosen program, in each program there is a set of workouts videos in addition to the duration of each of them and the number of calories expected to be burned after playing each one. In addition, the app will suggest some videos based on the user details, selected by the machine.

5. **ChatBot**
   A chat bot is a typical example of an AI system and one of the most elementary and widespread examples of intelligent Human-Computer Interaction. Users will be able to ask some questions and the robot will give the appropriate answer.

6. **Add Food**
   This application enables users to add foods that are not available on the search list and their information such as calories, fat, protein and many other things, only the name and calories are required. So, users from different cultures can comfortably use this app and add any kind of food.

4.3.3. Mobile Application:

1. **Welcome screen**
   The first page in the application, it contains Sign Up button,this enable user to register for the first Time, the other button enables the user to register with Google to access his activity data like calories and steps, The last one is Login button. if the user already has an account.

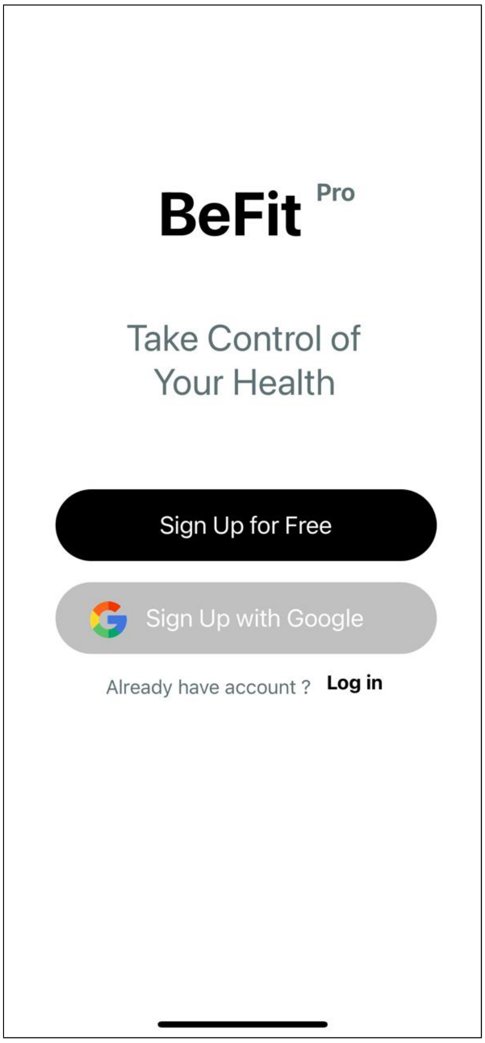
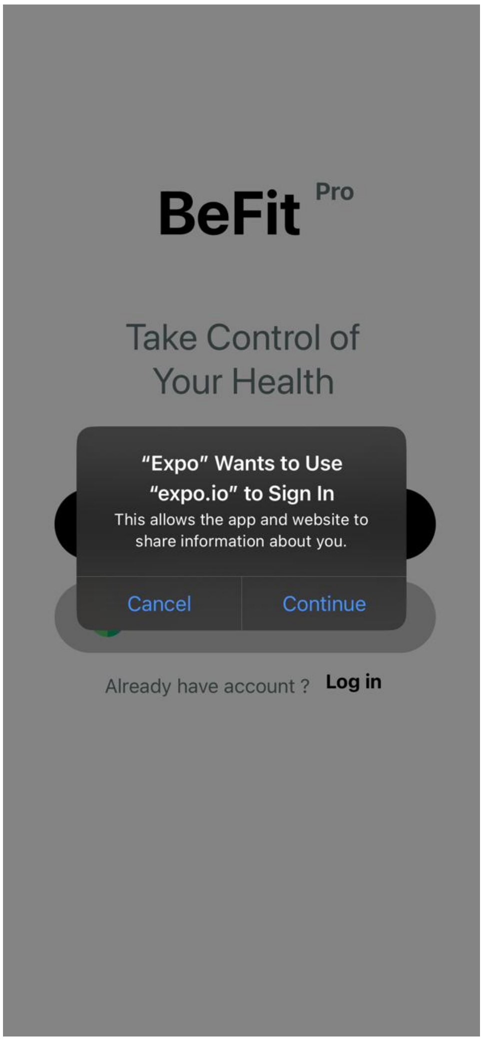


Figure 4.5: Welcome Screen

2. **Google Sign Up**
   The Sign Up with google option is added to access the activity of the user during the day. In order to access such sensitive data an OAuth 2.0 authentication is required. Since the application was developed in a RESTfull way, the request for google sign up had to be through a web browser.

   Expo Go provides AuthSession, which is an easy way to add web browser based authentication (for example, browser-based OAuth flows) to react apps, it is built on top of WebBrowser, Crypto, and Random.
   After the user chosses to sign in with google it will lead him to his google account and then to the sign up page. And stores the google token for a period of time so he can have the full features.



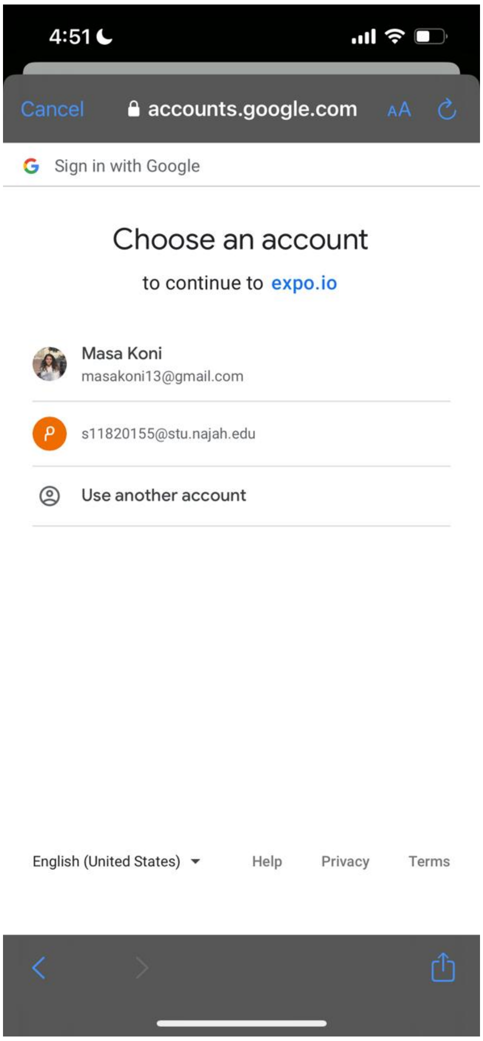
BeFit Pro

Take Control of Your Health

“Expo” Wants to Use “expo.io” to Sign In

This allows the app and website to share information about you.

Figure 4.6: Google Sign Up 1



Choose an account

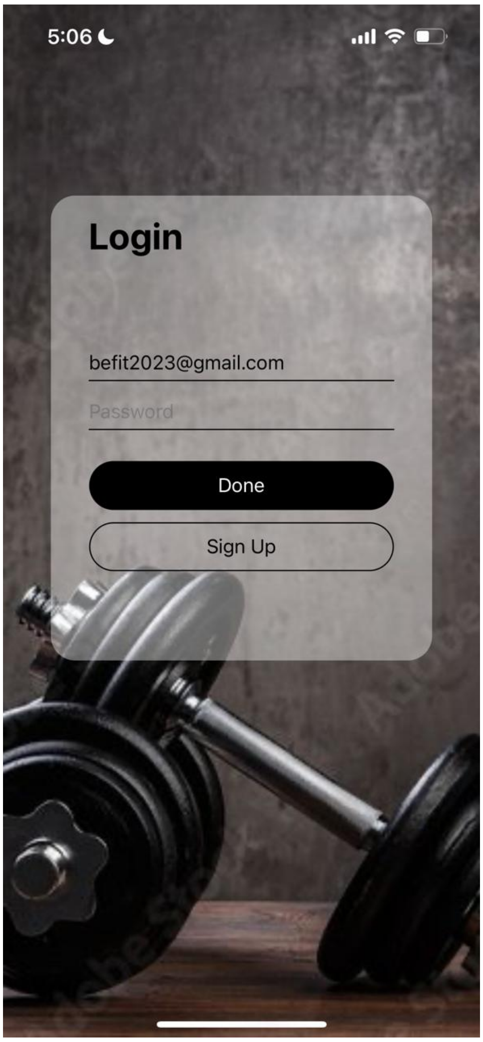
to continue to expo.io

Masa Koni
masakoni13@gmail.com

s11820155@stu.najah.edu

Figure 4.7: Google Sign Up 2

3. **Login screen**
   In this screen, if the user has an account enters his credentials, his E-mail and password, If one of them isn’t correct, the user will see a warning message to repeat the operation and he will stay in the same page. If he completes the process successfully, a token will be generated with a specified time to keep the user logged in for that period, and then the user navigate to home page.



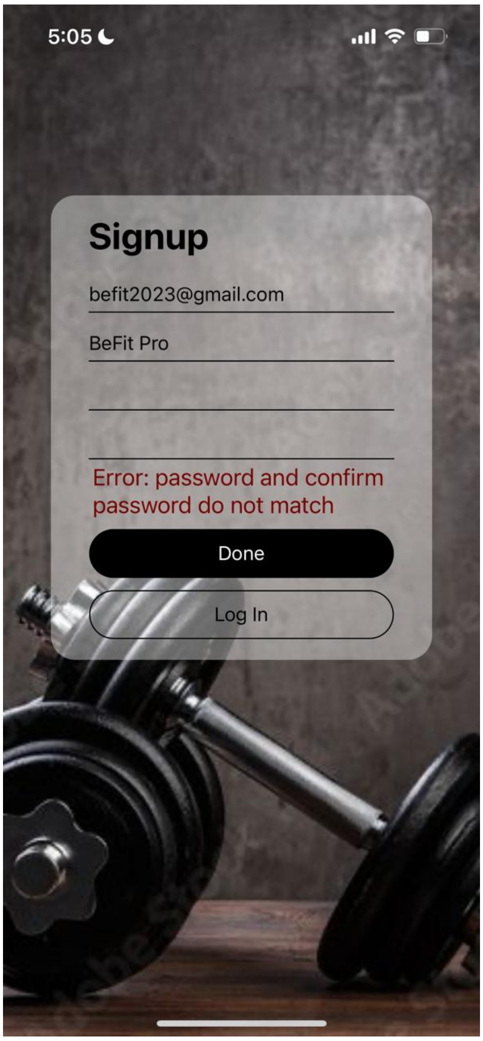
befit2023@gmail.com

Figure 4.8: Sign in screen

4. **Sign Up screen**
   This screen helps new users in registering in BeFit Pro, the user enters his Email, name, password and confirm his password. The password must be written within set of rules, it should has at least 6 characters and contain 1 lower case. The password and confirm password should be the same, if not the user will see a warning message to correct them.

   After registration the second page will appear, it's a horizontal flat-list contain questions about the user health details like gender, height, weight, birth date, if he has diabetes, lactose intolerance or blood Pressure.

   After filling in the health details by pressing the start button, the user will navigate to the home screen. And all his data will be stored to the database.



Signup

befit2023@gmail.com

BeFit Pro

Error: password and confirm password do not match

Figure 4.9: Sign Up screen

5. **Data screen**

   This screen built with horizontal flat-list contains questions about the user.

   First question is about gender, the user have to answer it by pressing one of the buttons containing his answer, the result will be stored in the database.

   when scrolling right, second question appears, it's about diabetes, the user have to answer it by pressing yes or no button. after that blood pressure and lactose intolerance should answered in the same way. Height and weight questions are answered by increasing or

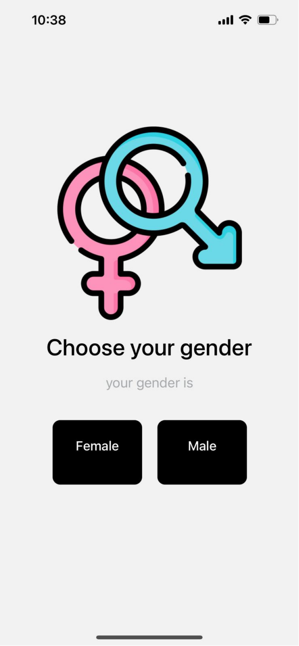


Figure 4.10: Gender screen

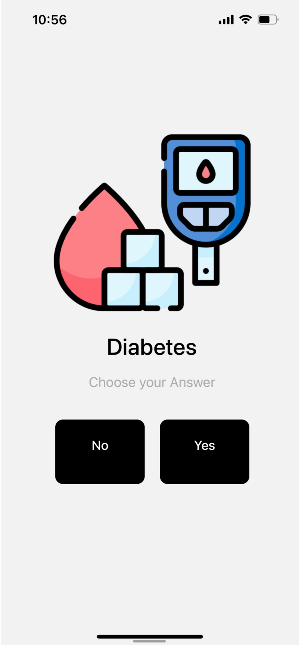


Figure 4.11: Diabetes screen

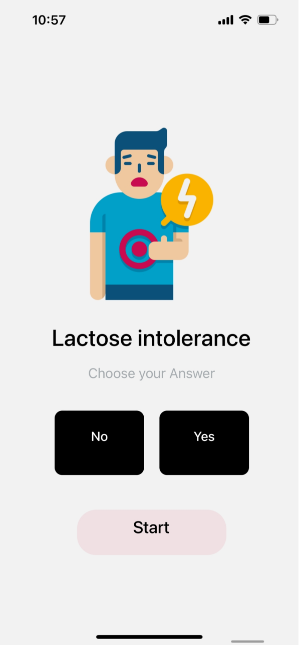


Figure 4.12: Lactose intolerance screen

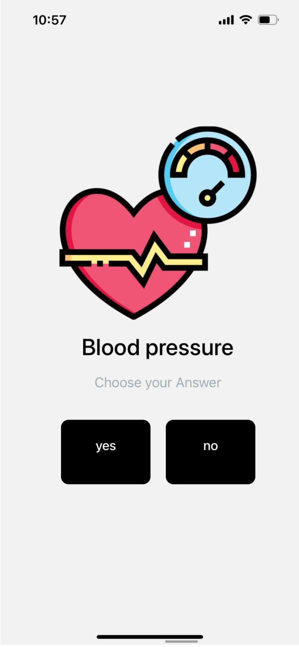
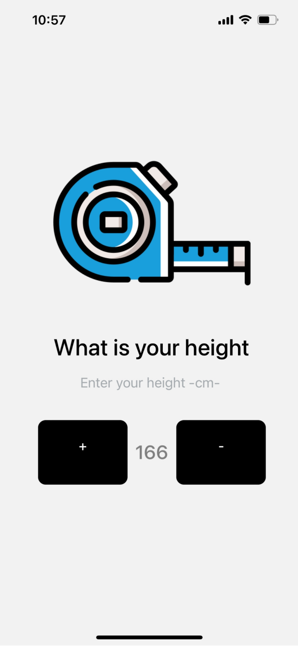


Figure 4.13: Blood pressure screen

decreasing the counter or by changing the added value in the text input.

