FitMatch

Tesina - Human Computer Interaction

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Contents

1 Introduction **4**

2 Requirement analysis **4**
2.1 Competitor analysis . . . 4
2.2 User Profile, personas and scenarios . . . 7
2.2.1 User Profile . . . 7
2.2.2 Personas and scenarios . . . 7
2.3 Questionnaire analysis . . . 10
2.3.1 Questionnaire conclusions . . . 21
2.4 Interviews . . . 22
2.4.1 Interviews conclusions . . . 24

3 Task analysis **25**
3.1 Authentication to application . . . 25
3.1.1 HTA . . . 25
3.1.2 STN . . . 26
3.2 Request fitness plan . . . 26
3.2.1 HTA . . . 26
3.2.2 STN . . . 27
3.3 Request diet plan . . . 27
3.3.1 HTA . . . 27
3.3.2 STN . . . 28
3.4 Insert extra meal . . . 28
3.4.1 HTA . . . 28
3.4.2 STN . . . 29
3.5 Show plans of the day . . . 29
3.5.1 HTA . . . 29
3.5.2 STN . . . 30

4 Prototype 1 **31**

5 Expert Based Evaluation **39**
5.1 Heuristic Evaluation . . . 39
5.1.1 Nielsen's Heuristics . . . 39
5.1.2 Expert Report . . . 41
5.2 Cognitive Walk-through . . . 43
5.2.1 Expert Report . . . 45

6 Prototype 2 **50**
6.1 Correction of HE detected defects . . . 50
6.2 Correction of CW detected defects . . . 60

7 Think Aloud **61**
7.1 TA session . . . 61
7.2 Conclusions of the think aloud session . . . 61

8 Controlled Experiment **63**
8.1 Insert Extra Meal . . . 63
8.1.1 ANOVA One-way Analysis . . . 64
8.2 Request Fitness Plan . . . 66
8.2.1 ANOVA One-way Analysis . . . 67

9 Final Product: Fit Match **69**
9.1 Technological information . . . 69
9.2 Storyboard . . . 69

10 Conclusion **81**
10.1 Future Works . . . 81

List of Figures

1 Competitors comparison . . . 6
2 Persona: Maria . . . 7
3 Persona: Diego . . . 9
4 Persona: Marcus . . . 10
5 Task: Sign Up . . . 32
6 Task: Login and view profile . . . 33
7 Task: Request Fitness Plan . . . 34
8 Task Request Diet Plan . . . 35
9 Insert Extra Meal . . . 36
10 Task: Show plan of the day fitness . . . 37
11 Task: Show plan of the day diet . . . 38
12 Interface 1 . . . 63
13 Interface 2 . . . 63
14 Seconds to complete the task with the 2 different interfaces . . . 65
15 ANOVA Results . . . 65
16 Interface 1 . . . 66
17 Interface 2 . . . 66
18 Seconds to complete the task with the 2 different interfaces . . . 68
19 ANOVA Results . . . 68
20 Intro pages . . . 70
21 Authentication . . . 71
22 Homepage . . . 72
23 Request fitness plan . . . 73
24 Request diet plan . . . 74
25 Insert extra meal . . . 75
26 Show today's fitness plan . . . 76
27 Show today's diet plan . . . 77
28 Show recipe details . . . 78
29 Account . . . 79
30 App settings and contact us . . . 80

1 Introduction

FitMatch is an application designed to help users find the perfect workout and diet for their individual needs. The application uses information provided by the user, such as their age, height, weight, level of physical activity, and fitness goals to evaluate information provided by the user. The main goal of FitMatch is to provide a list of personalized workouts and diets that have been selected based on the user's specific needs. In addition, FitMatch also offers a variety of tools to help users maintain their fitness regimen. The application has a physical activity tracking feature to help users monitor their progress and also provides tips and advice to help users achieve their goals. One of the key features of FitMatch is its ability to constantly adapt and adjust to the user's changing needs. As the user progresses in their fitness journey and achieves their goals, the app will adjust their workouts and diets accordingly to continue to challenge and support them. FitMatch is the ideal application for anyone looking for a simple and personalized way to improve their health and fitness, without wasting time in organizing training days and meals to be eaten during the day.

2 Requirement analysis

2.1 Competitor analysis

The main competitors to our application are:

- MyFitnessPal
- Fitbit
- MMA Spartan
- 7 Minute Workout

We will analyze the features of competitors to get information about the advantages, disadvantages, and tips that we could use in the implementation of our application:

- **MyFitnessPal:** Popular app that allows users to track their daily food intake and exercise.
  - Advantages:
    * Has a large database of over 11 million foods, making it easy for users to find and log their meals.
    * Has an active community of users who can offer support and advice to one another.
    * Can integrate with other apps and devices, such as fitness trackers and smart scales, to help users track their progress.
  - Disadvantages:
    * Inaccurate calorie counts: Some users have reported inaccuracies in MyFitnessPal's calorie counts for certain foods, which can lead to overeating or under-eating.
    * Time-consuming: Tracking every meal and snack can be time-consuming and may be difficult to maintain in the long term.
    * Some features, such as tracking macro-nutrients and accessing certain recipes, require a paid subscription.

  - Tips: Having a large database with specifications of all kinds of common foods is a good idea.

- **Fitbit:** Popular app that allows users to track their daily food intake, exercise, and weight.
  - Advantages:
    * Fitbit devices use advanced sensors to accurately track their health metrics.
    * Users can set personalized goals for their daily activity levels and health metrics.
    * Has an active community of users who can offer support and advice to one another.
    * Fitbit can send users reminders to move, drink water, and take breaks.
  - Disadvantages:
    * Fitbit devices can be expensive, and some features require a paid subscription.
  - Tips: Active community of users who can offer support and advice is a good idea. Also integrating data obtained from trackers is very useful.

- **MMA Spartan:** is a fitness app designed for martial arts enthusiasts and individuals looking to get in shape.
  - Advantages:
    * A wide range of workouts that target various muscle groups and aspects.
    * Hundreds of exercises that focus on strength, flexibility, speed, and endurance.
    * Allows to create workout routines and adjust the difficulty level to match their fitness levels.
    * Body-weight workout app without needing any equipment or gym membership.
  - Disadvantages:
    * Some exercises in the app may not come with detailed instructions, which could lead to improper form and potential injury.
    * Does not offer any live support or feedback from a personal trainer.
  - Tips: Exercises that do not require the use of equipment or a gym is a good idea.

- **7 Minute Workout:** is a fitness app that offers high-intensity interval training (HIIT) workouts that can be completed in just seven minutes.
  - Advantages:
    * The workouts are designed to be completed in just seven minutes.
    * No equipment needed.
  - Disadvantages:
    * The workouts cannot be customized.
    * The app does not offer any guidance or support from a personal trainer.
    * Limited number of exercises.
  - Tips: Workouts that take 7 minutes to complete is a good idea for people who do not want to devote too much time to training.

Competitors comparison chart

FEATURES	MYFITNESSPAL	FITBIT	MMA SPARTAN	7 MINUTES WORKOUT	FITMATCH
Large Database of Foods	✓	✗	✗	✗	✓
Community of Users	✓	✓	✗	✗	✓
Health Metrics	✓	✓	✗	✗	✓
Short Workouts	✗	✗	✓	✓	✓
Equipment not needed	✗	✗	✓	✓	✓
Suitable for Beginners	✓	✓	✓	✗	✓

Figure 1: Competitors comparison

2.2 User Profile, personas and scenarios

2.2.1 User Profile

- Age: 14-50 years
- Gender: male/female
- Medical Conditions: Diabetes, High blood pressure, Asthma, etc.
- Employment: Student, Worker, etc.
- Location: Worldwide
- Technology: Compatible with both iOS and Android devices, requires internet connectivity, and access to GPS, also compatible with smartwatch.
- Accessibility: The app should be designed to be accessible to individuals with disabilities or specific limitations.

2.2.2 Personas and scenarios

Persona: Maria

Figure 2: Persona: Maria

Maria is a 25-year-old software developer who recently started her first job after graduating from university.
She is engaged and has been living with her boyfriend for 2 years. In lonely moments she likes to paint, and on weekends, when she does not have to work, she enjoys volunteering at a local charity. These activities are a source of joy and fulfillment for her, as well as a way to express herself creatively.
She would like to start doing sports to have a more active and exciting day, since he often works from home. Also, being an extrovert, sports would be an opportunity to socialize with people and share her time with them. She wants to establish a healthy routine that fits her schedule and helps her feel more energized throughout the day.

Scenario:
On a bright summer morning, Maria wakes up early, stretches, and looks out the window. She takes a deep breath of the fresh air and she realizes that she feels a bit contracted and with little mobility of the body. After a long search online, she discovers that she needs exercise and to supplement a healthy diet.
Nevertheless, he prefers not to worry about it at this time and decides to go to work. While having a conference, she realizes that her neck has contracted and she cannot turn it. At this

point she realized that it is necessary to find a solution to the problem. In the afternoon, after work, she decides to call a friend of hers, Greta, to ask her advice, since she is a professional athlete in artistic gymnastics. Greta, after understanding her problem, recommends the app she also uses, namely FitMatch, explaining to her that it will allow her to get a workout plan customized for her and a diet that fits her goal. Maria signs up and is greeted with a brief, personalized introduction to her diet and fitness goals. Satisfied, she has a healthy dinner and gets ready for bed.

Persona: Diego

Figure 3: Persona: Diego

Diego is a 32-year-old freelance writer who works from home. He enjoys the freedom of being his own boss and setting his own schedule, but he finds it difficult to maintain a healthy lifestyle.
He is a creative person, and his work succeeds in fully satisfying his desire for expression.
In his free time, he usually tends to take very long walks to be inspired by his surroundings. He also has a tendency to snack on junk food while working, which has resulted in weight gain and low energy levels. Diego wants to establish healthy eating habits and incorporate regular exercise into his routine.

Scenario:
It's Monday morning and Diego is feeling guilty after a weekend of overeating and not exercising. He decides to take control of his health and after searching on the Internet something that can help him with his problem, he finds the FitMatch app being recommended by people in a gym forum. So he decides to download the app and after setting up his profile and goals, Diego begins using the app to track his meals and exercise.
At lunchtime, Diego is tempted to grab fast food with his coworkers, but he pulls out his phone and opens the app. He finds healthy restaurant options nearby and selects a meal that fits his calorie and nutrition goals. Later in the day, Diego starts feeling hungry and a little sluggish. He checks the app and realizes he hasn't had a snack in a while. He chooses a high-protein snack and feels energized again. After work, Diego heads to the gym. He uses the app to track his workout, which includes a mix of cardio and strength training. The app suggests new exercises to mix things up and keep him motivated.

Persona: Marcus

Figure 4: Persona: Marcus

Marcus is a 35-year-old guy who lives in the United States. Born and raised in Detroit, Michigan, Marcus is currently a software engineer working for a tech startup in Silicon Valley. Growing up in a city known for its automotive industry, Marcus developed a fascination with cars and mechanics. He spent many hours tinkering with engines and dreaming of one day building his own car. This passion for problem-solving eventually led him to pursue a degree in Computer Science. His innovative ideas and hard work have made him a valuable asset to his team, and he is considered one of the rising stars in the industry. In his free time, Marcus enjoys listening to hip-hop music, watching basketball games, and playing video games with his friends. He also volunteers at a local community center, where he mentors young students and helps them develop their skills in STEM fields.

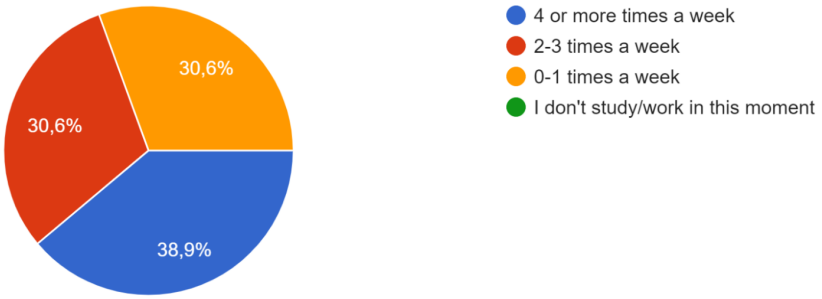
Scenario:
It's a beautiful Saturday morning and Marcus is planning to go for a hike with some friends. However, he is a little nervous because he hasn't been very active lately and is worried about keeping up. Accordingly, he asks his friends how they manage to stay active throughout the years. A friend in the group advises him to hire a personal trainer, but Marcus replies that it is too expensive for his finances and he would prefer a cheaper approach. At this point, his friend advises him to download the FitMatch app, telling him that it provides tutorials and workout plans, even for beginners. In the afternoon, Marcus, after downloading the app, finds a workout plan that focuses on building endurance and stamina and decides to follow it to get ready for the hike. Over the next few weeks, Marcus uses the app to track his workouts and meals. He gradually increases his exercise intensity and duration, and he starts feeling more confident about the upcoming hike. On the day of the hike, Marcus is excited and a little nervous. He feels strong and energized thanks to the training he has done with the app. As Marcus heads home, he reflects on how far he has come and feels proud of himself for taking control of his health and fitness.

2.3 Questionnaire analysis

In this section there are the questionnaire results used to understand better our targeted potential customers.
It is important to emphasize that the questionnaires were submitted **mostly to students**. For this reason, some questions may present results that are polarized toward a single answer.

How much you study/work remotely?

36 risposte



What is your status?