The last section is about birth date, user should set it by pressing on the calendar button the he will chose the date.

Then START button will appear to navigate the user to the main page.

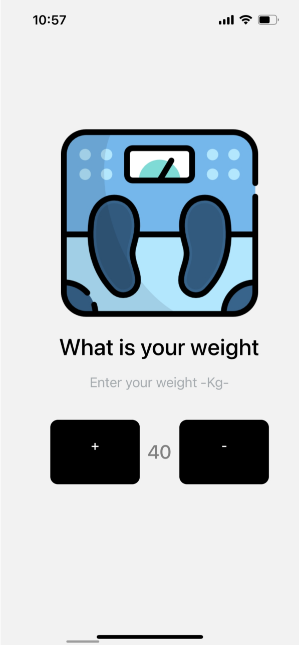


What is your height

Enter your height -cm-

166

Figure 4.14: Height screen

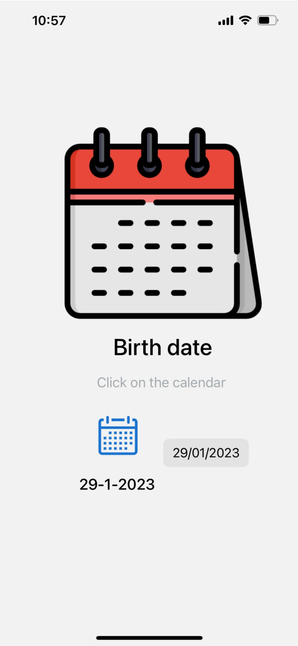


What is your weight

Enter your weight -Kg-

40

Figure 4.15: Weight screen



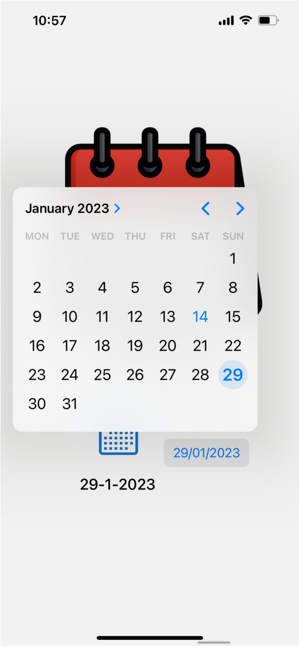
Birth date

Click on the calendar

29/01/2023

29-1-2023

Figure 4.16: Birth date screen



January 2023 >

MON	TUE	WED	THU	FRI	SAT	SUN
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

29/01/2023

29-1-2023

Figure 4.17: Edit date from date picker

6. **Main screen**
   This page will display: User's profile picture. Widget of images that may be used for advertisement later, or to display images related to the application. A chat button will be in the top of the screen to navigate the user to chat bot screen.

   The second widget will display, the burned calories taken from Google Fit, the eaten calories that will be calculated from the meals are registered by the user with a circular progress built by react native package named circular-progress-indicator, this progress circle shows the percentage of calories consumed compared with your daily calorie consumption goal. And finally the goal calories.

   The Third widget named Activity, it contains counted steps taken from Google-Fit, in addition to circular progress, this progress circle shows the percentage of walked steps in your day consumed compared with your daily steps goal, the burned calories taken from workouts that will be registered by the user when he exercise, And finally the goal steps. At the bottom of the screen there is a tab bar to navigate between app screens.

   If the goal steps have been reached the application will send a motivational message.

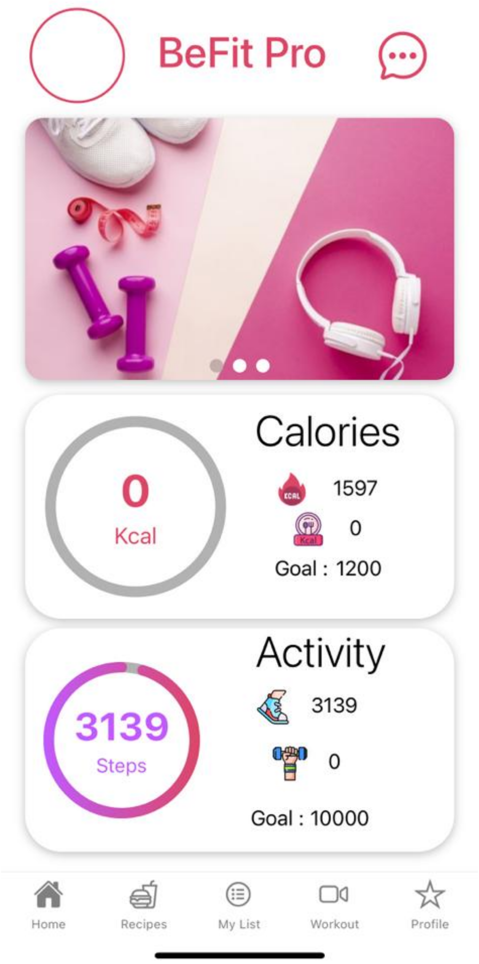


Figure 4.18: Main screen

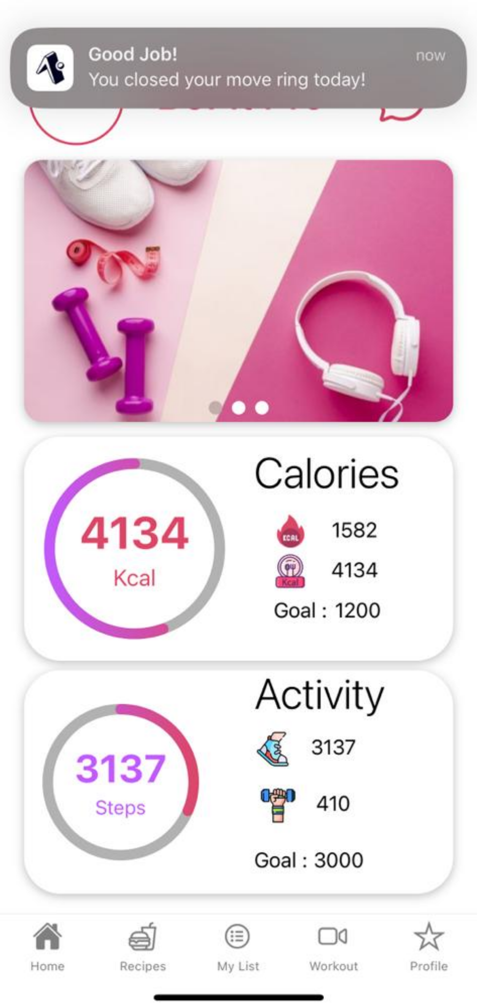


Figure 4.19: Main screen if goal steps reached

7. **Calories screen**

   This page will appear When the user presses on ”Calories” widget in the main screen, it contains two widgets.

   the first one displays eaten calories compared with goal calories, counted steps taken from Google-Fit compared to the goal steps, circular progress to track the percentage of burned calories from Google-Fit compared with your daily calorie consumption goal, and it displays the distance calculated from steps counter.

   The second widget shows the eaten calories in your day, the burned calories from your day activities, and finally the remaining calories you can eat to stay on your track.
   Here we notice since the user has not eaten anything his remaining calories are his daily goal plus the calories he burned during the day.

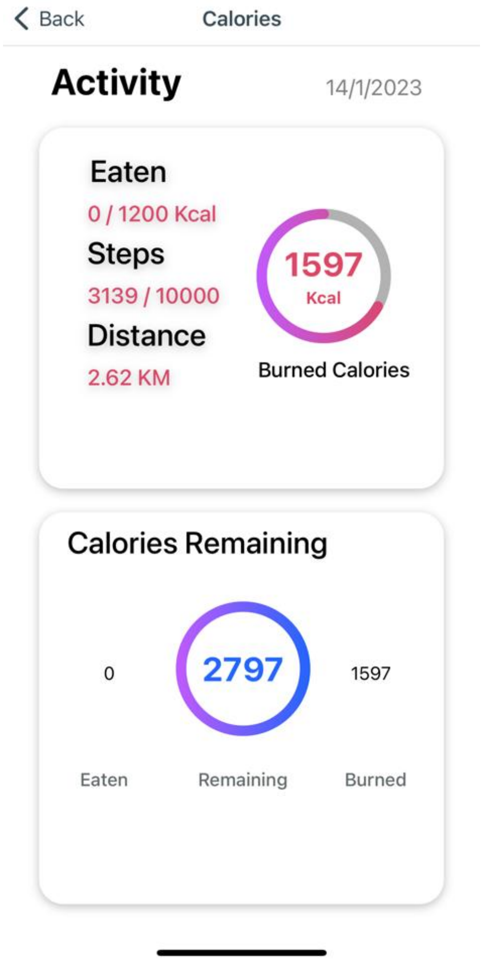


Figure 4.20: Calories Screen

8. **Programs screen**
   The program screen was added to help the user keep his healthy habits and encourage him by providing workout videos on the hand, and there will be no need to go to different application.
   It contains a list of programs that provides a variety of workouts in which the user can choose from, like, HIIT, Endurance,Yoga ..etc. The Admin can always add more programs to keep it more interesting.
   It also has a special widget called, suggestions, it is different from one user to another, it has a list of workouts based on the user activity and health details. Te videos get suggested to the user based on the python code in machine learning.

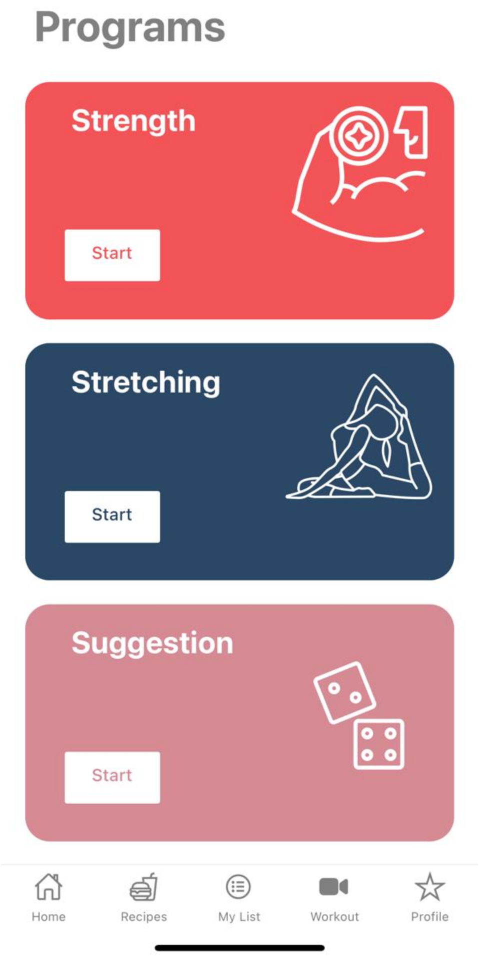


Figure 4.21: List of Programs 1

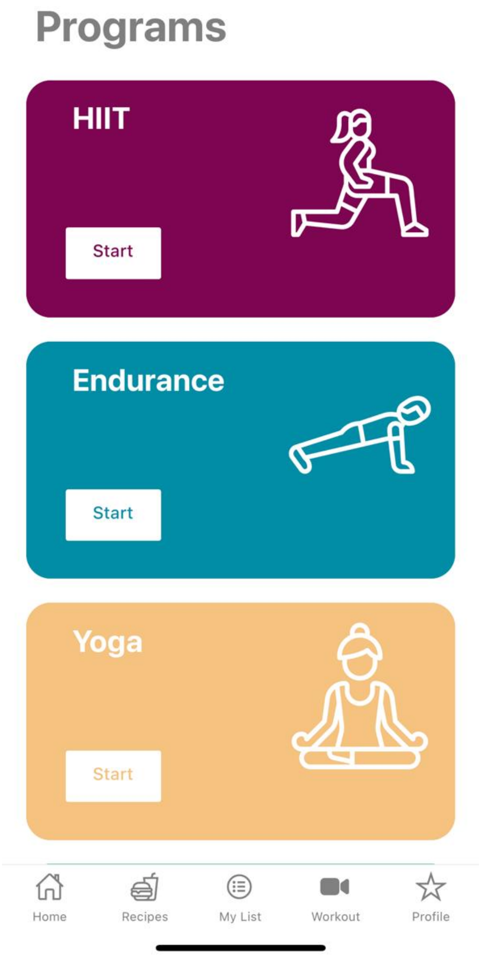
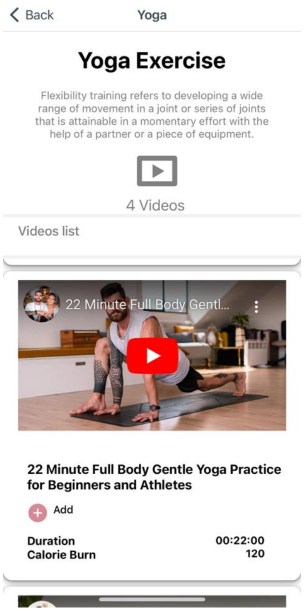


Figure 4.22: List of Programs 2

9. **Workouts Screens**
   Each workout screen contain a description of the current program, a list of workout videos that are inside a certain program. And each workout widget includes details about the workout, like, the calorie burned in this video, the duration and the video for the workout which can be viewed inside a YouTube frame and can be maximized for a full experience. The pages are shown below:


< Back Yoga

Yoga Exercise

Flexibility training refers to developing a wide range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment.

4 Videos

Videos list

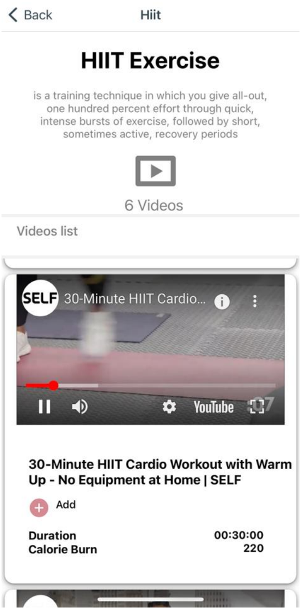
22 Minute Full Body Gentl...

22 Minute Full Body Gentle Yoga Practice for Beginners and Athletes

Add

Duration 00:22:00
Calorie Burn 120

Figure 4.23: Yoga


< Back Hiit

HIIT Exercise

is a training technique in which you give all-out, one hundred percent effort through quick, intense bursts of exercise, followed by short, sometimes active, recovery periods

6 Videos

Videos list

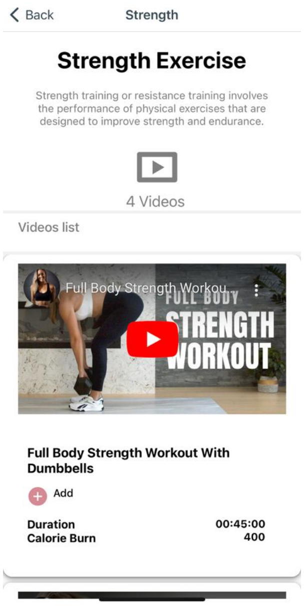
SELF 30-Minute HIIT Cardio...

30-Minute HIIT Cardio Workout with Warm Up - No Equipment at Home | SELF

Add

Duration 00:30:00
Calorie Burn 220

Figure 4.24: HIIT


< Back Strength

Strength Exercise

Strength training or resistance training involves the performance of physical exercises that are designed to improve strength and endurance.

4 Videos

Videos list

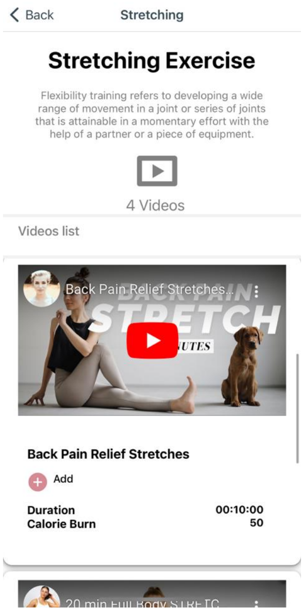
Full Body Strength Workou...

Full Body Strength Workout With Dumbbells

Add

Duration 00:45:00
Calorie Burn 400

Figure 4.25: Strength


< Back Stretching

Stretching Exercise

Flexibility training refers to developing a wide range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment.

4 Videos

Videos list

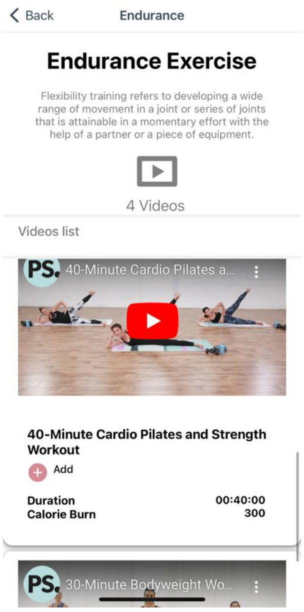
Back Pain Relief Stretches

Back Pain Relief Stretches

Add

Duration 00:10:00
Calorie Burn 50

Figure 4.26: Stretching



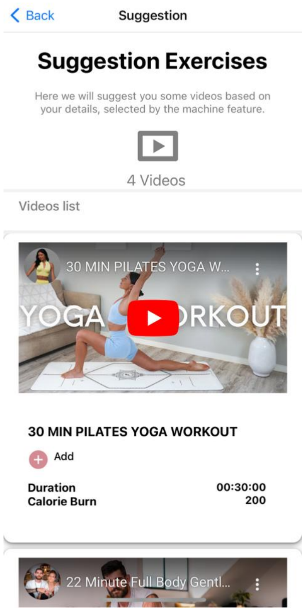
Endurance Exercise

Flexibility training refers to developing a wide range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment.

40-Minute Cardio Pilates and Strength Workout

Duration 00:40:00
Calorie Burn 300

Figure 4.27: Endurance



Suggestion Exercises

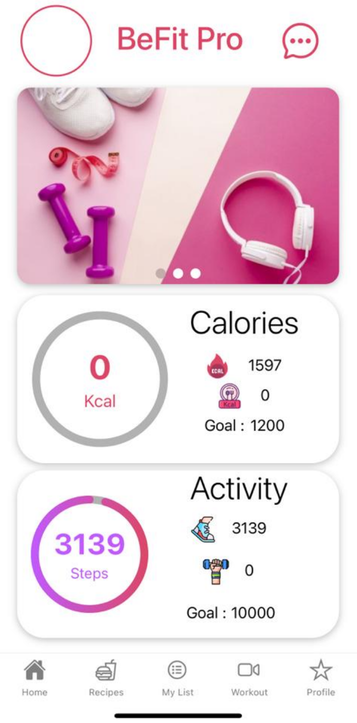
Here we will suggest you some videos based on your details, selected by the machine feature.

30 MIN PILATES YOGA WORKOUT

Duration 00:30:00
Calorie Burn 200

Figure 4.28: Suggestion

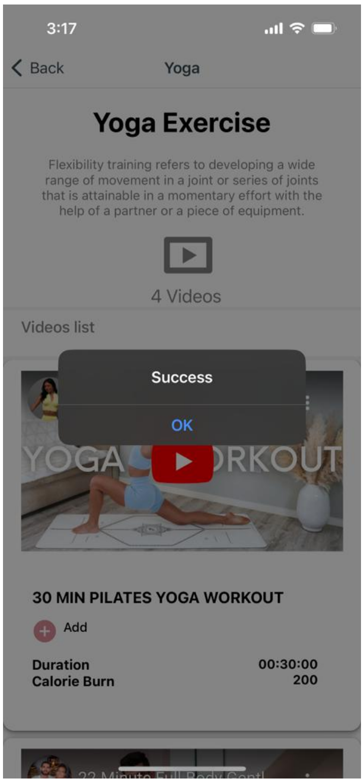
The user can do any of the workouts listed and then log it in his done workouts, all his workouts will be added to his workout calorie burn counter. Now lets take an example showing the addition operation: we can see as in figure 4.28 that the logged workouts is zero, then we start the addition operation.



Calories
0 Kcal
1597
0
Goal : 1200

Activity
3139 Steps
3139
0
Goal : 10000

Figure 4.29: Main Page before adding food, or workouts



Yoga Exercise

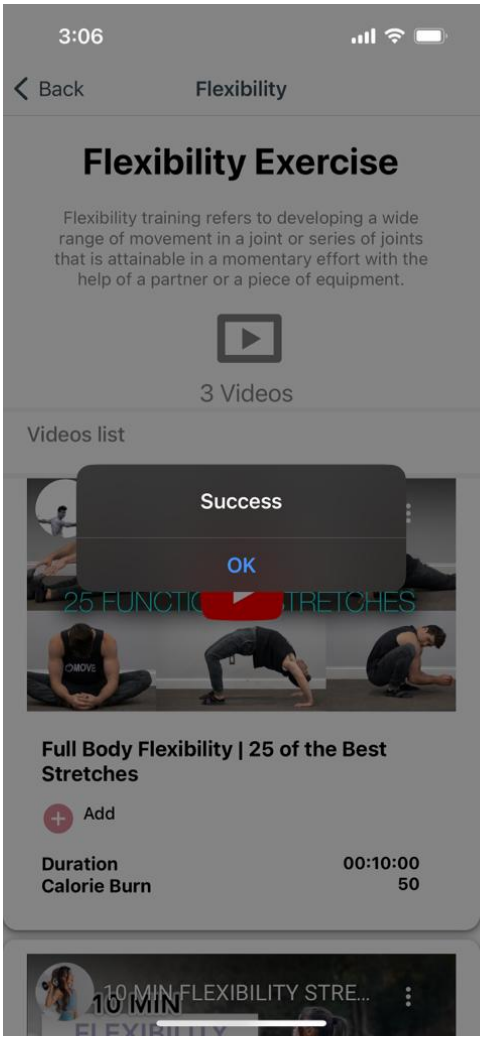
Flexibility training refers to developing a wide range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment.

30 MIN PILATES YOGA WORKOUT

Duration 00:30:00
Calorie Burn 200

Figure 4.30: Add Yoga Workout

After the addition operations we notice the workout calories in the main page has increased according to the logged workouts, the after can be shown in figure 4.31:



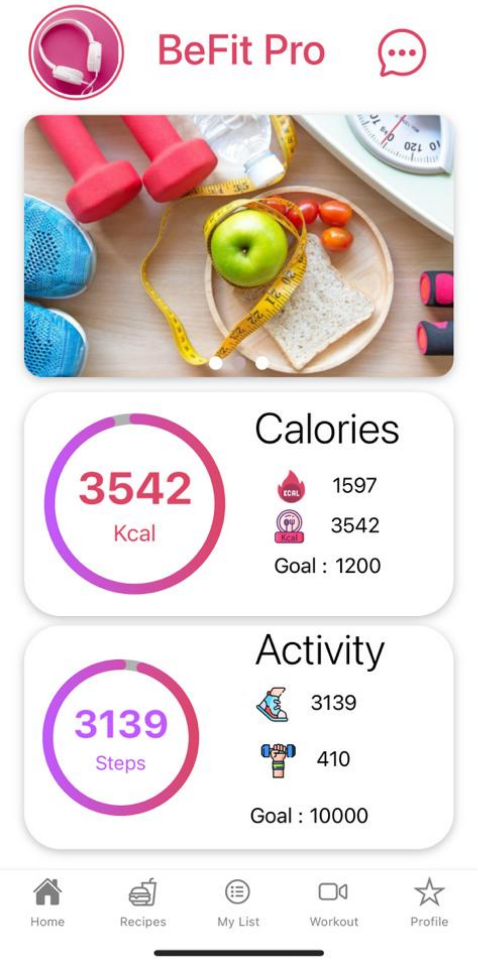
Flexibility Exercise

Flexibility training refers to developing a wide range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment.

Full Body Flexibility | 25 of the Best Stretches

Duration 00:10:00
Calorie Burn 50

Figure 4.31: Add Flexibility Workout



1597
3542
Goal : 1200

3139
410
Goal : 10000

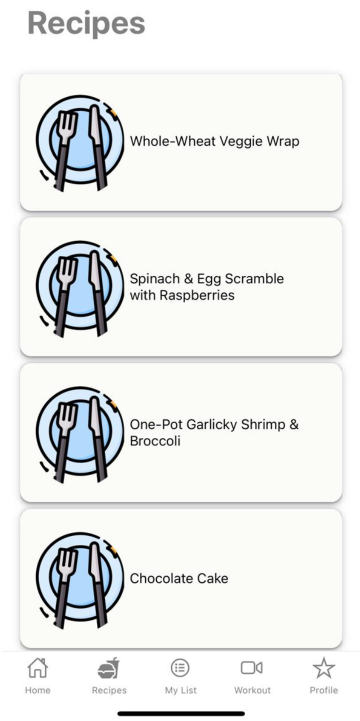
Figure 4.32: Main Page After Adding Workouts

10. **Recipes screen**

This feature has been added to the application to let the user browse healthy recipes easily and encourage him in maintaining a healthy lifestyle.

These recipes are added by the admin, when the user presses on any of these recipes in figure 4.32 it will navigate the to the meal screen shown in figure 4.33.

Meal screen displays the details of the pressed recipe which include, an image of the meal, the ingredient needed in making the meal, the instructions to help the user prepare the meal, and the nutrition value per serving size.