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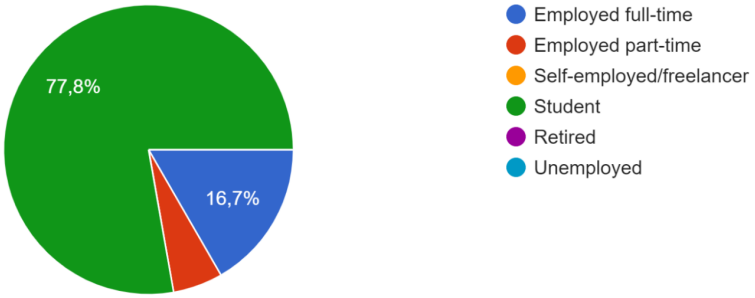

Do you consume alcohol? If so, how often and in what quantities?

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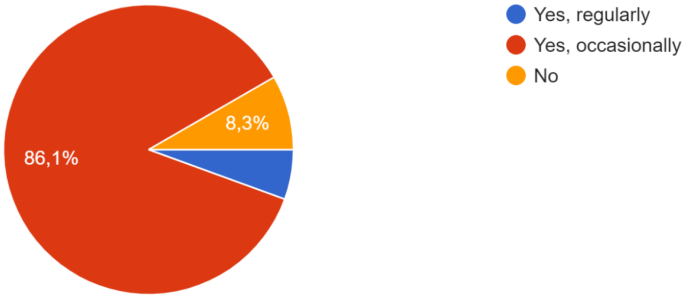

How much time per day/week do you have available for exercise?

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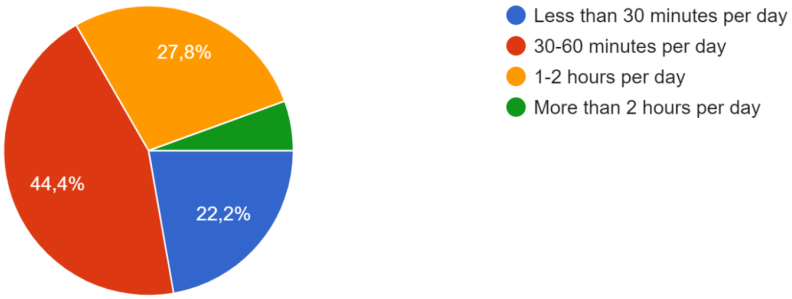

How often do you eat out or order takeout?

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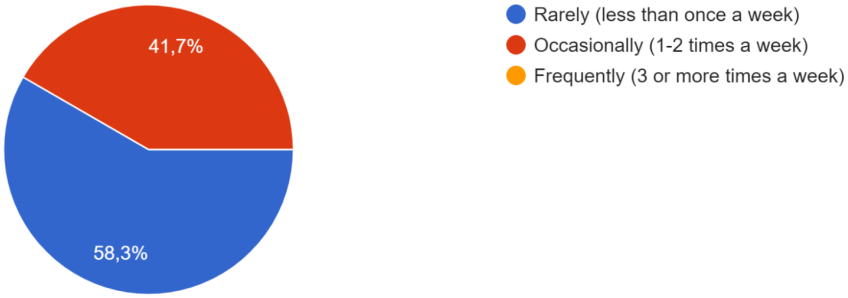

What is your age?

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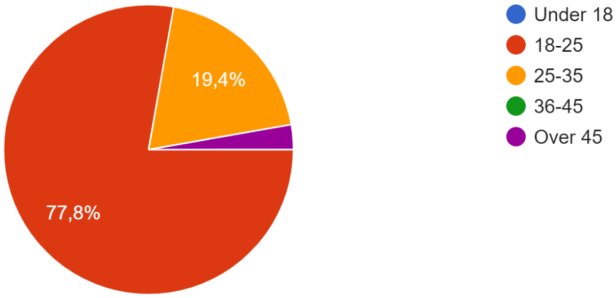
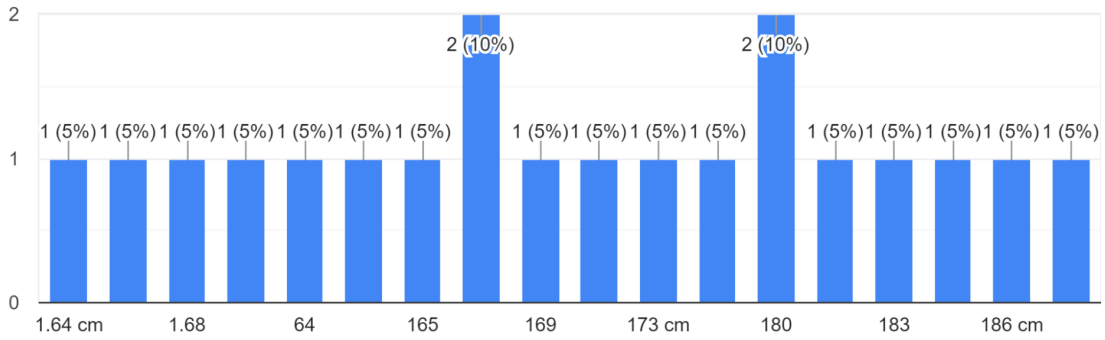


What is your current height? (optional)

20 risposte



What is your current diet like?

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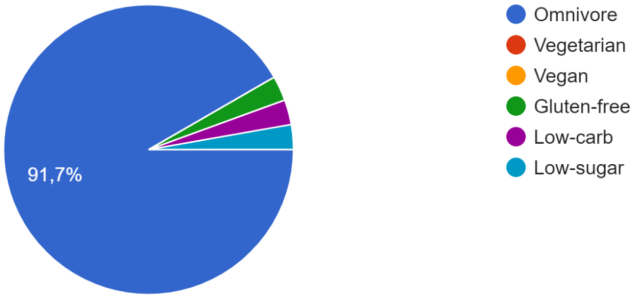

How often do you currently exercise per week?

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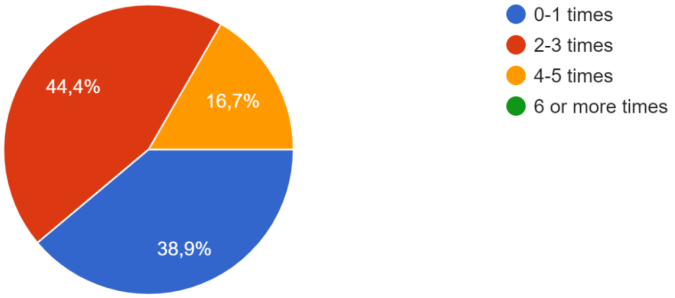

Which type of device do you use the most?

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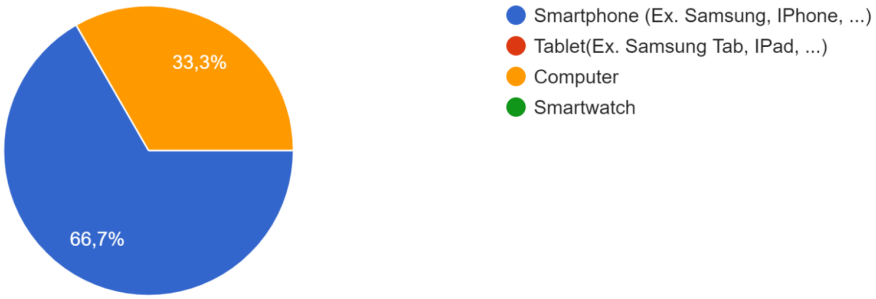
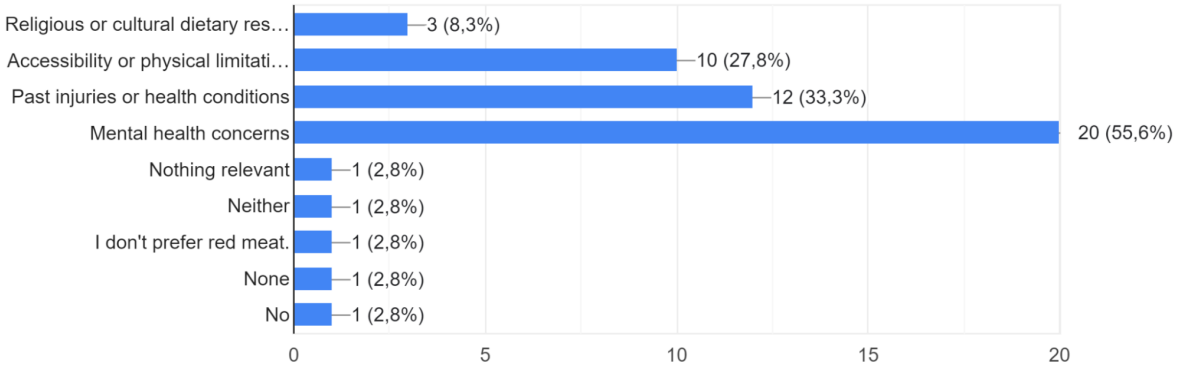


Are there any other factors that you think may be important to consider when developing your personalized fitness and diet plan?

36 risposte



Do you have any other regular commitments that may affect your availability for exercise and meal planning?

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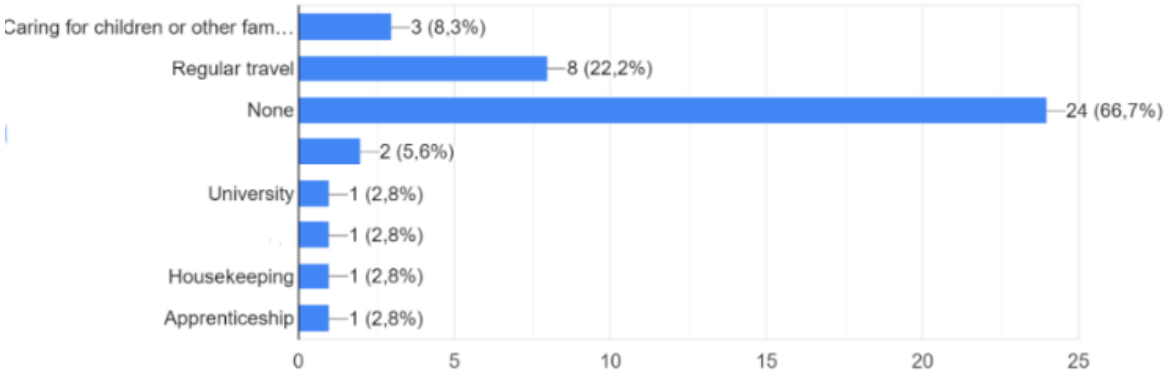

Have you ever followed a specific diet plan? (e.g. paleo, keto, Mediterranean)

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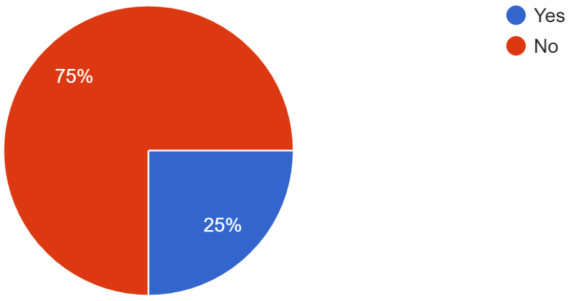

what is your favorite time to train?

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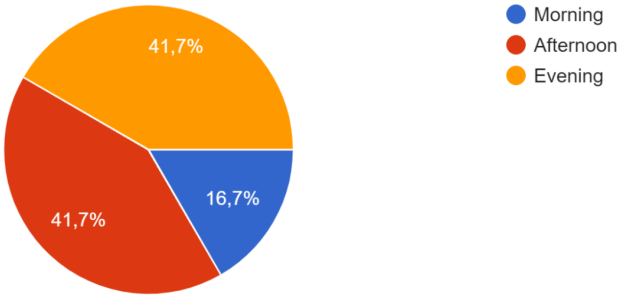
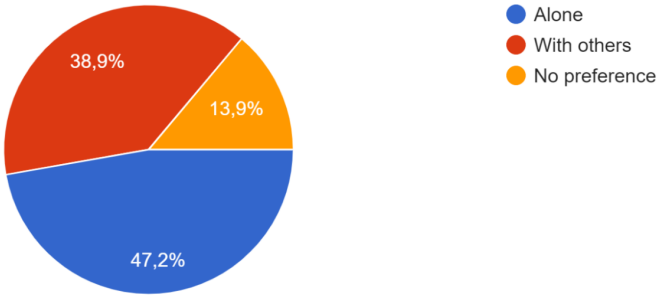
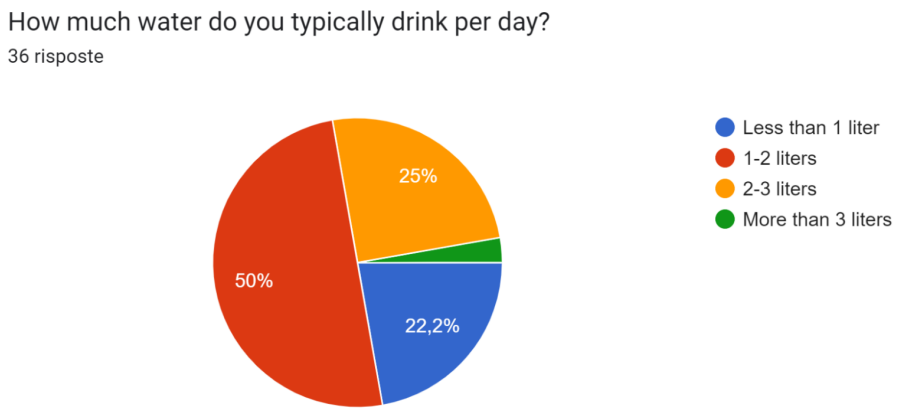


Do you prefer to work out alone or with others?

36 risposte





Do you have any dietary restrictions or preferences that should be taken into account, if yes write below:
We can summarize the answers to this question in the following categories:

- Eggs, milk, high glycemic index problem.
- Reduce sugar.
- Don't like vegetables.
- Celiac disease.

What do you want from a fitness app?

We can summarize the answers to this question in the following categories:

- Charts of performance over time.
- Remember training time, and show the weekly schedule.
- Personalized plan that take care also of injuries.
- To keep count in how much calories I lost for each workout.
- Give a detailed plan to follow and motivates me to follow it.
- Always propose new exercises.
- To give me alternative accordingly to my schedule and current location.
- Description of the right form for the exercises, also with videos.
- Have track of physical activities and how many time per day i am active.

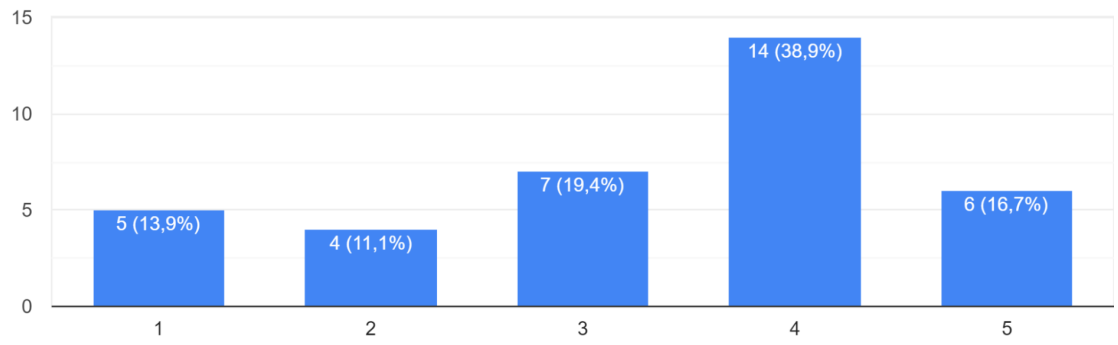
What do you want from a diet app?

We can summarize the answers to this question in the following categories:

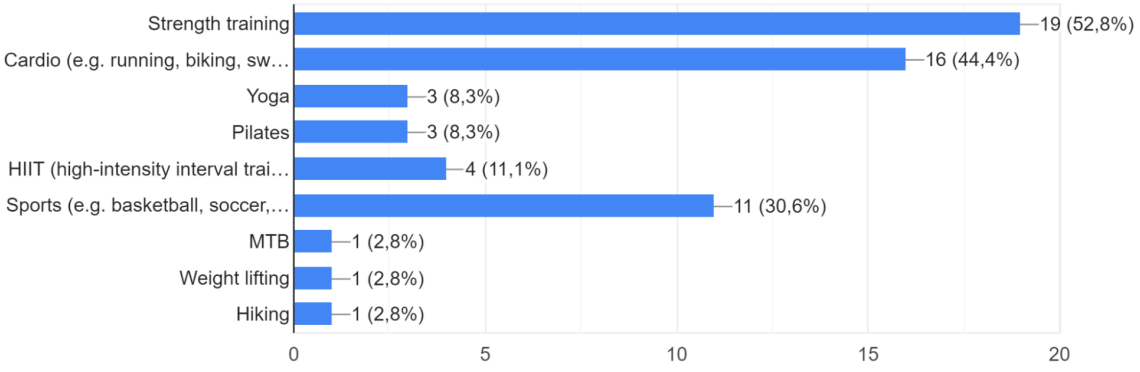
- Reminders to prepare meals in time, given the meal to eat.
- Cooking recipe to take inspiration from.
- Quick way to register meals eaten.

- A medical-level diet.
- Good organization and schedule of the diet plans.
- Always propose new exercises.
- Food calories list and keep tracking of calories.
- To provide a diet accordingly with logistics.
- Weekly challenges concerning my current habits, my current level of motivation and my current diet plan.
- Have more information about nutrients and unhealthy additives.
- That takes care of diseases.

Would you like to track your progress through the app's diet feature?
36 risposte

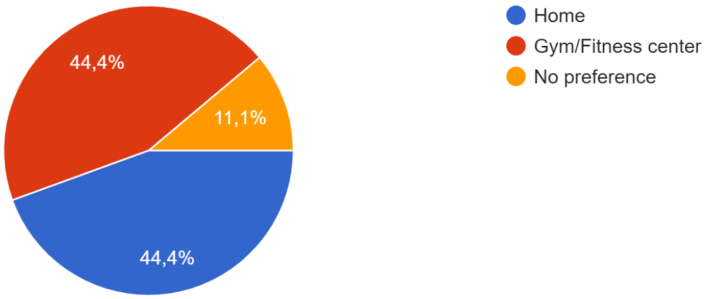


What types of exercises do you enjoy?
36 risposte



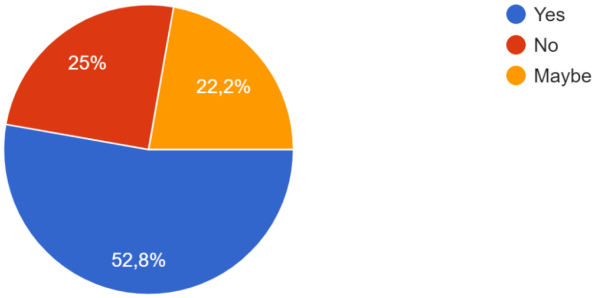
Would you prefer to exercise at home or at a gym/fitness center?

36 risposte



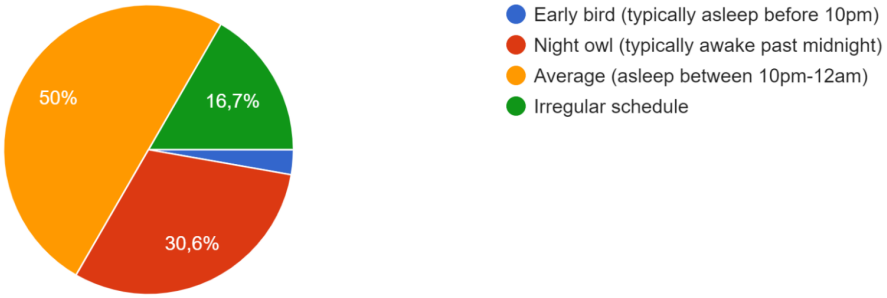
Are you interested in challenges and competitions to stay motivated?

36 risposte



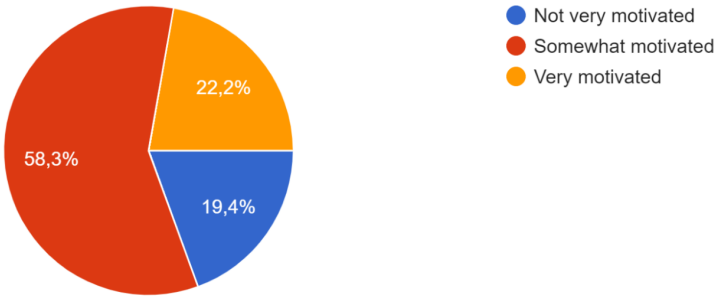
What is your typical sleep schedule like?

36 risposte



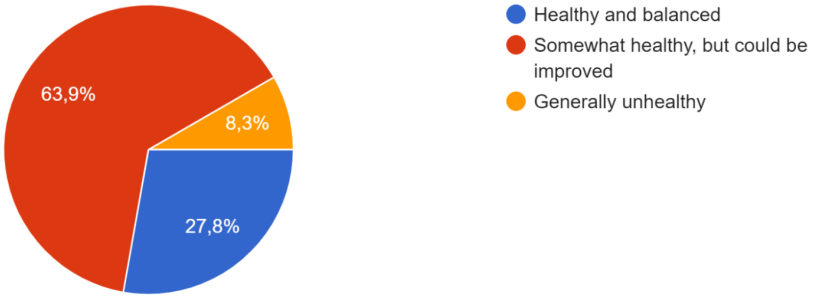
How motivated are you to make changes to your fitness routine and diet?

36 risposte



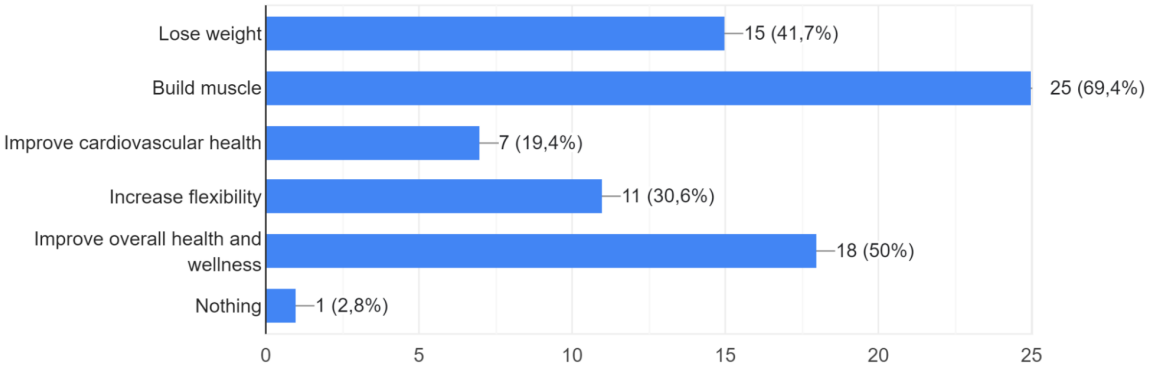
How would you describe your current eating habits?

36 risposte



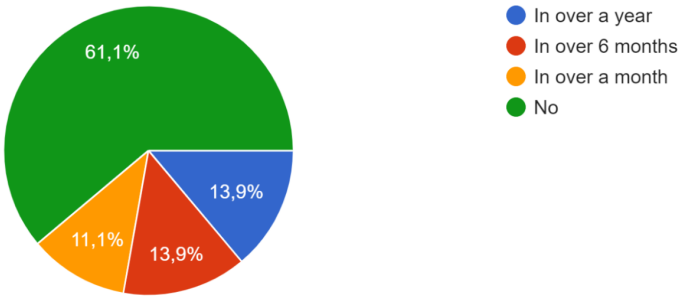
What are your fitness goals?

36 risposte



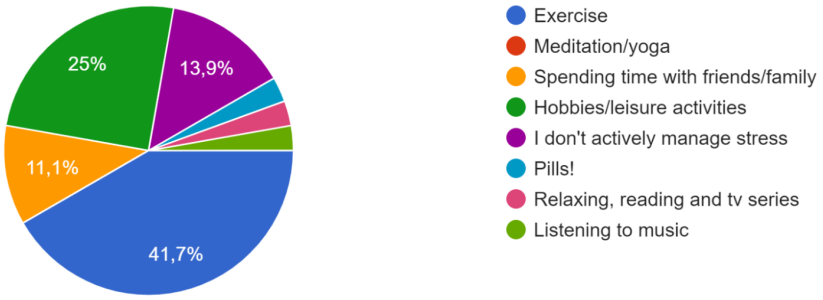
Did you recently move to a new city?

36 risposte



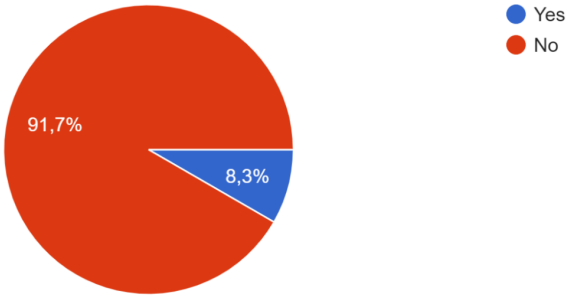
How do you typically manage stress?

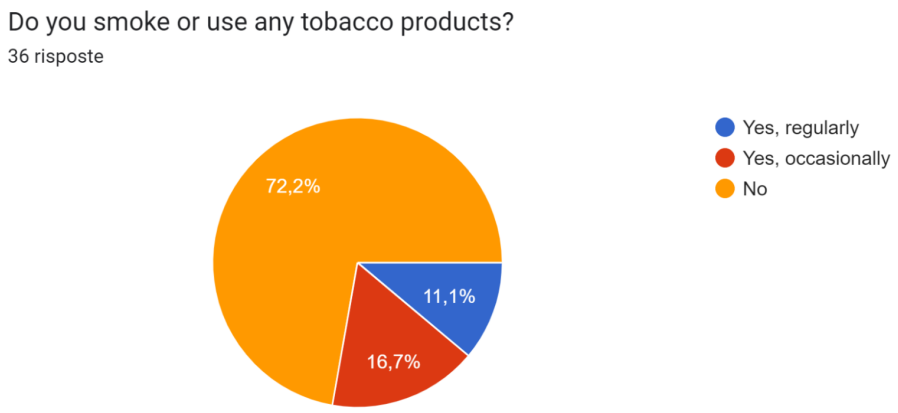
36 risposte

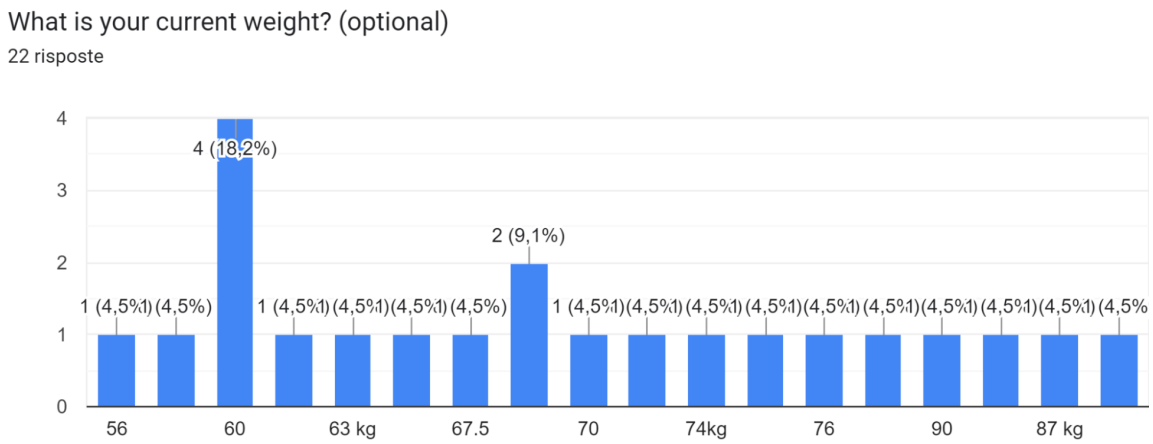


Do you have any physical limitations or injuries that may affect your exercise routine?