Recipes

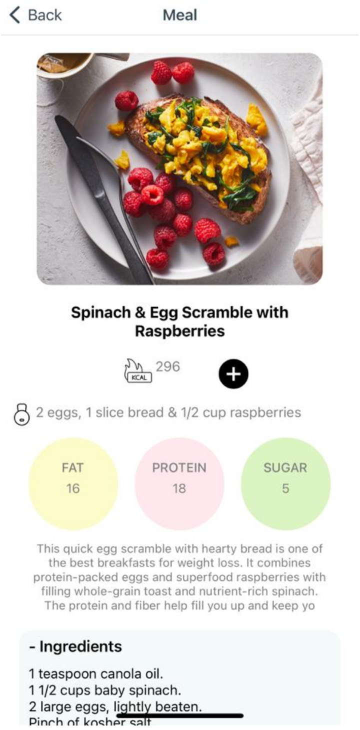
Whole-Wheat Veggie Wrap

Spinach & Egg Scramble with Raspberries

One-Pot Garlicky Shrimp & Broccoli

Chocolate Cake

Figure 4.33: Recipes screen



Spinach & Egg Scramble with Raspberries

2 eggs, 1 slice bread & 1/2 cup raspberries

FAT	PROTEIN	SUGAR
16	18	5

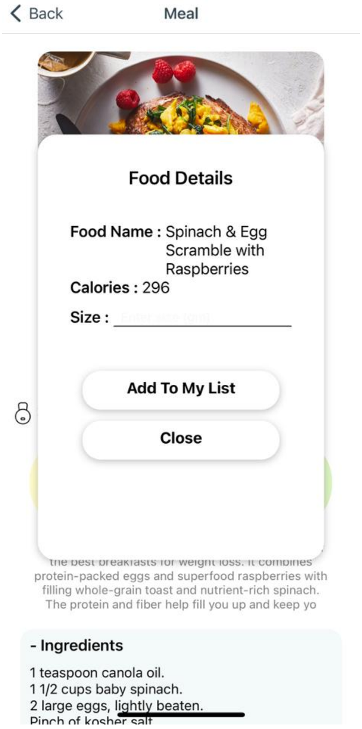
This quick egg scramble with hearty bread is one of the best breakfasts for weight loss. It combines protein-packed eggs and superfood raspberries with filling whole-grain toast and nutrient-rich spinach. The protein and fiber help fill you up and keep yo

- Ingredients

1 teaspoon canola oil.
1 1/2 cups baby spinach.
2 large eggs, lightly beaten.
Pinch of kosher salt

Figure 4.34: Meal screen

There is an 'Add' button, the user adds the meal to his list screen and log it's calories, each meal will be added to the list depending on their classification in the database (breakfast, dinner, lunch or snacks).
The user specifies the amount he has eaten like in figure 4.34 and then gets an indication of the success operation. After that the recipe will be added to the list page as shown in 4.36.



Food Details

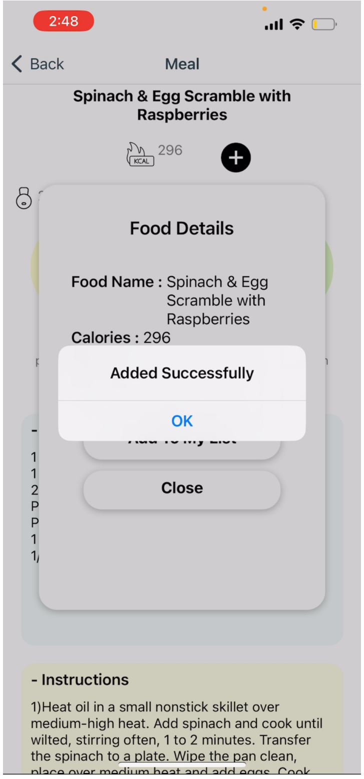
Food Name : Spinach & Egg Scramble with Raspberries
Calories : 296
Size : ____________

the best breakfasts for weight loss. It combines protein-packed eggs and superfood raspberries with filling whole-grain toast and nutrient-rich spinach. The protein and fiber help fill you up and keep yo

- Ingredients

1 teaspoon canola oil.
1 1/2 cups baby spinach.
2 large eggs, lightly beaten.
Pinch of kosher salt

Figure 4.35: Pop up page when add meal to the list



Spinach & Egg Scramble with Raspberries

Food Details

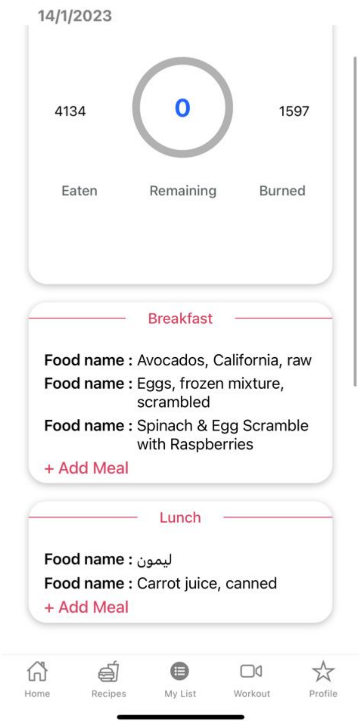
Food Name : Spinach & Egg Scramble with Raspberries
Calories : 296

Added Successfully

- Instructions

1)Heat oil in a small nonstick skillet over medium-high heat. Add spinach and cook until wilted, stirring often, 1 to 2 minutes. Transfer the spinach to a plate. Wipe the pan clean, place over medium heat and add eggs. Cook

Figure 4.36: Alert appears when the user add meal



14/1/2023

4134	0	1597
Eaten	Remaining	Burned

Breakfast

Food name : Avocados, California, raw
Food name : Eggs, frozen mixture, scrambled
Food name : Spinach & Egg Scramble with Raspberries

Lunch

Food name : ليمون
Food name : Carrot juice, canned

Figure 4.37: My List Screen after adding recipe

11. **List Screen**
    This screen provides the main food logging activity, at the top of the screen there is a widget that shows, the remaining calories with a circular progress, eaten calories and burned calories. The user can log his daily eaten food according to meals, breakfast, lunch, dinner and snacks. The user chooses the time slot in which he wants to log food into and press on Add Meal, which navigates him to a search screen including thousands of records. If the item the user is searching for is not included he can add a customized food item and use it regularly.
    The following screens will show the process of logging food, and adding custom food.

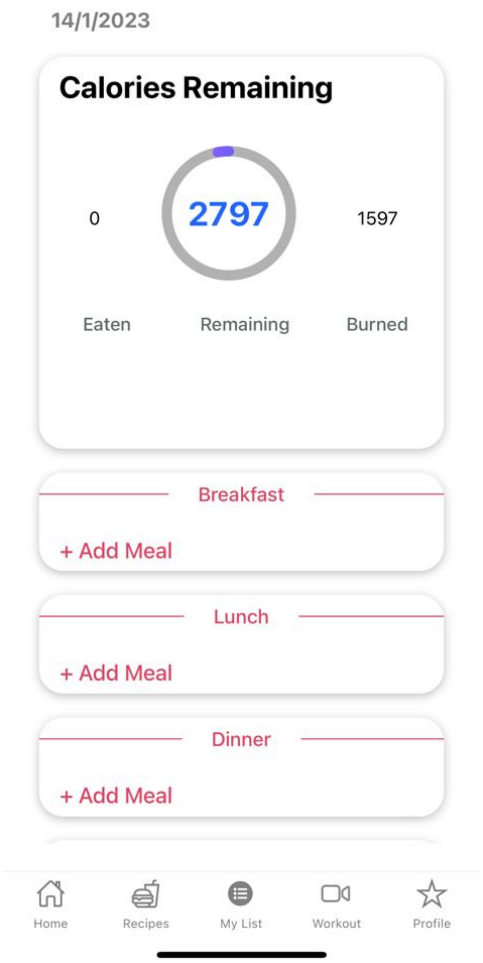
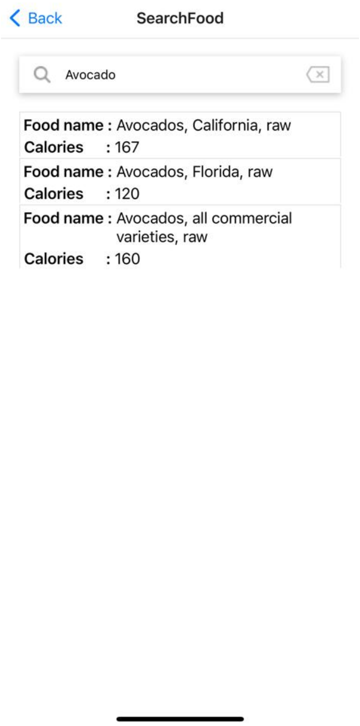


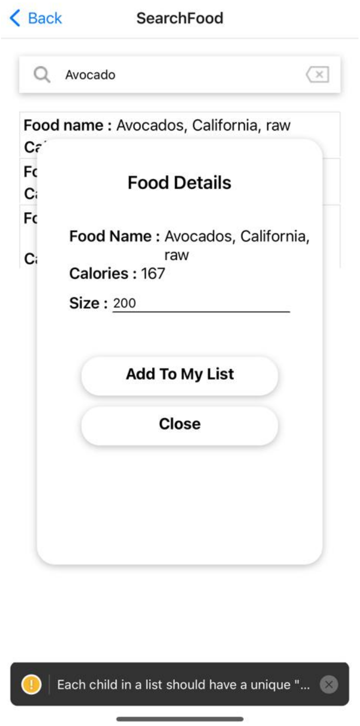
Figure 4.38: My List Screen

- **Searching and adding food from database:**
  The user enters his wanted food and get a list of all the available food with similar writing (figure 4.38). Then he chooses the amount eaten like in (figure 4.39).



Food name : Avocados, California, raw
Calories : 167
Food name : Avocados, Florida, raw
Calories : 120
Food name : Avocados, all commercial varieties, raw
Calories : 160

Figure 4.39: Searching in the database for food



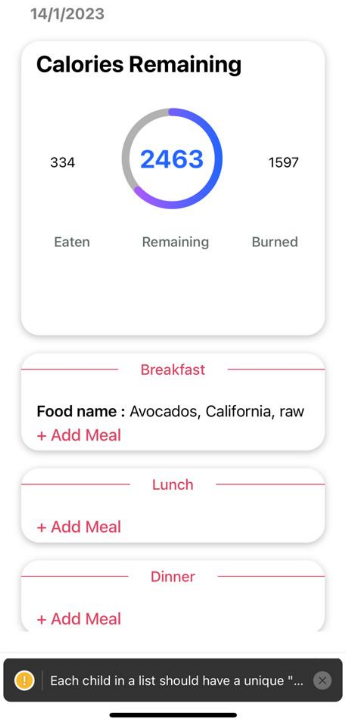
Food name : Avocados, California, raw

Food Details

Food Name : Avocados, California, raw
Calories : 167
Size : 200

Each child in a list should have a unique "...

Figure 4.40: Adding amount in grams for the meal

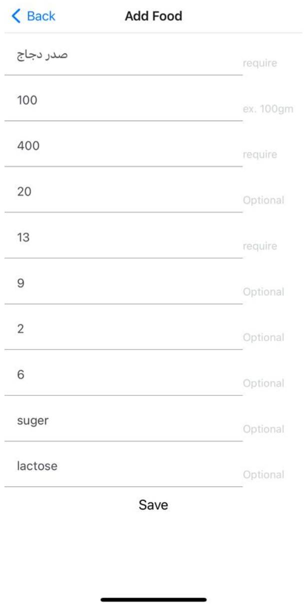


Food name : Avocados, California, raw

Each child in a list should have a unique "...

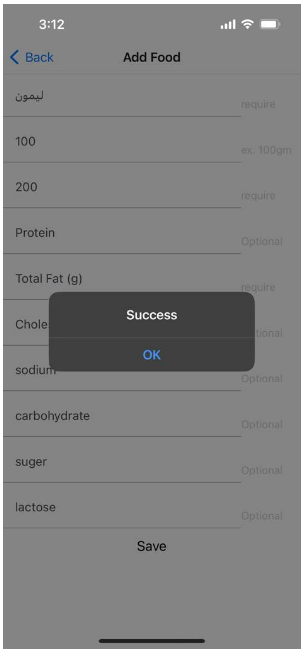
Figure 4.41: My List page after adding food

- **Adding custom food:**
  If the user can't find a certain food he can add it to the database, by adding the nutrition values and then he can access it anytime as it will be stored in the database. The user now can use the ”lemon” and ”Chicken Brest” he added in Arabic for logging his daily food. as shown in the list of figures below.



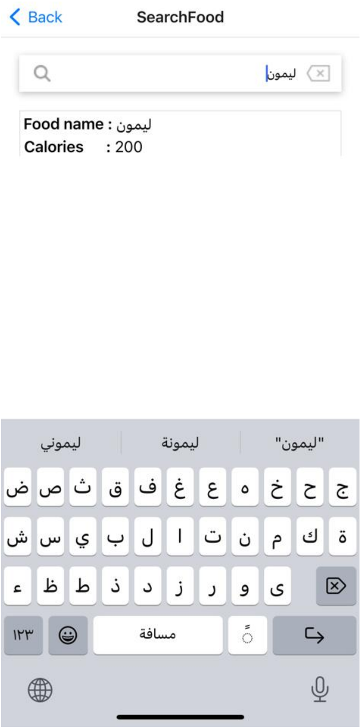
صدر دجاج
100
400
20
13
9
2
6
suger
lactose

Figure 4.42: Adding custom food with nutrition values



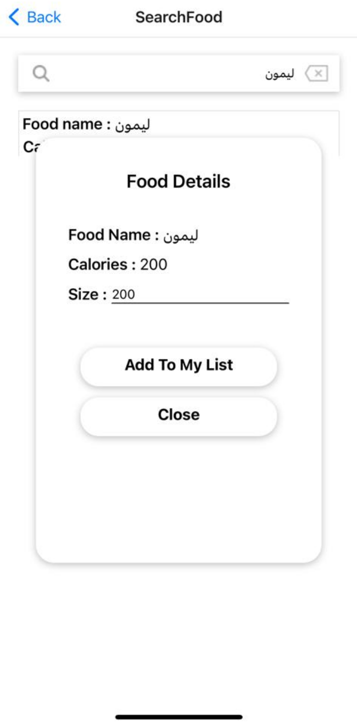
ليمون
100
200
Protein
Total Fat (g)
Chole
sodium
carbohydrate
suger
lactose

Figure 4.43: Adding custom food without nutrition values



Food name : ليمون
Calories : 200

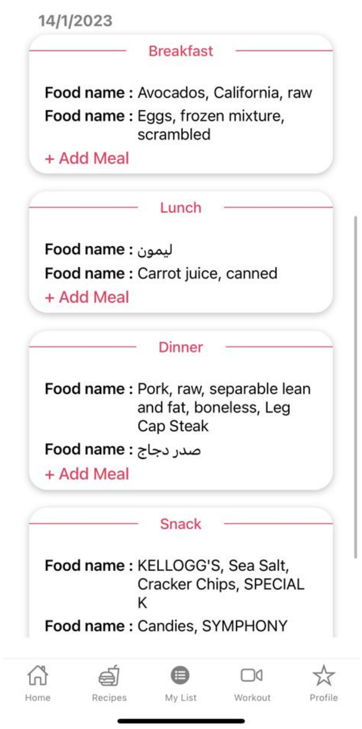
Figure 4.44: Searching for the custom food



Food name : ليمون
Food Name : ليمون
Calories : 200
Size : 200

Figure 4.45: Logging the custom food

- **Exceeding the goal calories:** If the user exceeds the goal calories he will get a notification indicating that, and warning him to watch what he eat.



14/1/2023

Breakfast

Food name : Avocados, California, raw
Food name : Eggs, frozen mixture, scrambled

Lunch

Food name : ليمون
Food name : Carrot juice, canned

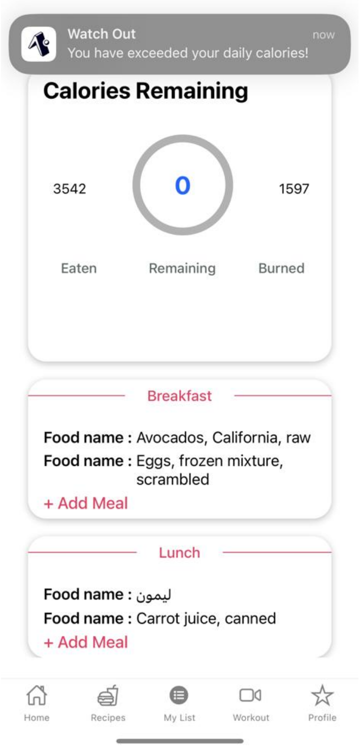
Dinner

Food name : Pork, raw, separable lean and fat, boneless, Leg Cap Steak
Food name : صدر دجاج

Snack

Food name : KELLOGG'S, Sea Salt, Cracker Chips, SPECIAL K
Food name : Candies, SYMPHONY

Figure 4.46: Eating so much food



Watch Out now
You have exceeded your daily calories!

Calories Remaining

3542	0	1597
Eaten	Remaining	Burned

Breakfast

Food name : Avocados, California, raw
Food name : Eggs, frozen mixture, scrambled

Lunch

Food name : ليمون
Food name : Carrot juice, canned

Figure 4.47: Notification will be sent if goal calories exceeded

12. **Profile Screen**

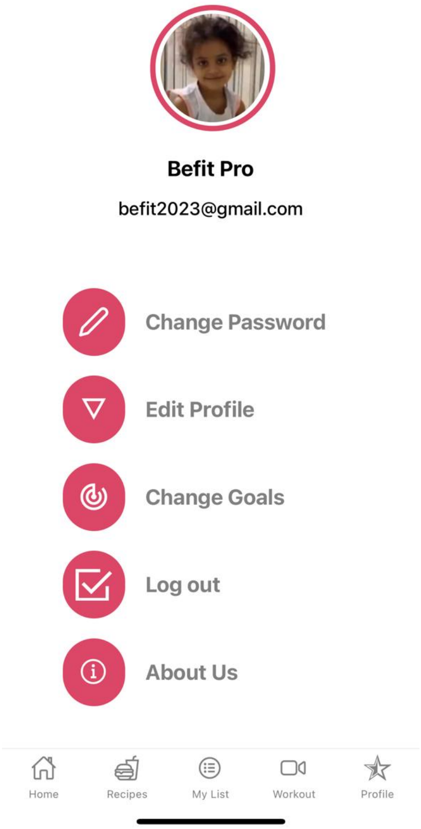
    In this page the user will be able to add profile picture, this feature was built using cloudinary API then, it will automatically appear on the home page, also it shows user name and E-mail.

    This page contains 5 buttons, first one let the user to change his password. Second one to edit the personal information, this page enables user to edit his personal information.

    When press on third button user will show The goals page, he will be able to modify his daily goals (eaten calories and steps).

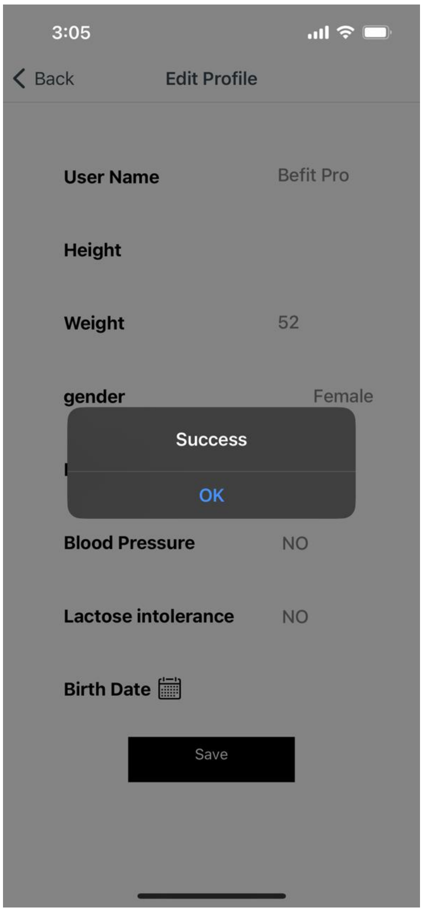
    Fourth button enables the user to log out of the account.

    Fifth button shows information about the application.


Befit Pro

befit2023@gmail.com

Figure 4.48: Profile Screen



User Name Befit Pro

Height

Weight 52

gender Female

Success

Blood Pressure NO

Lactose intolerance NO

Birth Date

Figure 4.49: Profile details Screen

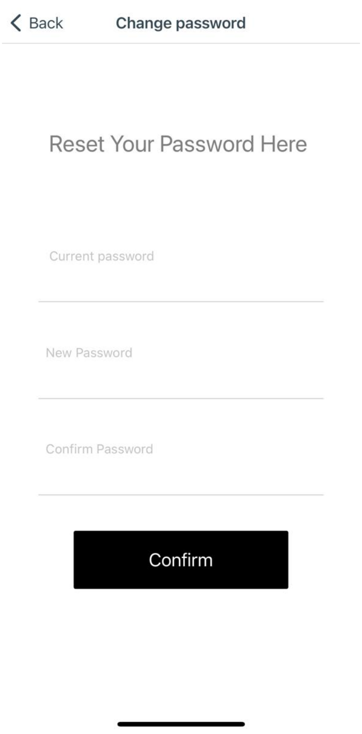
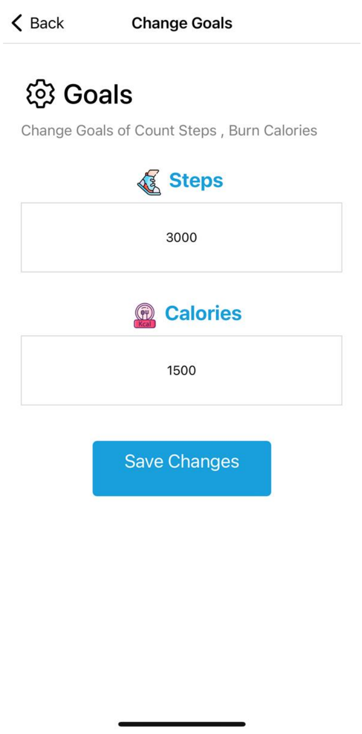


Figure 4.50: Reset password screen



Steps: 3000

Calories: 1500

Figure 4.51: Change goals screen

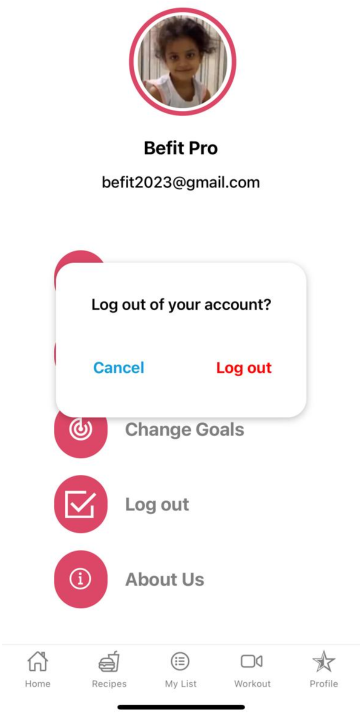
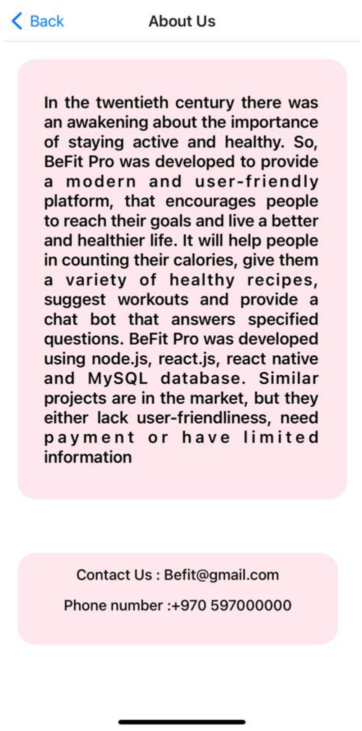


Figure 4.52: Log out PopUp



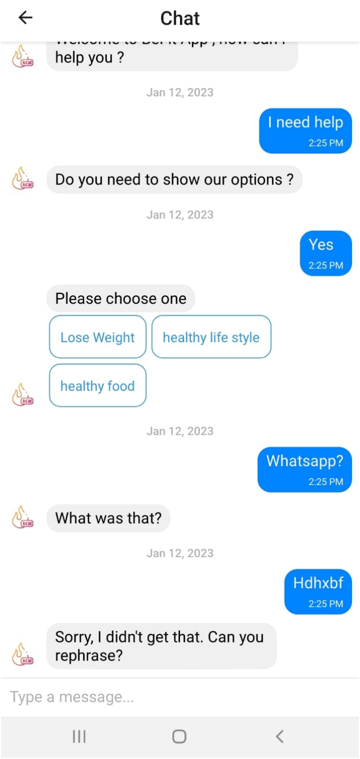
In the twentieth century there was an awakening about the importance of staying active and healthy. So, BeFit Pro was developed to provide a modern and user-friendly platform, that encourages people to reach their goals and live a better and healthier life. It will help people in counting their calories, give them a variety of healthy recipes, suggest workouts and provide a chat bot that answers specified questions. BeFit Pro was developed using node.js, react.js, react native and MySQL database. Similar projects are in the market, but they either lack user-friendliness, need payment or have limited information

Contact Us : Befit@gmail.com

Phone number :+970 597000000

Figure 4.53: About Us

13. **Chat bot**
    At chat bot screen users will be able to ask some questions and the robot will give the appropriate answer.



help you ?

Jan 12, 2023

I need help 2:25 PM

Do you need to show our options ?

Jan 12, 2023

Yes 2:25 PM

Please choose one

Jan 12, 2023

Whatsapp? 2:25 PM

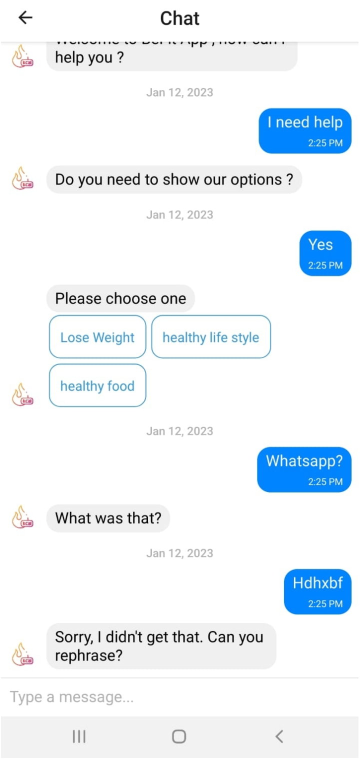
What was that?

Jan 12, 2023

Hdhxbf 2:25 PM

Sorry, I didn't get that. Can you rephrase?

Figure 4.54: Chat bot



help you ?

Jan 12, 2023

I need help 2:25 PM

Do you need to show our options ?

Jan 12, 2023

Yes 2:25 PM

Please choose one

Jan 12, 2023

Whatsapp? 2:25 PM

What was that?

Jan 12, 2023

Hdhxbf 2:25 PM

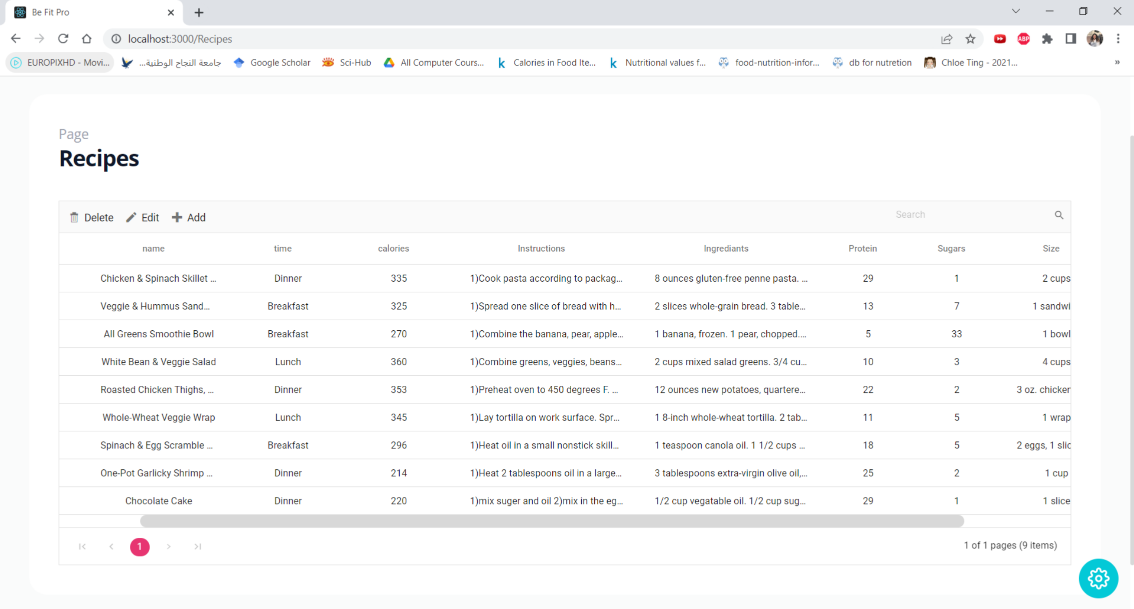
Sorry, I didn't get that. Can you rephrase?