36 risposte







2.3.1 Questionnaire conclusions

Analyzing the data collected from the questionnaires, as previously explained, we expected that some answers were affected by the fact that the people subjected to the questionnaires were mostly students. Apart from this, we can extract the following considerations:

- About 60% of possible customers are male users, against the 40% of women. There is no specific target related to the user's gender. We can confirm the idea of building gender-based training paths.
- The age of our customers ranges from 18 to over 45. Most of them are in the 18-25 range. Depending on age, we can identify lighter training exercises.
- About 80% of respondents are students, with a lower concentration of full-time workers. Our application will make sure to calibrate the training according to the user's free time.
- The most used device is the smartphone. For this reason we will develop the mobile application.
- The goals of our possible customers are mainly to build muscle and improve overall health. The main field of our application is diet and training.

- About 40% of respondents enjoy cardio and strength training. The users will be able to choose the type of training.
- Most of the possible users have 30 to 60 minutes to be able to train. For this reason, both short and long training plans will be proposed.
- There is an equal partition between users who are beginners and users who are moderately trained. Our app will distinguish training routes based on their physical level.
- There is a high interest in tracking individual users' progress. It will be a feature of our app.

2.4 Interviews

We perform a structured interview to better understand the needs of the possible customers to render the application very useful and respect the real need, giving the best user experience possible:

Interviewee 1:

- Simone, 26 years old.
- born in Rome, Italy.
- currently living in Milan, Italy.

Now we report the questions with the answers:

- Can you tell us about your experience with exercise and diet?

Sure, I've always been interested in staying active and eating healthy. I used to play soccer in high school and university, but after I graduated and started working full-time, it became harder to find the time to exercise regularly. In the last few months I've gained some weight and I've also realized that my metabolism has slowed down a bit. I tried to eat less and go to the gym but I cannot see any result.

- What are some of the challenges you've faced in trying to maintain a healthy lifestyle?

One of the biggest challenges for me has been finding an exercise routine that I enjoy and can stick to. I've tried going to the gym, running outdoors, and doing home workouts, but I always seem to lose motivation after a few weeks. Another challenge is figuring out what to eat and how much to eat. There's so much conflicting information out there about what constitutes a healthy diet, and I feel I cannot find the right one. One of the biggest things that makes it difficult for me to stick to a diet is the fact that I have to follow a fixed plan. It happens really frequently that I go out for a beer after work.

- How do you think an app like FitMatch could help you with these challenges?

I think FitMatch could be really helpful because it would connect me with other people who have similar fitness goals and interests. It can be hard to stay motivated when you're working out alone, but if I had a workout buddy or a group of people to exercise with, I think I would be more likely to stick with it. I also like the idea of being able to track my progress and get personalized recommendations for workouts and meals. I would like my plan to be updated automatically according to what I ate.

- Are there any specific features or categories you would like to see in the app?

Yes, I think it would be great if there was a feature for finding workout partners or groups based on location and availability. It would also be helpful to have a section for healthy recipes and meal planning, as well as a way to track your daily water intake. Overall, I think FitMatch has a lot of potential and I'm excited to see how it develops.

Interviewee 2:

- Federica, 32 years old.
- born in Rome, Italy.
- currently living in Rome, Italy.

Now we report the questions with the answers:

- Can you tell us about your experience with exercise and diet?

Sure, I've always been focused on exercise and diet, but always struggles to maintain consistency. I used to do dancing in high school, but after my son was born 4 years ago, I really feel I don't have any time for myself. As for my diet, I try to eat following a balanced diet and also to avoid food with high glycemic index because I have a problem with it.

- What are some of the challenges you've faced in trying to maintain a healthy lifestyle?

One of the biggest challenges for me has been trying to eat less. Between work and family commitments, it can be tough to fit in a workout. Another challenge has been staying motivated and finding a routine that I enjoy.
Even though I try to eat less, I struggle to eat healthy, especially when I'm stressed or tired.

- How do you think an app like FitMatch could help you with these challenges?

I think FitMatch could be really helpful because it would provide me, based on my engagements, a schedule to follow and support. I also like the idea of getting personalized recommendations for workouts and meals. Sometimes it happens I cannot resist eating a certain food, so I eat if and then I feel guilty and skip the following meal trying to compensate. This is the reason why I believe that the FitMatch feature that allows you to dynamically redefine your diet plan according to what you have eaten could help me.

- Are there any specific features or categories you would like to see in the app?

Yes, I would like to see a feature for tracking my progress and setting goals, as well as a section for healthy recipes and meal planning. It would also be great if the app had a way to connect with local fitness studios and trainers, as I'm always looking for new workout ideas and challenges.

Interviewee 3:

- Francesco, 25 years old.
- born in Bari, Italy.
- currently living in Rome, Italy.

Now we report the questions with the answers:

- Can you tell us about your experience with exercise and diet?

Sure, I've always been interested in staying healthy, but I'm not very athletic. I try to eat a balanced diet that's rich in fruits, vegetables, and lean proteins. I'm not a big fan of junk food, but I do enjoy the occasional treat. I used to go jogging with my ex-girlfriend, but since we broke up I lost the habit and put on a few pounds.

- What are some of the challenges you've faced in trying to maintain a healthy lifestyle?

One of the biggest challenges for me has been finding an exercise routine that I enjoy and keep motivated. It is very difficult for me to stay motivated, in high school I used to go to the gym with my friends, but now I have no one to join with. I would like someone to share my journey with, so that we can encourage each other. Another challenge is figuring out what to eat and how much to eat. I'm not a great cook, so I tend to rely on quick and easy meals, which aren't always the healthiest options.

- How do you think an app like FitMatch could help you with these challenges?

I think FitMatch could be really helpful because it could provide me with personalized recommendations for workouts and meal plans that are tailored to my fitness goals and dietary preferences. But the main feature of Fitmatch is the ability to compare your progress with other users and connect with them. This helps me to stay motivated.

- Are there any specific features or categories you would like to see in the app?

Yes, I would like to see a feature that provides me with easy-to-follow workout routines that don't require any equipment, as I don't have access to a gym. It would also be helpful to have a section with healthy recipes and meal ideas that are both delicious and easy to prepare. Lastly, I would appreciate a feature that helps me set achievable goals and provides me with tips and advice on how to stay motivated and consistent with my exercise and diet habits.

2.4.1 Interviews conclusions

Analyzing the data collected with the interviews we can extract the following considerations:

- We notice a common problem in finding a workout plan to follow for a long time, in that the application must provide various plans based on preference and time available by the user. Also must change regularly the exercise like to always maintain motivated the user.
- Another problem is to find an easy recipe to cook and follow a healthy diet, must provide in application an easy recipe that can be done in a short time and low number of ingredients.
- All interviewers are interested in fitness and diet, which confirm the result of the questionnaire.
- Working with other people can help to stay motivated and focused.
- Tracking progress and set goals can be useful.
- Personalized workouts are fundamental.
- Users are interested in features that automatically update the diet and workout plan taking into account user extra meals.

3 Task analysis

A task model is a representation of the sequence of actions that a user performs to complete a task with a computer system.

Hierarchical Task Analysis (HTA) and State Transition Networks (STN) are two methods used to model tasks and activities performed by users.

HTA is a top-down approach to task analysis that involves breaking down a complex task into smaller, more manageable subtasks. The resulting hierarchical structure shows the relationships between the subtasks and how they contribute to the overall task.

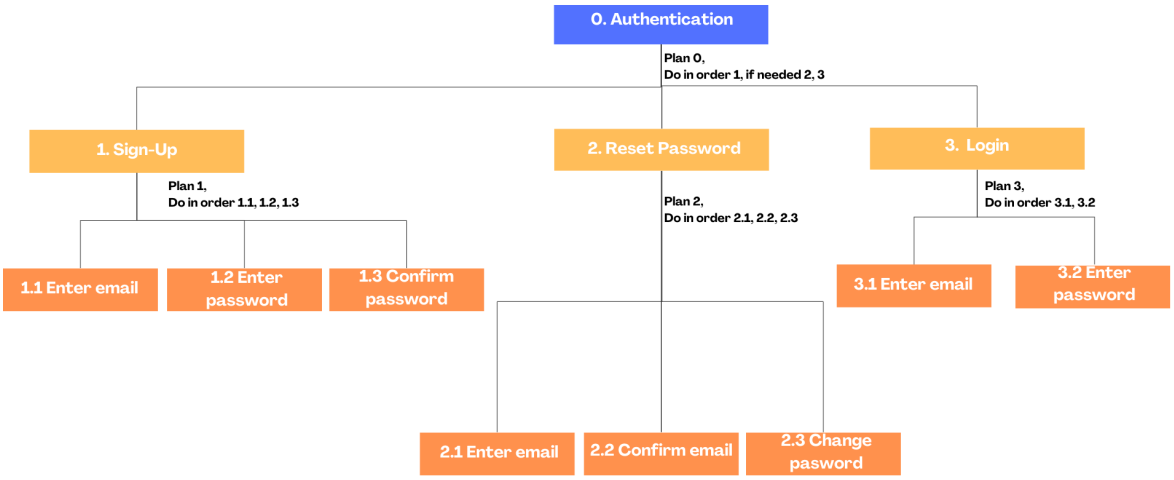
STN is a graphical representation of the states that a system can be in and the events that can trigger transitions between those states.

We will use the HTA and STN for modeling the following tasks of our application:

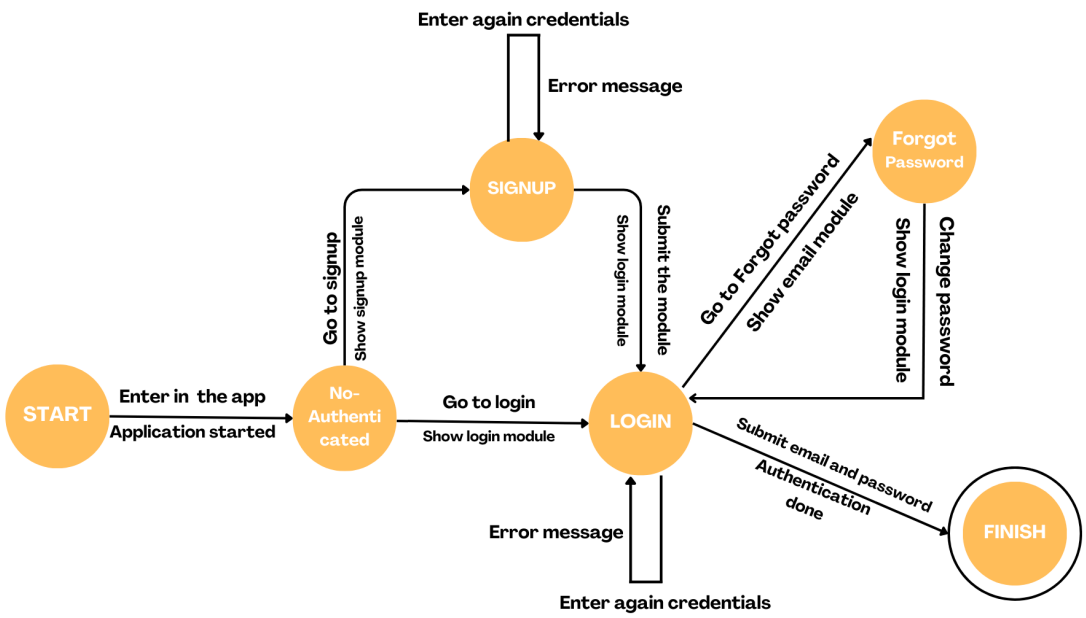
3.1 Authentication to application

In order to perform the authentication to the application the user must enter in the app, if he or she is not registered must sign up to the application inserting the needed information. After, the user can fill the form of login with its email and password, then click the login button to perform the access. If the user doesn't remember the password, he or she can reset the password by filling a form and then repeating the actions for logging in.