Figure 4.55: Chat bot

4.3.4. Web Application

The admin side was created using node.js and react.js. He can do a list of the following:

- Make CRUD operations on programs, workouts,recipes and food table like shown in the figures bellow:
  Here the user can add, Delete, Edit and View recipes.



Page

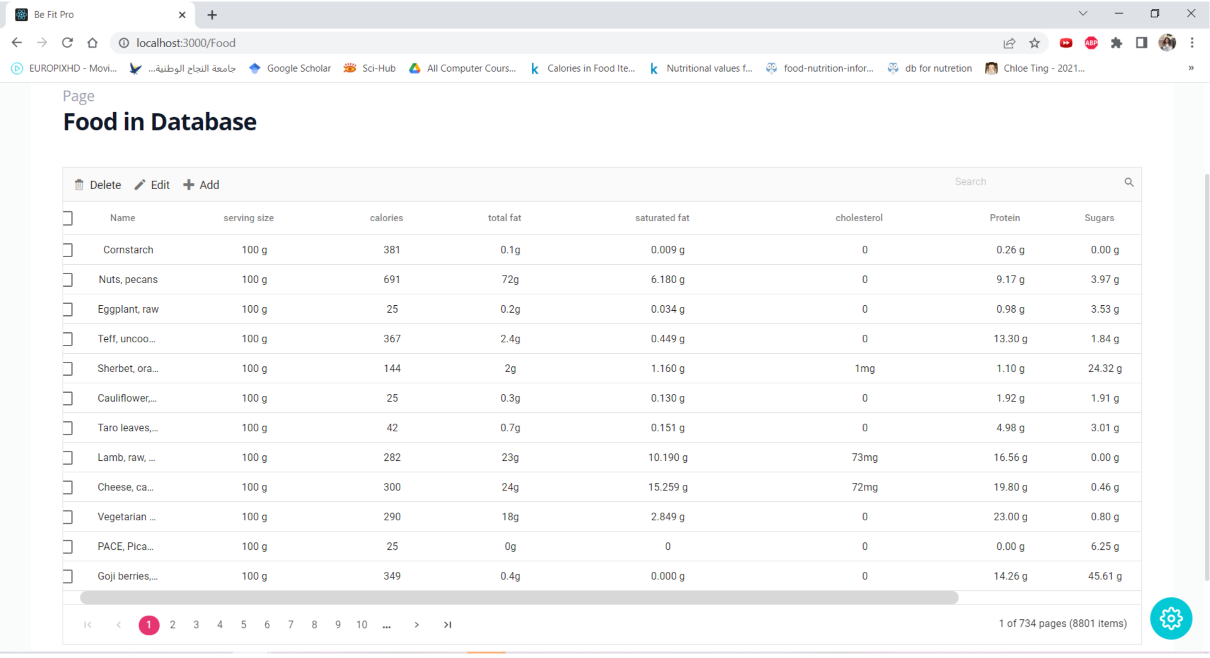
Recipes

name	time	calories	Instructions	Ingrediants	Protein	Sugars	Size
Chicken & Spinach Skillet ...	Dinner	335	1)Cook pasta according to packag...	8 ounces gluten-free penne pasta. ...	29	1	2 cups
Veggie & Hummus Sand...	Breakfast	325	1)Spread one slice of bread with h...	2 slices whole-grain bread. 3 table...	13	7	1 sandwi
All Greens Smoothie Bowl	Breakfast	270	1)Combine the banana, pear, apple...	1 banana, frozen. 1 pear, chopped....	5	33	1 bowl
White Bean & Veggie Salad	Lunch	360	1)Combine greens, veggies, beans...	2 cups mixed salad greens. 3/4 cu...	10	3	4 cups
Roasted Chicken Thighs, ...	Dinner	353	1)Preheat oven to 450 degrees F. ...	12 ounces new potatoes, quartere...	22	2	3 oz. chicker
Whole-Wheat Veggie Wrap	Lunch	345	1)Lay tortilla on work surface. Spr...	1 8-inch whole-wheat tortilla. 2 tab...	11	5	1 wrap
Spinach & Egg Scramble ...	Breakfast	296	1)Heat oil in a small nonstick skill...	1 teaspoon canola oil. 1 1/2 cups ...	18	5	2 eggs, 1 slic
One-Pot Garlicky Shrimp ...	Dinner	214	1)Heat 2 tablespoons oil in a large...	3 tablespoons extra-virgin olive oil,...	25	2	1 cup
Chocolate Cake	Dinner	220	1)mix suger and oil 2)mix in the eg...	1/2 cup vegatable oil. 1/2 cup sug...	29	1	1 slice

1 of 1 pages (9 items)

Figure 4.56: View recipes

Here the user can add, Delete, Edit and View food.



Page

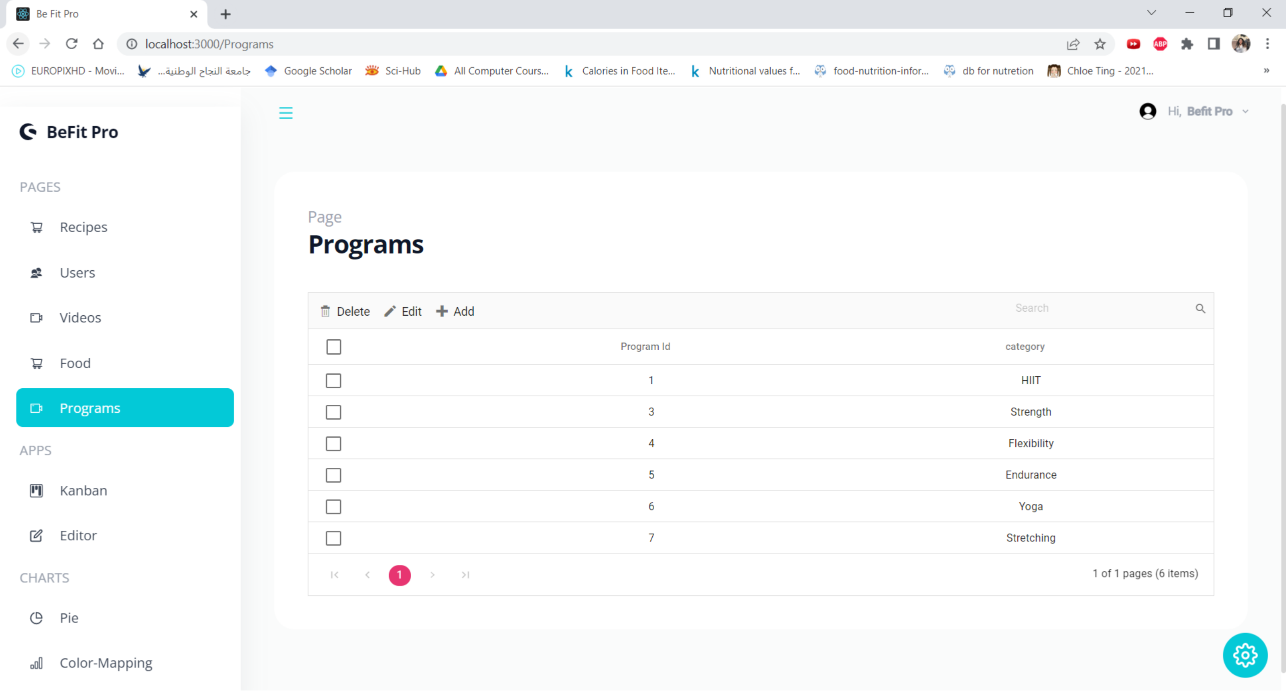
Food in Database

□	Name	serving size	calories	total fat	saturated fat	cholesterol	Protein	Sugars
□	Cornstarch	100 g	381	0.1g	0.009 g	0	0.26 g	0.00 g
□	Nuts, pecans	100 g	691	72g	6.180 g	0	9.17 g	3.97 g
□	Eggplant, raw	100 g	25	0.2g	0.034 g	0	0.98 g	3.53 g
□	Teff, uncoo...	100 g	367	2.4g	0.449 g	0	13.30 g	1.84 g
□	Sherbet, ora...	100 g	144	2g	1.160 g	1mg	1.10 g	24.32 g
□	Cauliflower,...	100 g	25	0.3g	0.130 g	0	1.92 g	1.91 g
□	Taro leaves,...	100 g	42	0.7g	0.151 g	0	4.98 g	3.01 g
□	Lamb, raw, ...	100 g	282	23g	10.190 g	73mg	16.56 g	0.00 g
□	Cheese, ca...	100 g	300	24g	15.259 g	72mg	19.80 g	0.46 g
□	Vegetarian ...	100 g	290	18g	2.849 g	0	23.00 g	0.80 g
□	PACE, Pica...	100 g	25	0g	0	0	0.00 g	6.25 g
□	Goji berries,...	100 g	349	0.4g	0.000 g	0	14.26 g	45.61 g

1 of 734 pages (8801 items)

Figure 4.57: View food

Here the user can add, Delete, Edit and View programs.


Be Fit Pro
localhost:3000/Programs
EUROPIXHD - Movi... جامعة النجاح الوطنية... Google Scholar Sci-Hub All Computer Cours... Calories in Food Ite... Nutritional values f... food-nutrition-infor... db for nutretion Chloe Ting - 2021...
BeFit Pro
PAGES
Recipes
Users
Videos
Food
Programs
APPS
Kanban
Editor
CHARTS
Pie
Color-Mapping
Hi, Befit Pro
Delete
Edit
Add
Search

Page

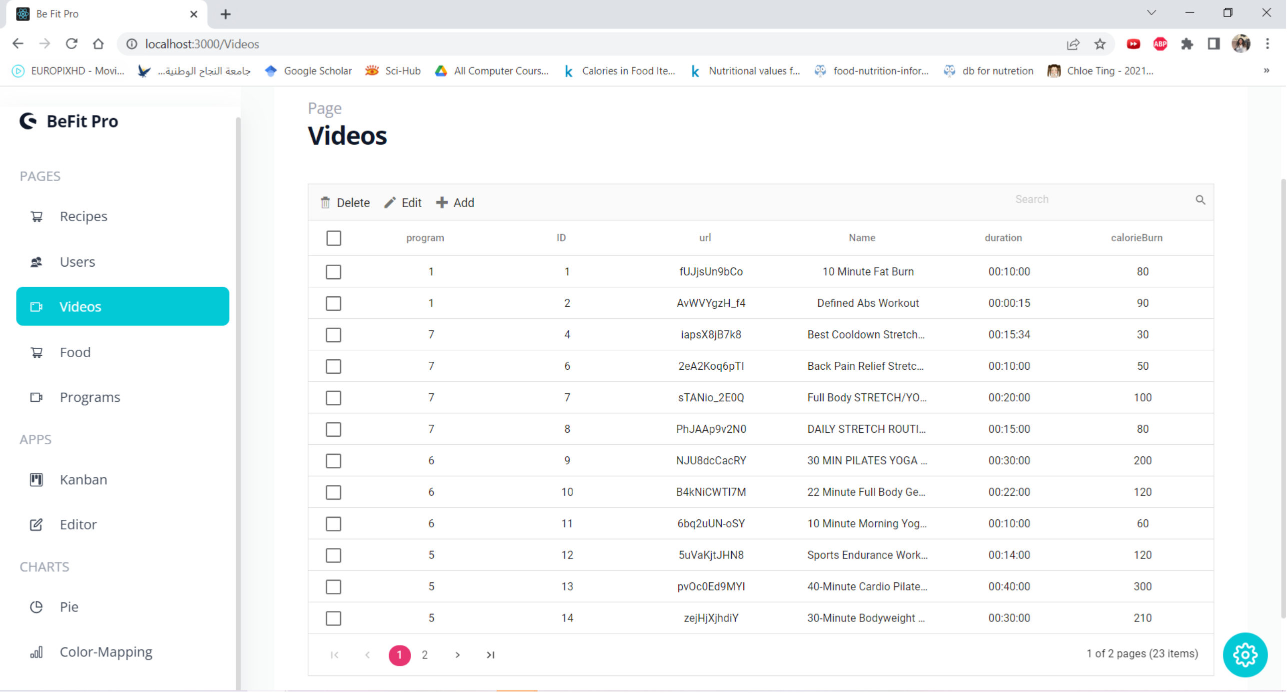
Programs

□	Program Id	category
□	1	HIIT
□	3	Strength
□	4	Flexibility
□	5	Endurance
□	6	Yoga
□	7	Stretching

1 of 1 pages (6 items)

Figure 4.58: View programs

Here the user can add, Delete, Edit and View workouts.