3.1.1 HTA



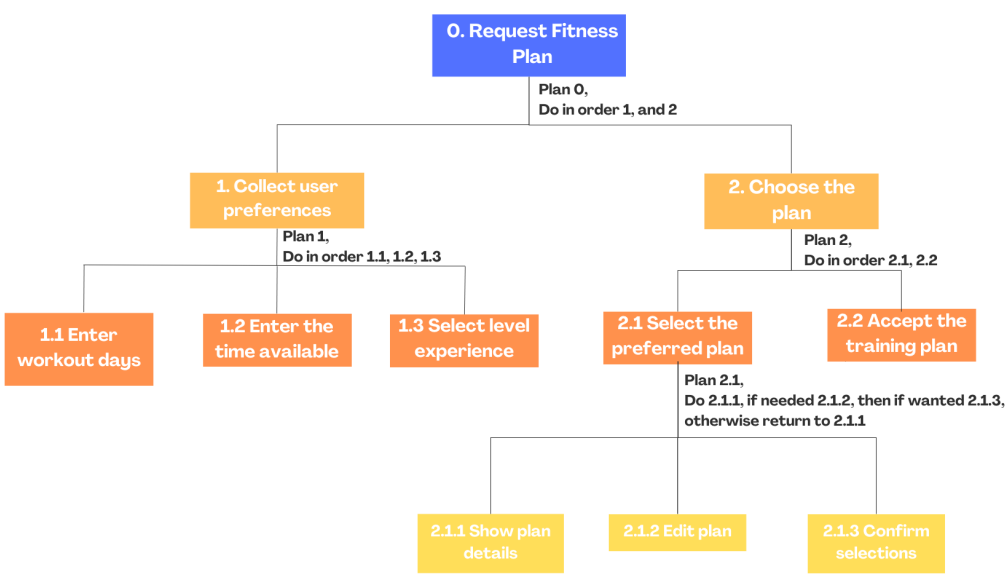
3.1.2 STN



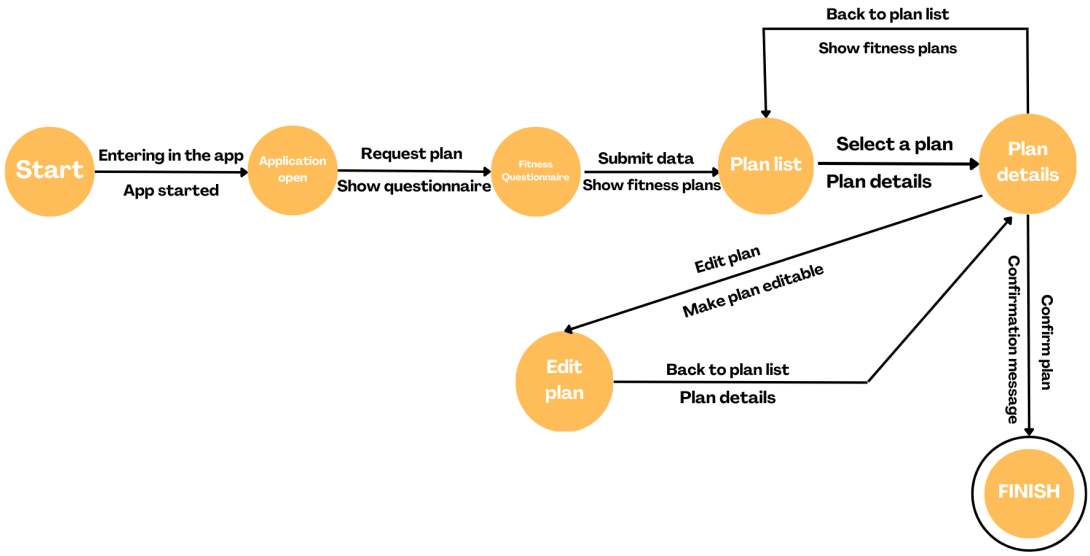
3.2 Request fitness plan

In order to request a fitness plan, the logged in user must fill out a form in which he will be asked about how many days per week, how much time per workout is available and the training level experience. Then, the system will process the information and propose a set of choosable customized training plans for the user.

3.2.1 HTA



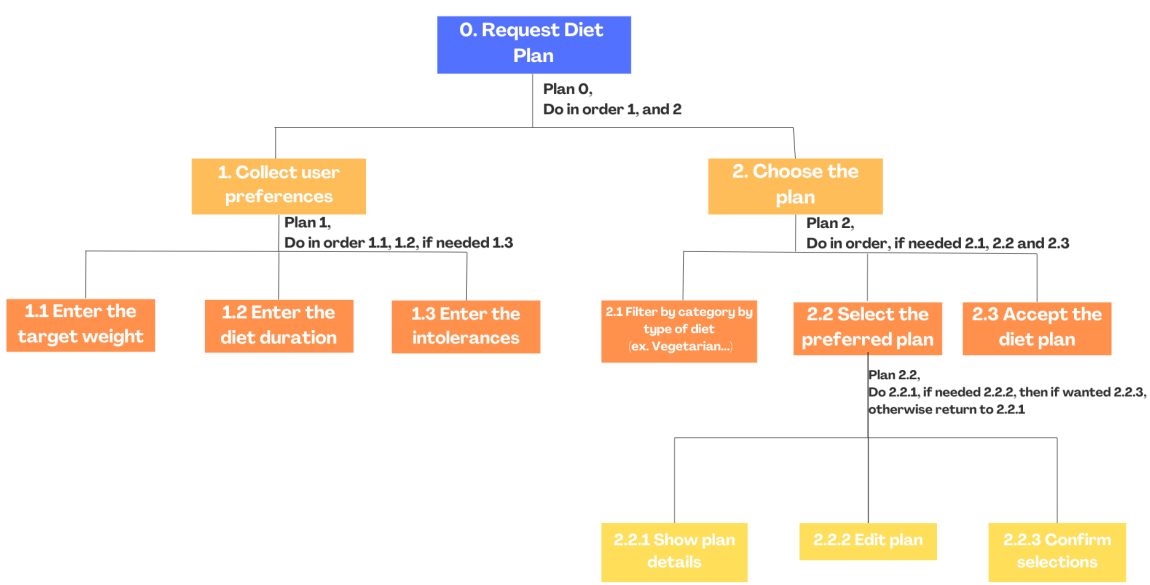
3.2.2 STN



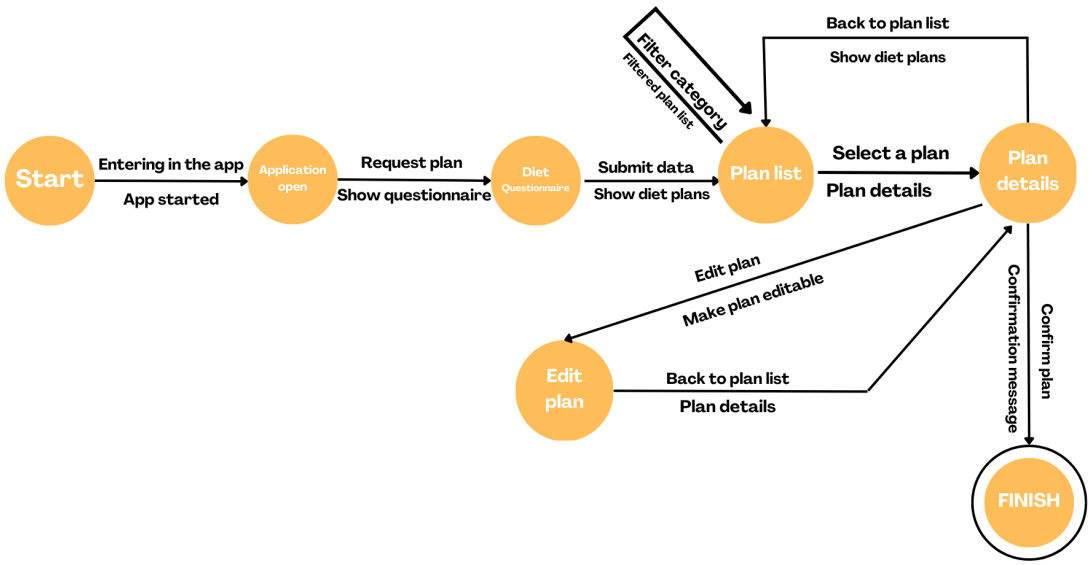
3.3 Request diet plan

In order to request a diet plan, the logged in user must fill out a form in which he will be asked about the target weight, the diet duration and food intolerances, if any. Then, the system will process the information and propose a set of choosable customized diet plans for the user.

3.3.1 HTA



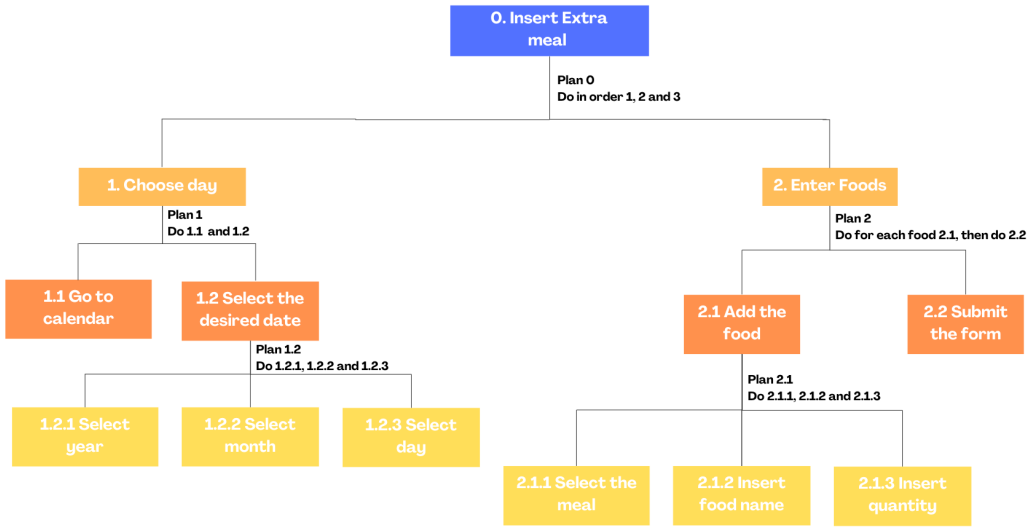
3.3.2 STN



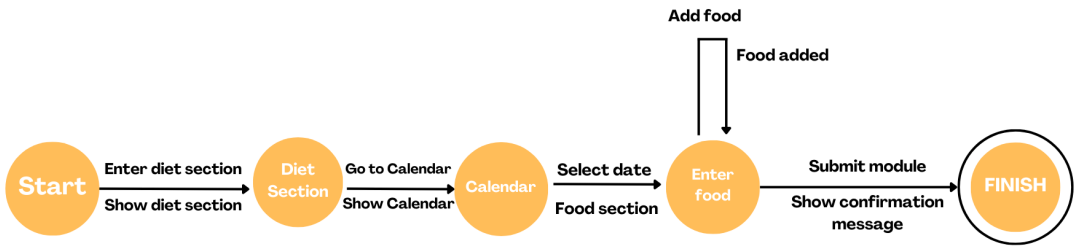
3.4 Insert extra meal

To automatically update diet and workout plans, the user can add extra meals he or she has made compared to his diet. The logged in user, after going to the diet section, should first select the day on the calendar, then he can add the food by selecting the meal, inserting the eaten food name and quantity. Then he can submit the form to the system.
The application will have in its database the list of all foods with their nutritional values and will update the user's diet and workout plan accordingly to his new needs.

3.4.1 HTA



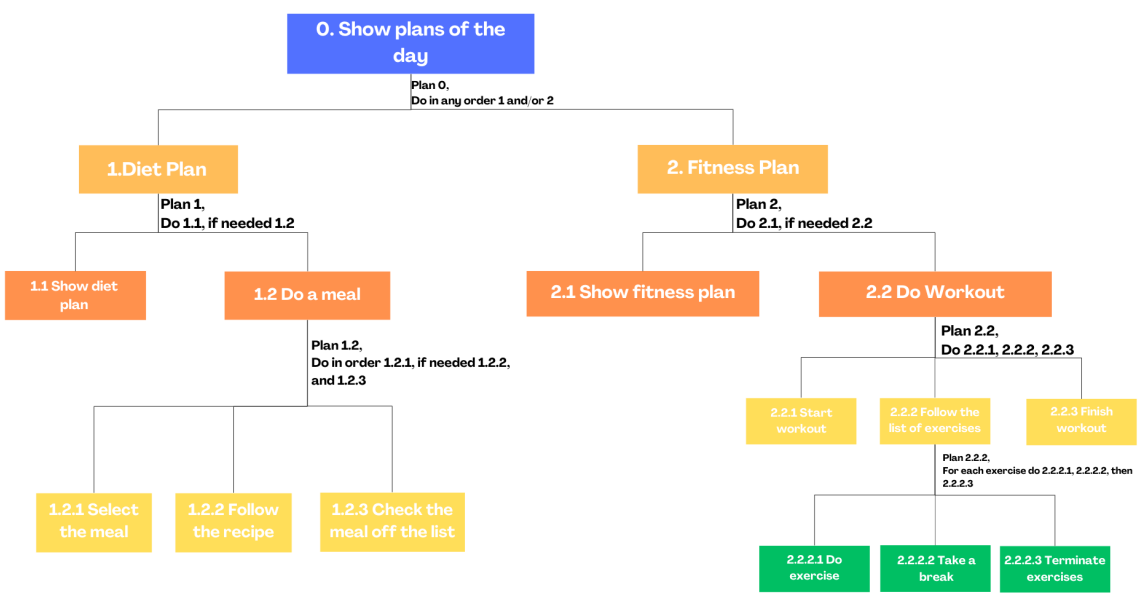
3.4.2 STN



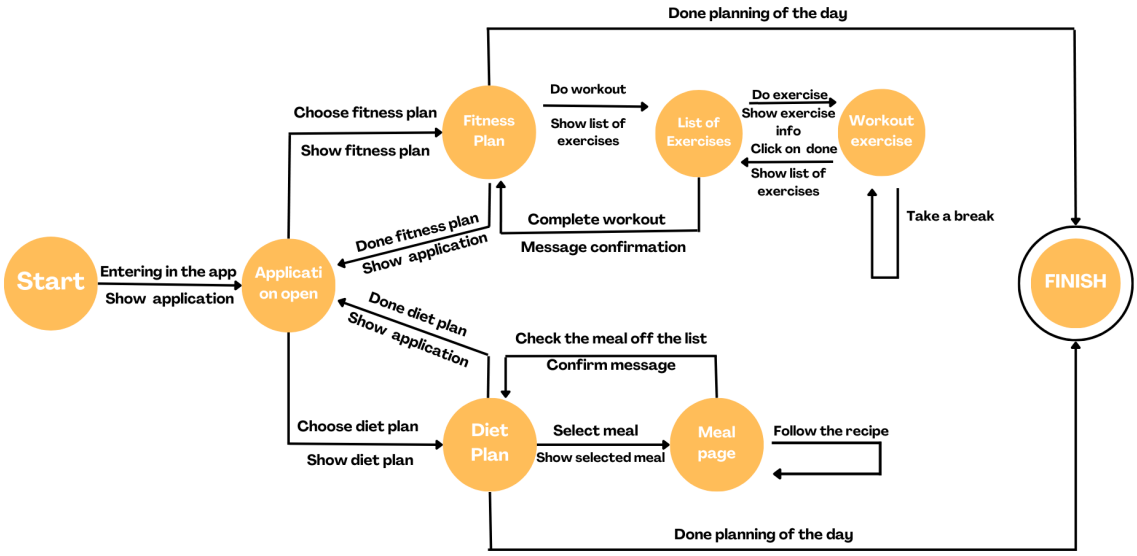
3.5 Show plans of the day

In order to show the plans of the day, the logged in user, after going to the diet or fitness section he or she will be able to see the diet or the fitness plan. Then the user can start to do a meal, following the recipe or to workout, following the list of exercises, in which each exercise is composed of an exercise and a break.