Be Fit Pro
localhost:3000/Videos
EUROPIXHD - Movi... جامعة النجاح الوطنية... Google Scholar Sci-Hub All Computer Cours... Calories in Food Ite... Nutritional values f... food-nutrition-infor... db for nutretion Chloe Ting - 2021...
BeFit Pro
PAGES
Recipes
Users
Videos
Food
Programs
APPS
Kanban
Editor
CHARTS
Pie
Color-Mapping
Delete
Edit
Add
Search

Page

Videos

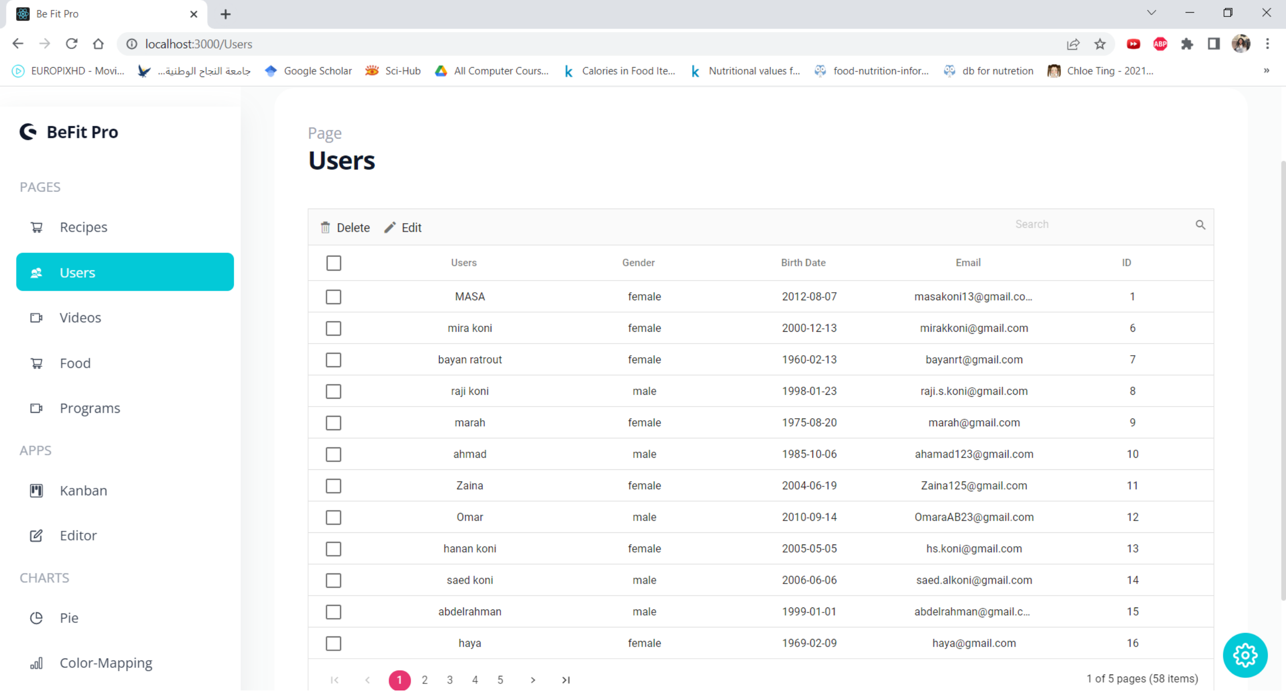
□	program	ID	url	Name	duration	calorieBurn
□	1	1	fUJjsUn9bCo	10 Minute Fat Burn	00:10:00	80
□	1	2	AvWVYgzH_f4	Defined Abs Workout	00:00:15	90
□	7	4	iapsX8jB7k8	Best Cooldown Stretch...	00:15:34	30
□	7	6	2eA2Koq6pTI	Back Pain Relief Stretc...	00:10:00	50
□	7	7	sTANio_2E0Q	Full Body STRETCH/YO...	00:20:00	100
□	7	8	PhJAAp9v2N0	DAILY STRETCH ROUTI...	00:15:00	80
□	6	9	NJU8dcCacRY	30 MIN PILATES YOGA ...	00:30:00	200
□	6	10	B4kNiCWTI7M	22 Minute Full Body Ge...	00:22:00	120
□	6	11	6bq2uUN-oSY	10 Minute Morning Yog...	00:10:00	60
□	5	12	5uVaKjtJHN8	Sports Endurance Work...	00:14:00	120
□	5	13	pvOc0Ed9MYI	40-Minute Cardio Pilate...	00:40:00	300
□	5	14	zejHjXjhdiY	30-Minute Bodyweight ...	00:30:00	210

1 2

1 of 2 pages (23 items)

Figure 4.59: View workouts

- The admin can also view the list of users in his application and delete them.


Be Fit Pro
localhost:3000/Users
EUROPIXHD - Movi... جامعة النجاح الوطنية... Google Scholar Sci-Hub All Computer Cours... Calories in Food Ite... Nutritional values f... food-nutrition-infor... db for nutretion Chloe Ting - 2021...
BeFit Pro
PAGES
Recipes
Users
Videos
Food
Programs
APPS
Kanban
Editor
CHARTS
Pie
Color-Mapping

Page

Users

Delete Edit Search

□	Users	Gender	Birth Date	Email	ID
□	MASA	female	2012-08-07	masakoni13@gmail.co...	1
□	mira koni	female	2000-12-13	mirakkoni@gmail.com	6
□	bayan ratrout	female	1960-02-13	bayanrt@gmail.com	7
□	raji koni	male	1998-01-23	raji.s.koni@gmail.com	8
□	marah	female	1975-08-20	marah@gmail.com	9
□	ahmad	male	1985-10-06	ahamad123@gmail.com	10
□	Zaina	female	2004-06-19	Zaina125@gmail.com	11
□	Omar	male	2010-09-14	OmaraAB23@gmail.com	12
□	hanan koni	female	2005-05-05	hs.koni@gmail.com	13
□	saed koni	male	2006-06-06	saed.alkoni@gmail.com	14
□	abdelrahman	male	1999-01-01	abdelrahman@gmail.c...	15
□	haya	female	1969-02-09	haya@gmail.com	16

1 2 3 4 5 1 of 5 pages (58 items)

Figure 4.60: View users

- The admin can see the insights of his application and how it is doing by seeing the age group of the users like figure 4.61 and the registration traffic throughout months of the year like figure 4.62.

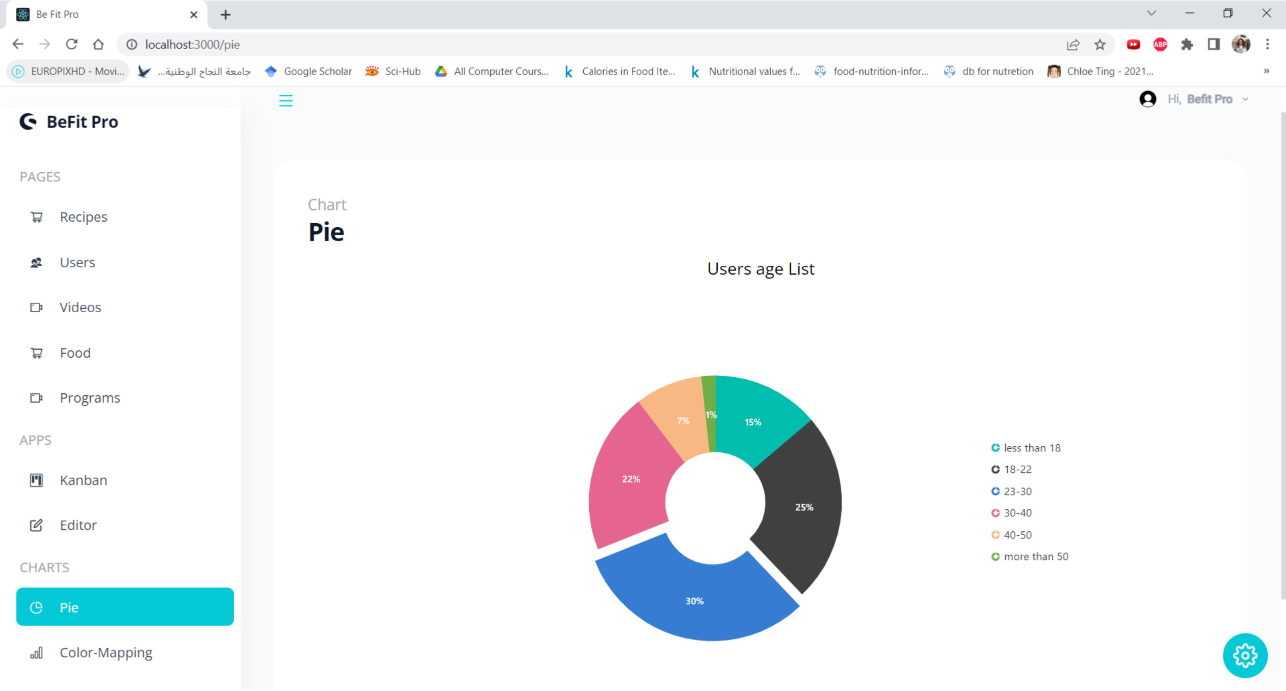


Figure 4.61: Users age chart

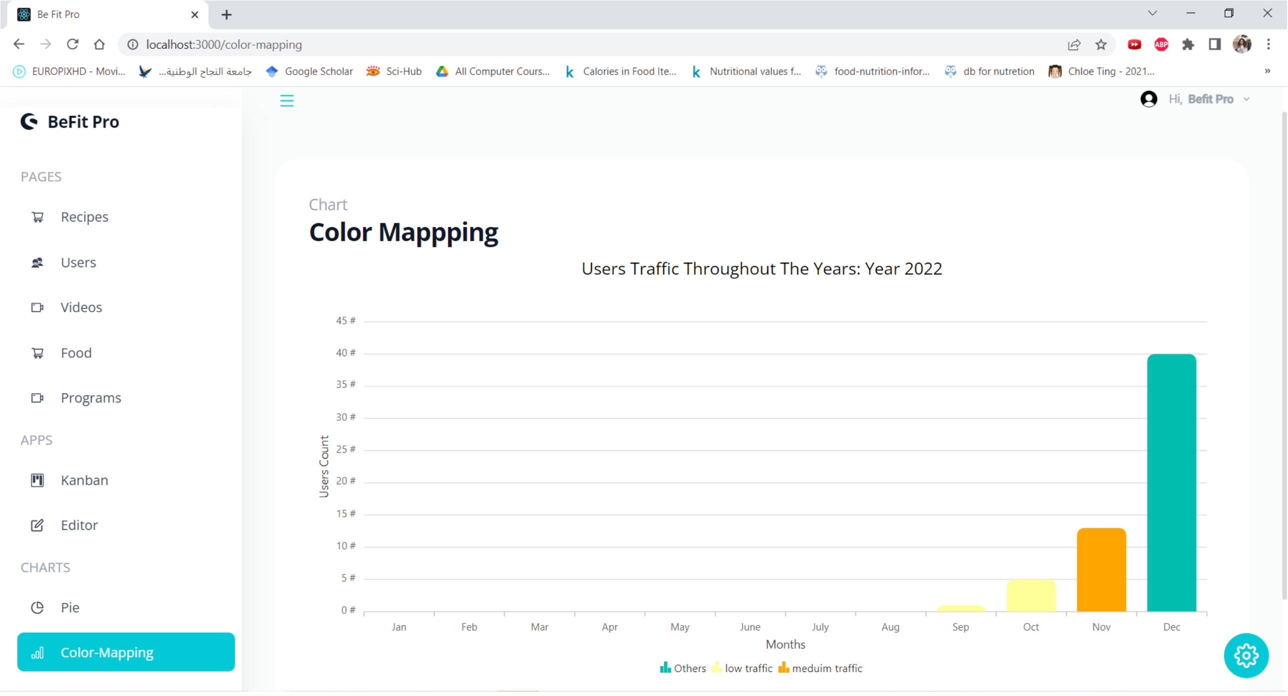
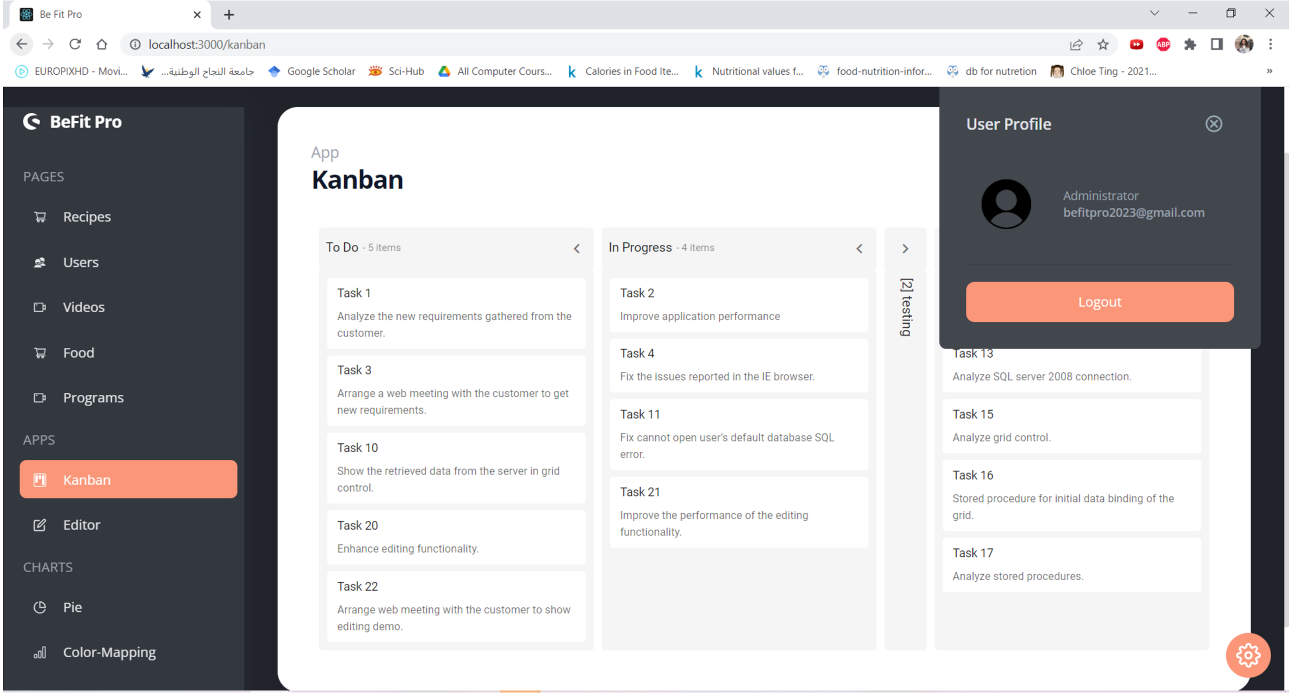


Figure 4.62: Users traffic

- The admin will have a task page he can put his daily tasks in. It was used from kanban from react. He can also logout through the log out button.