3.5.1 HTA



3.5.2 STN


Done planning of the day
Choose fitness plan
Show fitness plan
Fitness Plan
Do workout
Show list of exercises
List of Exercises
Do exercise
Show exercise info
Click on done
Show list of exercises
Workout exercise
Take a break
Complete workout
Message confirmation
Done fitness plan
Show application
Start
Entering in the app
Show application
Applicati on open
Done diet plan
Show application
FINISH
Check the meal off the list
Confirm message
Choose diet plan
Show diet plan
Diet Plan
Select meal
Show selected meal
Meal page
Follow the recipe
Done planning of the day

4 Prototype 1

In the following, the mockup of the first prototype of our application will be shown. The relevant features were selected based on the responses of the questionnaire users and based on the importance of the feature according to the user's possible activities.

As for the user interface, we followed a standard pattern for mobile application development. In particular, the buttons are clearly visible and differentiated by color, the navigation menu is based on a static footer with which the user can select the most important sections of the application, such as the settings of user profile, the diet section, and the training section.

The mobile application main functionalities are:

- Sign up: filling a form.
- Login: with username and password.
- Request Fitness Plan: filling a form and choose from the recommended plans, checking what each plan contains.
- Request Diet Plan: filling a form and choose from the recommended plans, checking what each plan contains
- Insert Extra Meal: filling a form, the app will update the current diet plan based on the food entered (which is outside the planned diet)
- Show plans of the day: by navigating through the sections contained in the footbar, the user can choose to view the day's food plan and training plan.

The mock-ups have been done through the Figma web application.