Administrator
befitpro2023@gmail.com

Task 1
Analyze the new requirements gathered from the customer.

Task 3
Arrange a web meeting with the customer to get new requirements.

Task 10
Show the retrieved data from the server in grid control.

Task 20
Enhance editing functionality.

Task 22
Arrange web meeting with the customer to show editing demo.

Task 2
Improve application performance

Task 4
Fix the issues reported in the IE browser.

Task 11
Fix cannot open user's default database SQL error.

Task 21
Improve the performance of the editing functionality.

Task 13
Analyze SQL server 2008 connection.

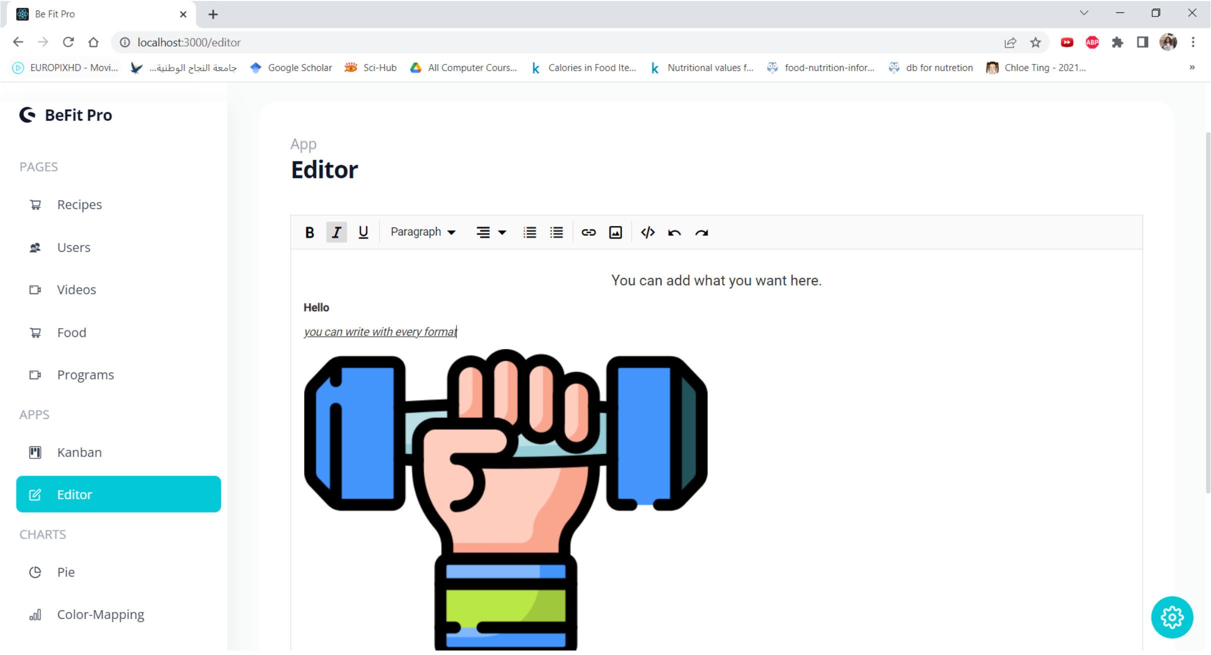
Task 15
Analyze grid control.

Task 16
Stored procedure for initial data binding of the grid.

Task 17
Analyze stored procedures.

Figure 4.63: Task list and logout

- The admin will also have a text editor to log his thoughts if he wants. It was used from react editor.



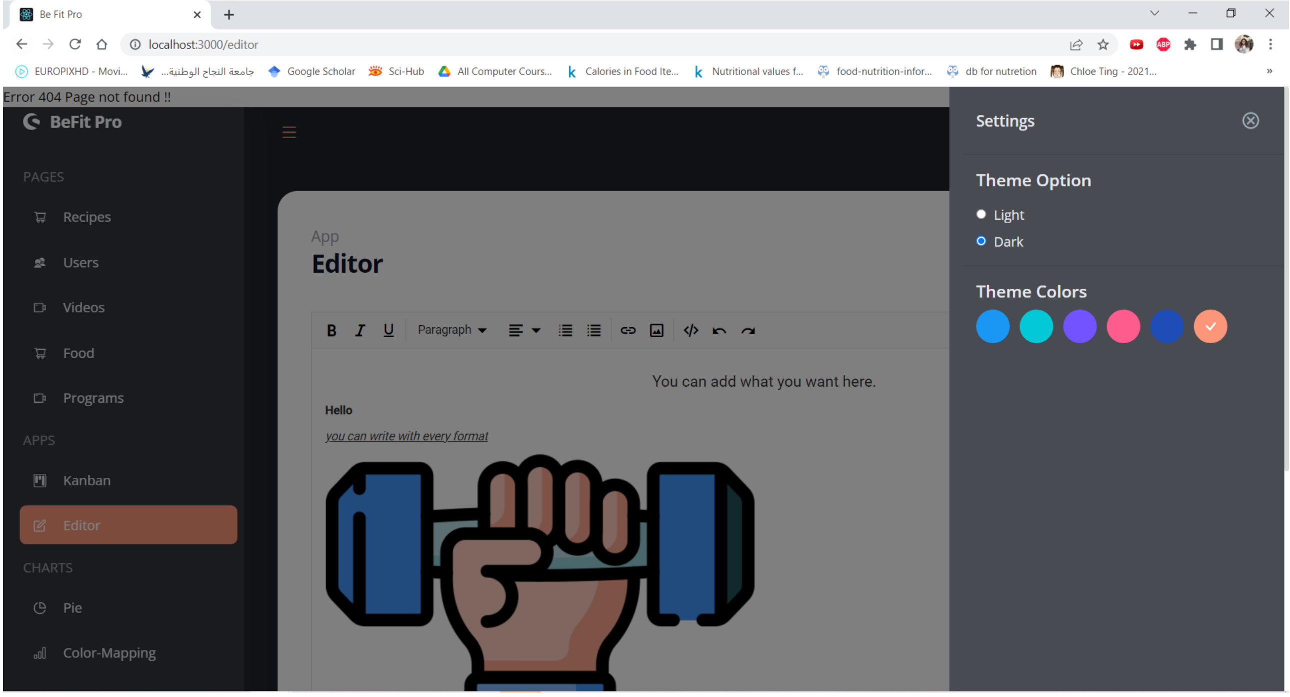
You can add what you want here.

Hello

you can write with every format

Figure 4.64: Editor page

- He can change the theme of the page from light to dark, he can also change the colors from a color palette.



Error 404 Page not found !!

Theme Option

○ Light
● Dark

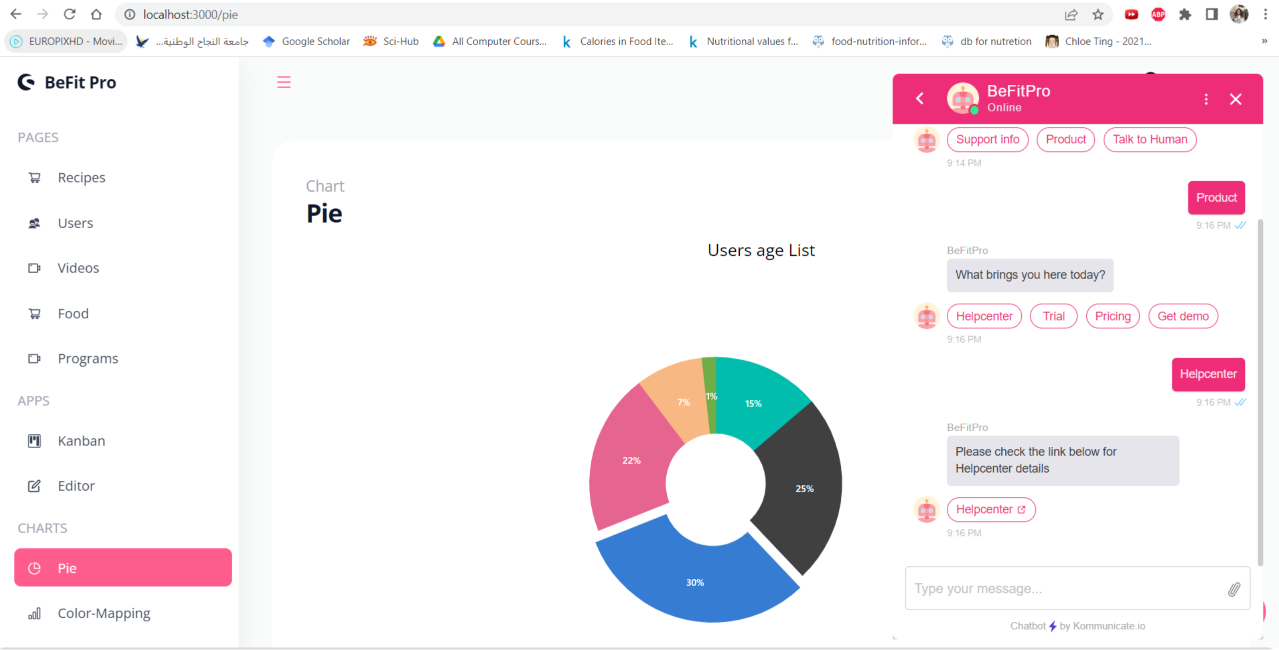
You can add what you want here.

Hello

you can write with every format

Figure 4.65: Change theme

- A chatbot will be provided, so he can answer the questions of the user in the future when a side for the trainers will be added.
  The chat bot handels the conversation to humans when he don not understand.



9:14 PM

Product — 9:16 PM

BeFitPro: What brings you here today?

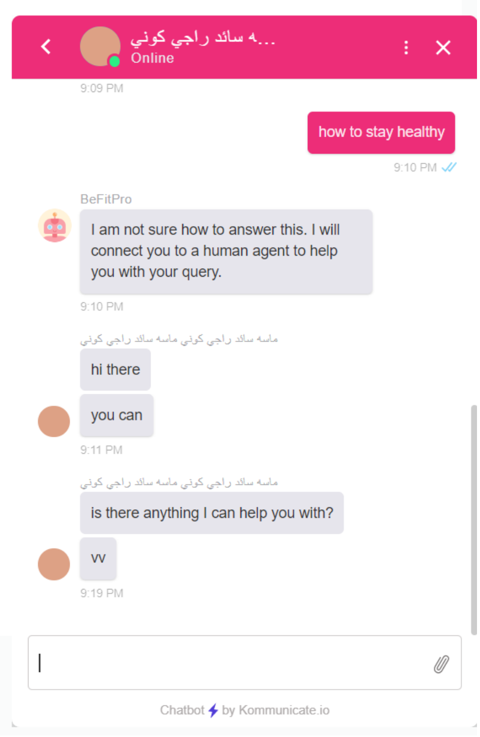
9:16 PM

Helpcenter — 9:16 PM

BeFitPro: Please check the link below for Helpcenter details

9:16 PM

Figure 4.66: Chat bot



9:09 PM

how to stay healthy

9:10 PM

BeFitPro

I am not sure how to answer this. I will connect you to a human agent to help you with your query.

9:10 PM

ماسه سائد راجي كوني ماسه سائد راجي كوني

hi there

you can

9:11 PM

ماسه سائد راجي كوني ماسه سائد راجي كوني

is there anything I can help you with?

vv

9:19 PM

Figure 4.67: Chatbot with human assist

5

Results and Analysis

The final result is a user-friendly application with many features built with many tools and programming languages to help users reach their goals and make healthy life style by By committing to exercise, not exceeding the allowed number of calories, and suggesting healthy meals for users.

Starting with VS code to build the front-end and back-end then MySQL was used to build huge data base.

In addition, machine learning and AI was used in this application with Google APIs to make the project more efficient.

6
Discussion

6.1. Testing

The mobile application was reviewed and tested constantly with the supervisor Dr. Anas Tomah, as well as it was given to a small group of family and friends and gave their experience and helpful advice through out the development process.

6.2. Learning Curve

At first building the application was very hard as there was three new languages needed to be learnt in addition to another architectural style which separates client side and serve-side.

So, the first few months were very unproductive from the application development. But, with a great set of documents, plenty of online tutorials, and a community of supportive people, the learning mission was not as challenging or steep as it initially seemed.

The following months after that were very productive as the application was built 90% front-end and back-end separately. After that the connection process took some time to get used to, but the following months were much easier as we got the hang of the work.

7

Conclusions and Recommendation

7.1. Things we learned

- how to build mobile application using react native and node js, building end points, using recommendation system with machine learning
- Understanding how to use dialog flow to build chat bot.
- How to set up expo to render the application without using emulator .
- How to solve errors and installing packages in the right way.

7.2. Future Work

- Future work will include a recommendation system for displaying recipes based on the user's personal information using machine learning.
- A connection system between users will be developed to allow conversation between users, the connected users will have the same interests and same goals, and that be a huge support system for the person to archive his goals.
- in addition, the user will be able to communicate with nutritionists to communicate with them continuously and ask for their advice.
- e-commerce section will be added to the application, where the user will be able to order healthy meals offered on the application.

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