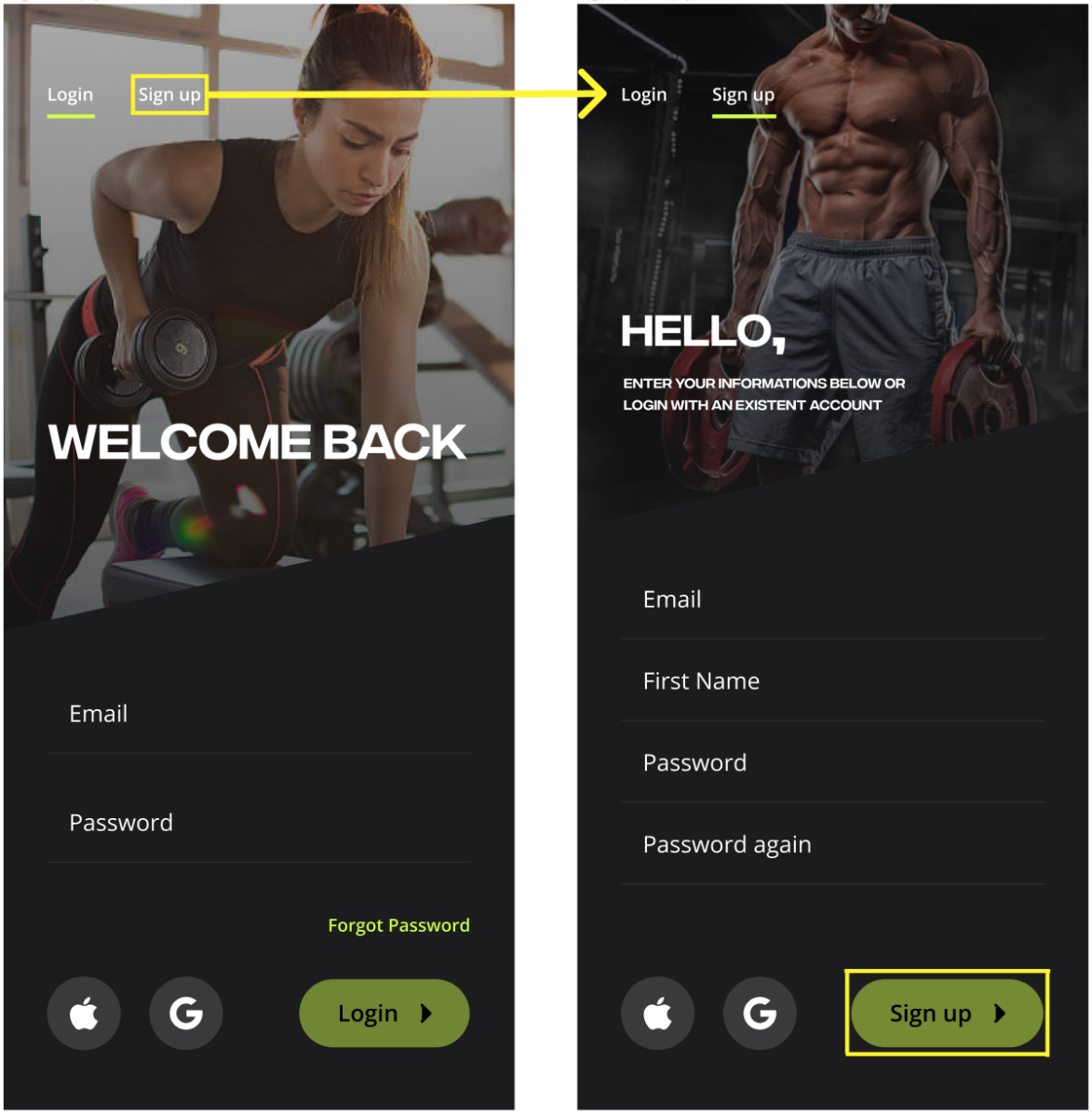


Figure 5: Task: Sign Up

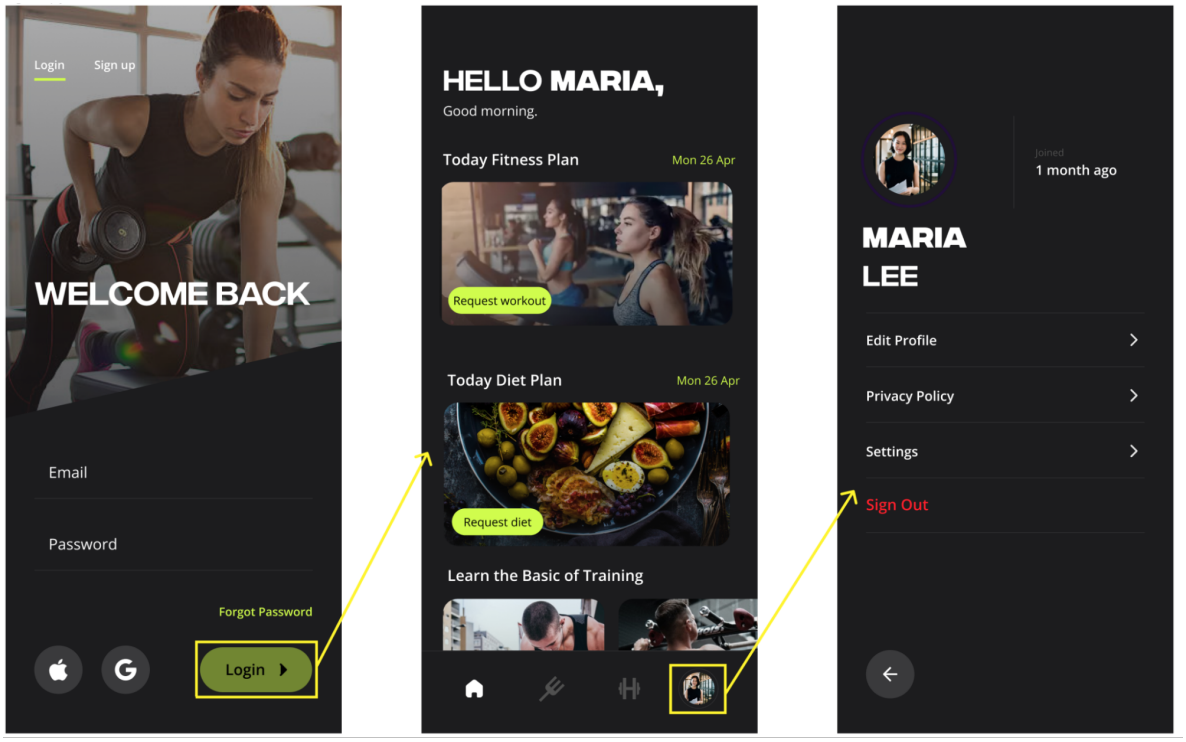


Figure 6: Task: Login and view profile

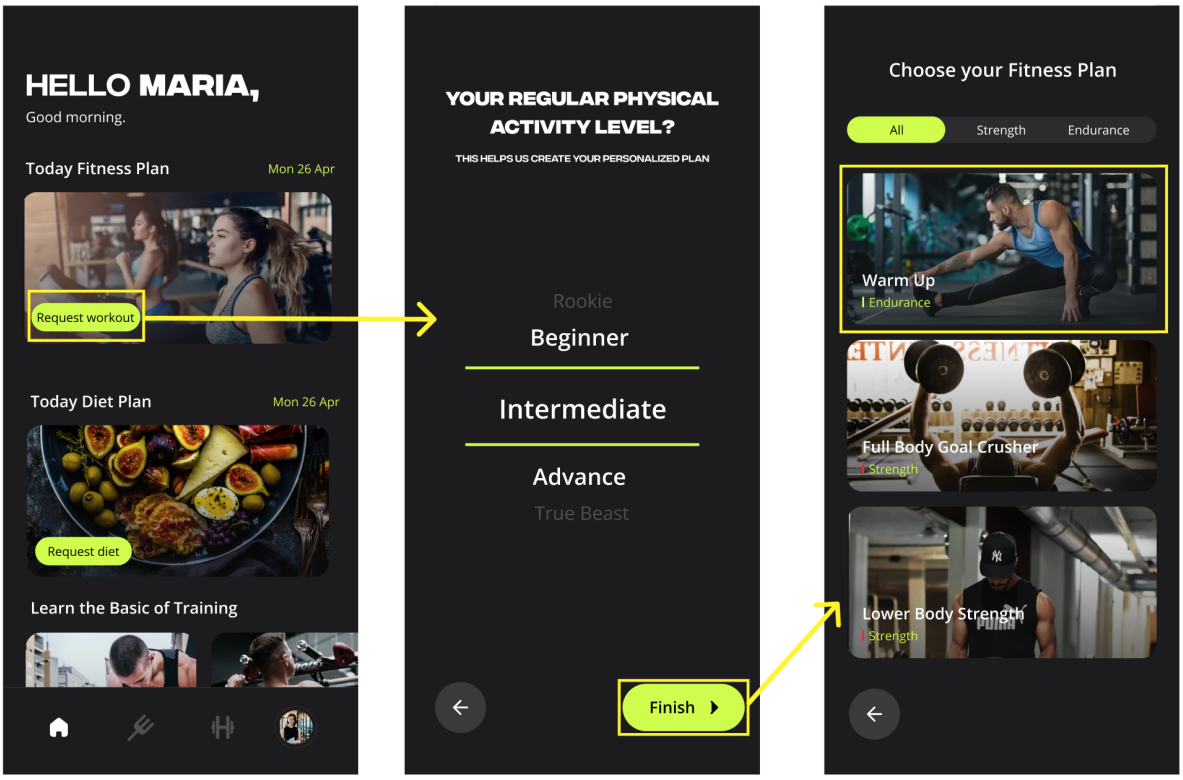


Figure 7: Task: Request Fitness Plan

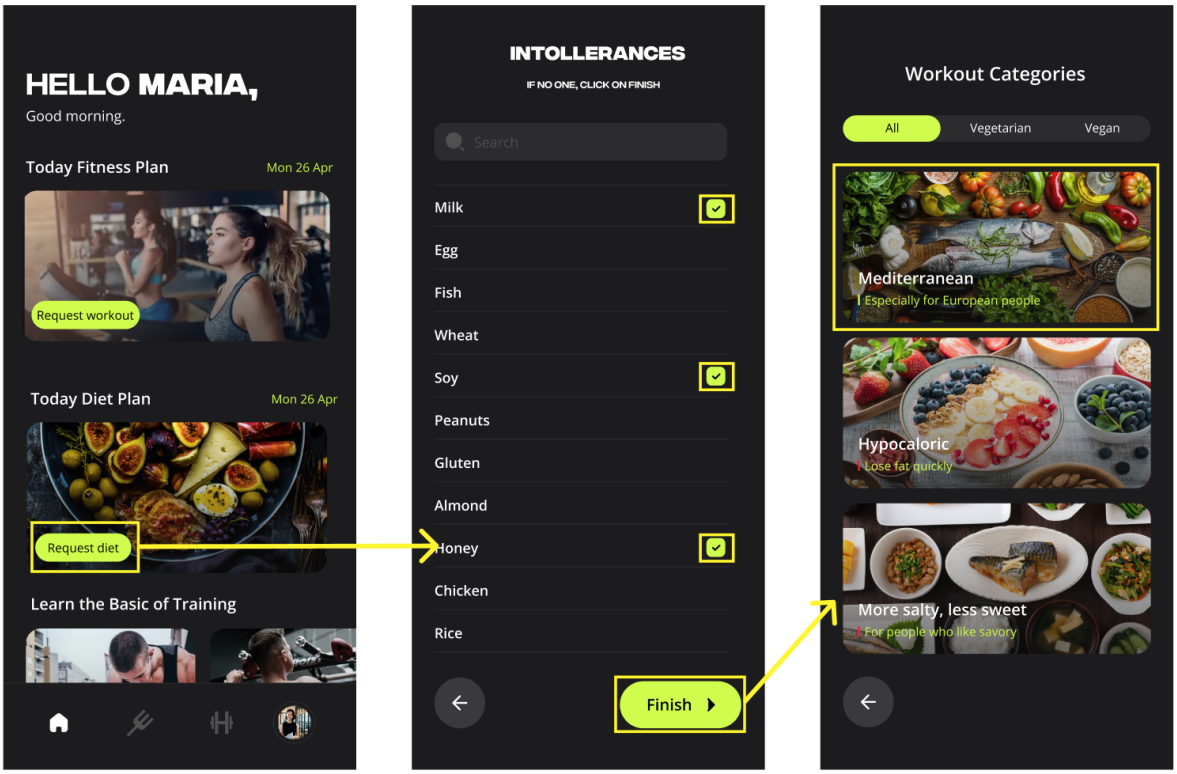


Figure 8: Task Request Diet Plan

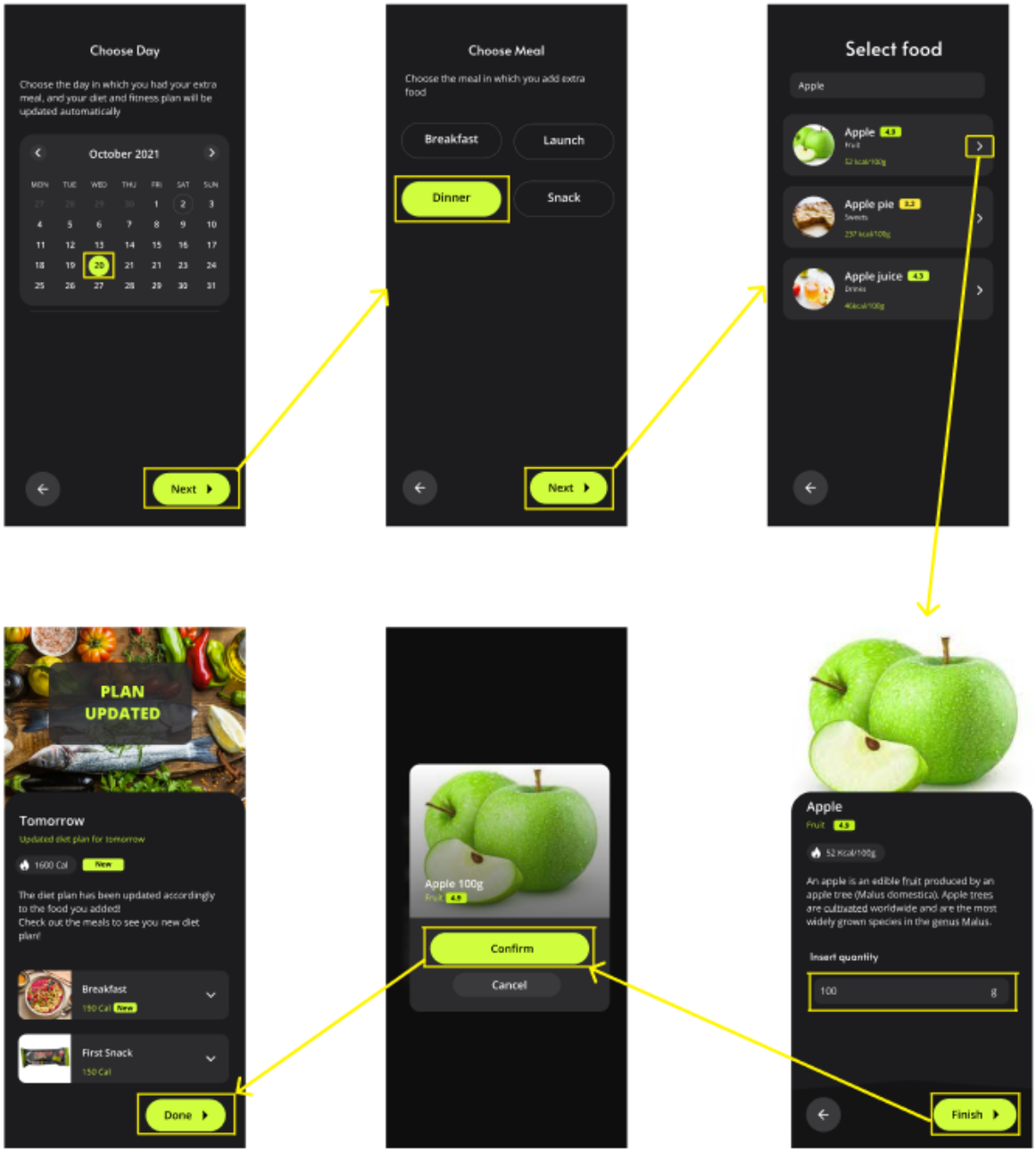


Figure 9: Insert Extra Meal

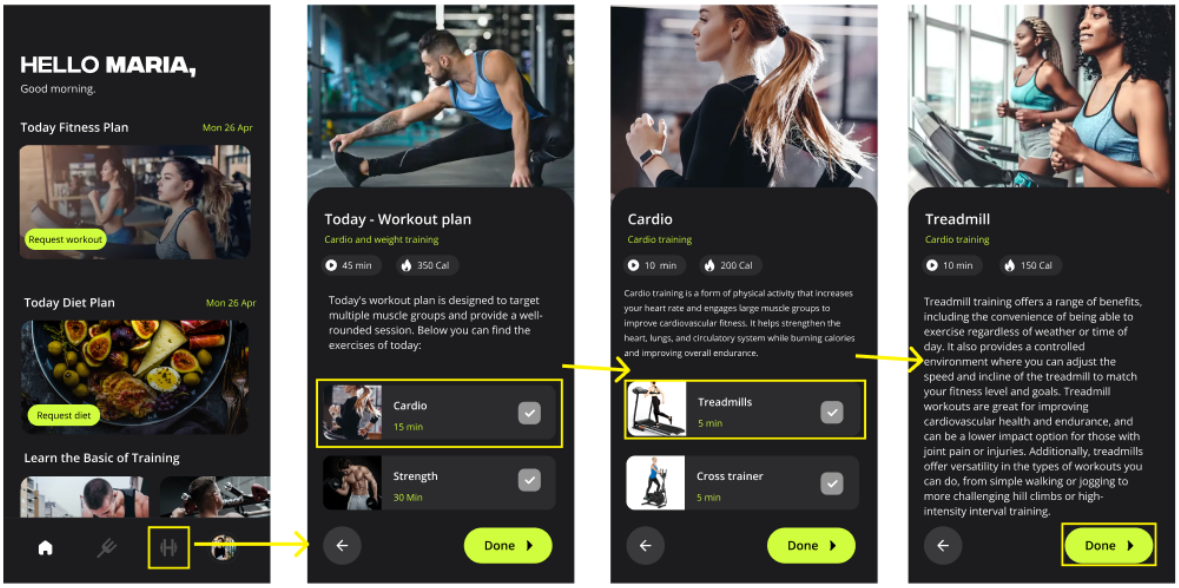


Figure 10: Task: Show plan of the day fitness

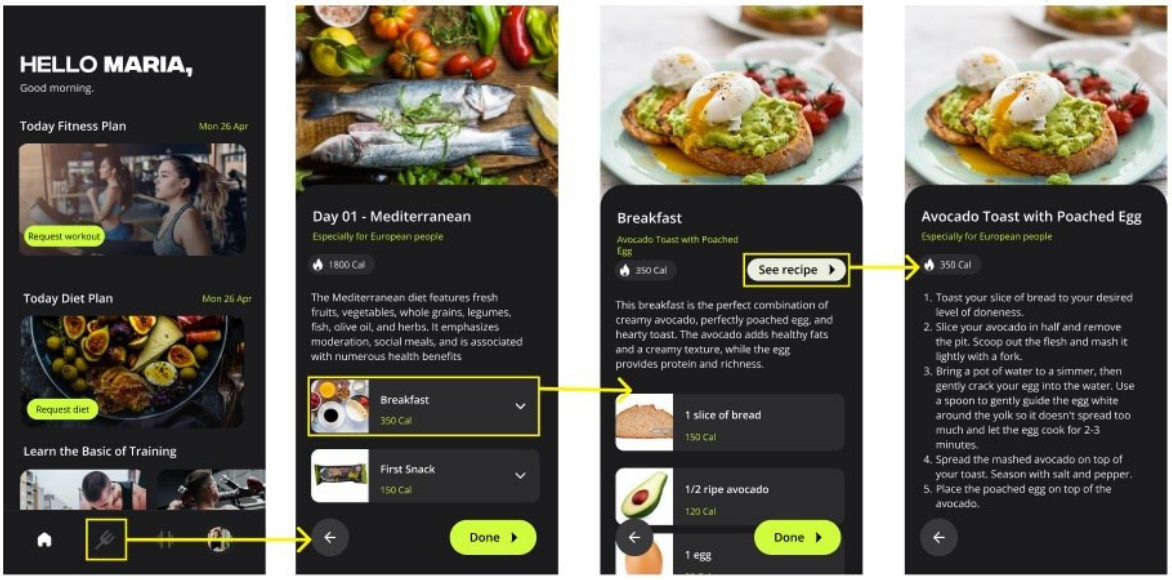


Figure 11: Task: Show plan of the day diet

5 Expert Based Evaluation

The Expert Based Evaluation is a method of evaluating the usability and user experience of a software system or interface by involving experts. There are several techniques commonly used in expert-based evaluation, including:

- **Heuristic Evaluation:** experts examine the interface based on a set of predefined usability principles or heuristics. They identify any violations of these principles and provide recommendations for improving the system's usability.
- **Cognitive Walkthrough:** experts simulate the interaction process of typical users and assess the system's usability based on cognitive models of user behavior. They analyze how users would perform specific tasks and identify any potential obstacles or difficulties.

5.1 Heuristic Evaluation

Heuristic Evaluation will be based on Nielsen's heuristics that provide a set of general principles for evaluating the usability of user interfaces, and reporting when they are violated and how high is the severity of the violation. This is done by testing the interface.

5.1.1 Nielsen's Heuristics

- **Visibility of system status:** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- **Match between system and the real world:** The system should speak the user's language, following real-world conventions, using words, phrases and concepts familiar to the user and making information appear in a natural and logical order, rather than using system-oriented terms.
- **User control and freedom:** Given that users often make mistakes, choosing the wrong system function, they need a clearly "emergency" exit to leave the unwanted state. Because of that, the system should support undo and redo.
- **Consistency and standards:** Follow platform conventions so that users don't have to understand if different words, situations or actions mean the same thing.
- **Error prevention:** Having a careful design which prevents a problem from occurring in the first place is better than a good error message, so eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
- **Recognition rather than recall:** Minimize the user's memory load by making objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
- **Flexibility and efficiency of use:** Allow users to personalize frequent actions with accelerators. Accelerators, unseen by the novice user, may often speed up the interaction for the expert user such that the system can provide for both inexperienced and experienced users.

- **Aesthetic and minimalist design:** Dialogues should not contain information which is irrelevant or rarely needed, because every extra unit of information in a dialogue, competes with the relevant units of information reducing their visibility.
- **Help users recognize, diagnose and recover from errors:** Error should not be expressed in codes, but in plain language, precisely indicating the problem and constructively suggesting a solution.
- **Help and documentation:** It may be necessary to provide help and documentation, even though it is better if the system can be used without documentation. Any information should be easy to search, focused on the user's task, so make a list of concrete steps to be carried out, and not be too large.

5.1.2 Expert Report

Evaluator: Alba Bisante

Prototype: FitMatch

Date: 22/05/2023

Page	Heuristic violated	Severity	Description / Comment
Start (onboarding pages)	User in control and freedom	2	The first three screens shows some promotional sentences, but they do not contain actual instructions for the app usage. As they are not technically useful, it is suggested to allow the user to skip them. The severity is 2 as they are only three and skipping by scrolling them is fairly fast.
Authentication (sign up page)	Flexibility and efficiency of use	3	After sign up, the user is redirected to the log in page instead of directly the home page. Why ask the user to repeat the action of inserting email and password?
Request fitness plan (your regular physical activity level page)	Help and documentation	2	The user is required to select his activity level between 5 choices. It is suggested to insert some additional descriptions to help the user identify the correct level.
Request fitness plan (detail page of a fitness plan, e.g. Warm up)	Match between the system and the real world	3	When clicking a fitness plan, it directly suggests the user the first day of exercise, instead of giving an overview of the plan. Also, the word "Finish" is misleading, as the effect of that action is more "Select the plan".
Plan of the fitness day (exercise detail page, e.g. "Simple Warm-up exercises"	Consistency and standards	2	The back button is placed on the top left, instead as the bottom left as the rest of the app. As a side note, the standard placement of the back button is usually top left.
Home page (after choosing fitness and meal plan)	Aesthetic and minimalistic design	1	The day (Mon 26) is repeated on both cards (fitness and meal).
Home page (after choosing fitness and meal plan)	User control and freedom, Flexibility and efficiency of use	3	Can the user change/stop a chosen program?
Diet plan of the day	Match between the system and the real world, Aesthetic and minimalist design	3	There is a "Done" button not linked to anywhere. If it is supposed to link the home, it is not necessary as the back button is enough. Moreover, the label is misleading, as it suggests that the user should do something before leaving the page.

Passage Home page > Today diet plan detail > Diet section	Recognition rather than recall	4	When clicking on today diet plan from the home page, the back button navigates to a different section (the tab bar diet section) generating confusion.
Diet section (Extra meal feature)	Recognition rather than recall	2	The feature to add an extra meal is slightly hidden
Extra meal feature	Aesthetic and minimalistic design	3	There are 4 pages just to add the details of an extra meal, which makes the task a little tedious. This happens also for the phase of choosing a plan, but that task is supposed to happen more rarely.
Extra meal feature	Visibility of system status, Help users recognize, diagnose and recover from errors	4	Once an extra meal is added, there is not enough feedback about it. The following page is called "Plan updated", but it is not showing the extra meal the user added, and it is referring to the tomorrow plan. What I understood from this is that if I insert an extra meal today, it will affect the tomorrow plan (e.g. suggesting me to eat less), but it is not clear.
Workout plan of the day page and sub-section detail page	Match between the system and the real world, Aesthetic and minimalist design	3	As in the diet plan day, there are "Done" buttons that may be not necessary. The status of the workout is highlighted from the checks of each sub-section.
Workout detail page	Match between the system and the real world	4	The label of the done button is misleading, as if you click it the exercise starts.

Workout plan section	Aesthetic and minimalistic design	2	There are a lot of pages for doing the today planned exercises. Some of them could be merged.
End of cardio workout page (all subsections completed)	Recognition rather than recall, Consistency and standards	4	The "Done" button here makes sense, as the workout is done, but the back button disappeared. Then, if the user clicks "Done" he lands on a middle page with a back button that if clicked prompts a "do you want to quit?" alert. The flow is not clear. This may be related to pages very similar to one another.

Severity legend:

- 0: I don't agree that this is a usability problem at all.
- 1: Cosmetic problem only.
- 2: Minor usability problem
- 3: Major usability problem
- 4: Usability catastrophe

5.2 Cognitive Walk-through

The Cognitive walk-through is a usability evaluation technique used to assess the usability and effectiveness of a software system or interface. It focuses on examining the system from the perspective of a typical user and simulating their cognitive processes when performing tasks.
The action and the system response are listed below. The expert evaluates the task walking through the design considering psychological principles. By simulating user actions and thought processes, this method can uncover potential usability problems and areas where the system may require enhancements to improve user experience and task completion.

The task analyzed by the expert, Alba Bisante, is: "Request a fitness plan".

Action 1: press button request workout.

Response 1: the system shows the first question about the number of days per week available for the training.

Action 2: select the number of days per week available for the training.

Response 2: the system shows the selected amount of days.

Action 3: press the "next" button.

Response 3: the system shows the next question about the time available for each workout.

Action 4: select the time available for each workout.

Response 4: the system shows the selected time.

Action 5: press the "next" button

Response 5: the system shows the next question about the workout level experience.

Action 6: select the workout level experience.

Response 6: the system shows the selected level experience.

Action 7: press the "Finish" button.

Response 7: the system shows a list of generated plans ad-hoc for the user.

Action 8: select the "endurance" type of workout on the filter.

Response 8: the system shows only the "endurance" type of workouts.

Action 9: press on the Warm Up Workout.

Response 9: the system shows an overview of the Warm Up Workout

Action 10: click on "Stability Training Basics" tab

Response 10: the system shows the video tutorial of the exercise

Action 11: Click on the "back arrow" button.

Response 11: the system shows the previous page.

Action 12: Click on the "finish" button.

Response 12: the system shows a pop-up to confirm the choice.

Action 13: Click on the "Confirm" button.

Response 13: the system shows the home page updated with the selected plan.

5.2.1 Expert Report

Evaluator: Alba Bisante

Prototype: FitMatch

Date: 29/05/2023

1. Request a fitness plan

Action 1: press button request workout.
Response 1: the system shows the first question about the number of days per week available for the training.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	As the application provides multiple features, it is reasonable to expect the user to look for a dedicated page when aiming at requesting a fitness plan.
Q2 Will users see the action is available?	The button is visible and placed in a standard location, but the user could be misled by the label (why call it request a "workout", if the (desired) effect is to request a fitness plan?)
Q3 Once users find the correct action, will they know it is the one they need?	The user could be misled by the label (workout instead of fitness plan). However, as there are only a few other actions available, it is reasonable to not doubt the correctness of this action.
Q4 After the action is taken, will users understand the feedback they get?	The following page delves immediately into asking details for the plan, which is reasonable feedback.

Action 2: select the number of days per week available for the training.
Response 2: the system shows the selected amount of days.

Action 3: press the "next" button.
Response 3: the system shows the next question about the time available for each workout.

Action 4: select the time available for each workout.
Response 4: the system shows the selected time.

Action 5: press the "next" button
Response 5: the system shows the next question about the workout level experience.

Action 6: select the workout level experience.
Response 6: the system shows the selected level experience.

Note: I compressed these actions as they are very similar and straightforward

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	As the displayed pages ("How many days per week?" , "Your time availability for each workout", "Your regular physical activity level?") are modals, it is reasonable that the user will understand these are required actions. Moreover, the user is further supported in understanding by the subtitles ("This helps us create your personalized plan").
Q2 Will users see the action is available?	Yes. Regarding the selection actions (2, 4, 6) , the slide picker is a fairly common UI element and it is placed in a very evident location. Also the actions 3, 5 (press next) are reasonably available as placed in a standard location and made visible by the highlighted color of the button.
Q3 Once users find the correct action, will they know it is the one they need?	Yes (only action available).
Q4 After the action is taken, will users understand the feedback they get?	Reasonably yes.

Action 7: press the "Finish" button.
Response 7: the system shows a list of generated plans ad-hoc for the user.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	Yes. The user added workout related information and will expect to finish the questionnaire to receive a suggested plan.
Q2 Will users see the action is available?	Yes, as above.
Q3 Once users find the correct action, will they know it is the one they need?	Yes, as above.
Q4 After the action is taken, will users understand the feedback they get?	The user will understand that the questionnaire is over, and that some plans are suggested to him.

Action 8: select the "endurance" type of workout on the filter.
Response 8: the system shows only the "endurance" type of workouts.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	The action is not strictly required. However, filters are standard and the user will reasonably understand that this action is available to facilitate the process of selecting a plan.
Q2 Will users see the action is available?	Yes, as the filters are placed in a standard location (above a collection of elements)
Q3 Once users find the correct action, will they know it is the one they need?	Yes.
Q4 After the action is taken, will users understand the feedback they get?	Yes, as the collection of elements below is filtered accordingly to the selected type of plan.

Action 9: press on the Warm Up Workout.
Response 9: the system shows an overview of the Warm Up Workout

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	Yes, it is reasonable to expect the user to click on the card describing the chosen plan.
Q2 Will users see the action is available?	Yes.
Q3 Once users find the correct action, will they know it is the one they need?	Yes.
Q4 After the action is taken, will users understand the feedback they get?	Yes, as the following page shows a text with the details of the selected plan, repeating title and type, and a button "call to action" labeled "Select Plan".

Action 10: click on "Stability Training Basics" tab
Response 10: the system shows the video tutorial of the exercise

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	The action is not strictly required. However, clicking on a card to explore more details is a standard action.
Q2 Will users see the action is available?	Yes.
Q3 Once users find the correct action, will they know it is the one they need?	Yes (if required).
Q4 After the action is taken, will users understand the feedback they get?	Yes, as it is shown a video explaining the clicked exercise.

Action 11: Click on the back arrow button.
Response 11: the system shows the previous page.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	Yes (standard)
Q2 Will users see the action is available?	Yes (standard)
Q3 Once users find the correct action, will they know it is the one they need?	Yes (standard)
Q4 After the action is taken, will users understand the feedback they get?	Yes (standard)

Action 12: Click on the FInish button.
Response 12: the system shows a pop-up to confirm the choice.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	Yes, as the button has a "call to action" label that corresponds to the goal.
Q2 Will users see the action is available?	Yes (standard)
Q3 Once users find the correct action, will they know it is the one they need?	Yes (standard)
Q4 After the action is taken, will users understand the feedback they get?	Yes, a confirm alert is also shown (Note: as the user can change a selected plan, this alert may be unnecessary).

Action 13: Click on the Confirm button.
Response 13: the system shows the home page updated with the selected plan.

Q1 Is the effect of the action the same as the user's goal at that point? (Does the user understand that this subtask is needed to reach the goal?)	Yes (standard)
Q2 Will users see the action is available?	Yes (standard)
Q3 Once users find the correct action, will they know it is the one they need?	Yes (standard)
Q4 After the action is taken, will users understand the feedback they get?	Yes, as the homepage gets updated with the selected plan.

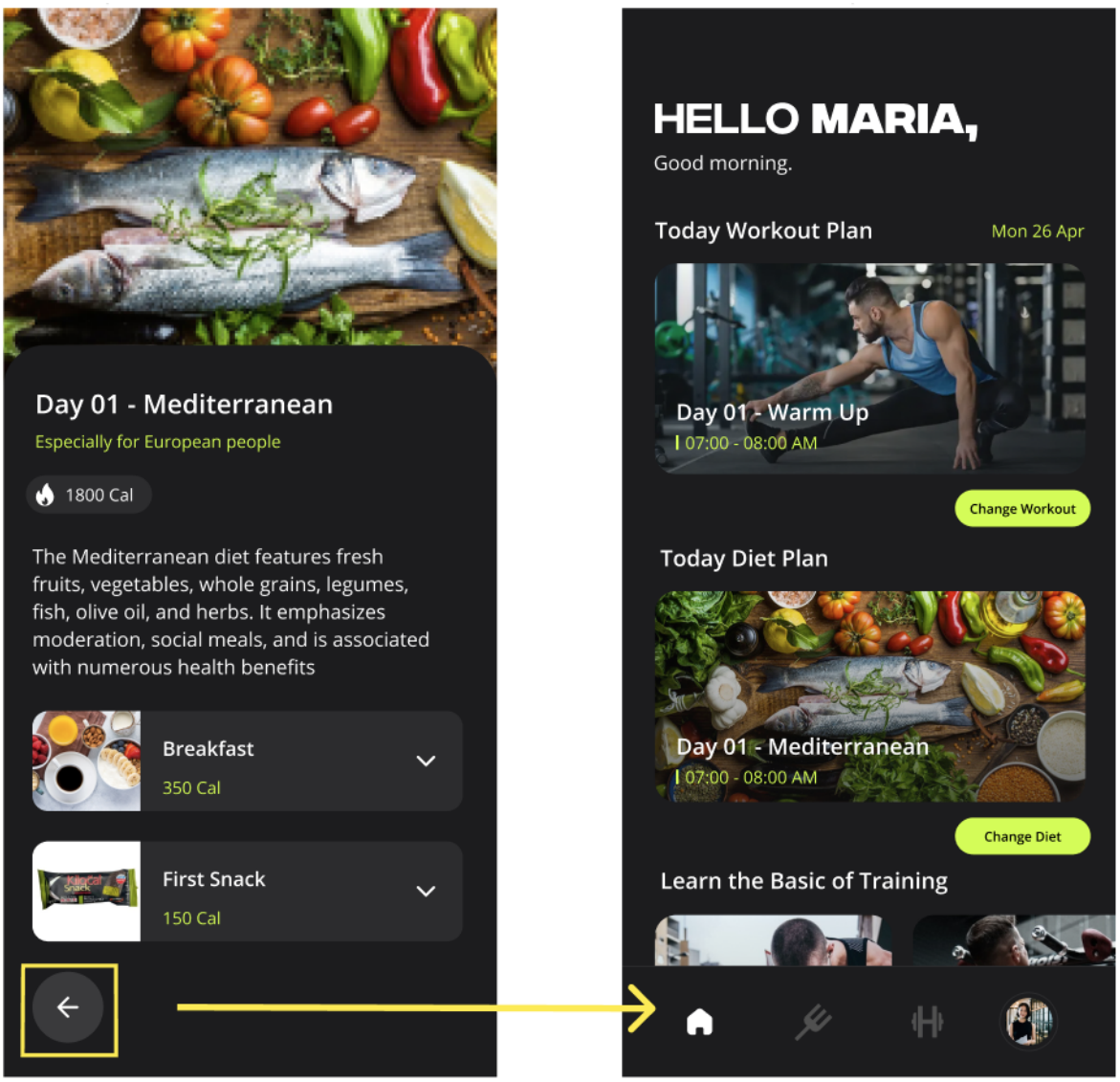
6 Prototype 2

Prototype 2 was built on the basis of the expert's evaluations. In particular, all the problems that had been noted in the evaluation were solved.

6.1 Correction of HE detected defects

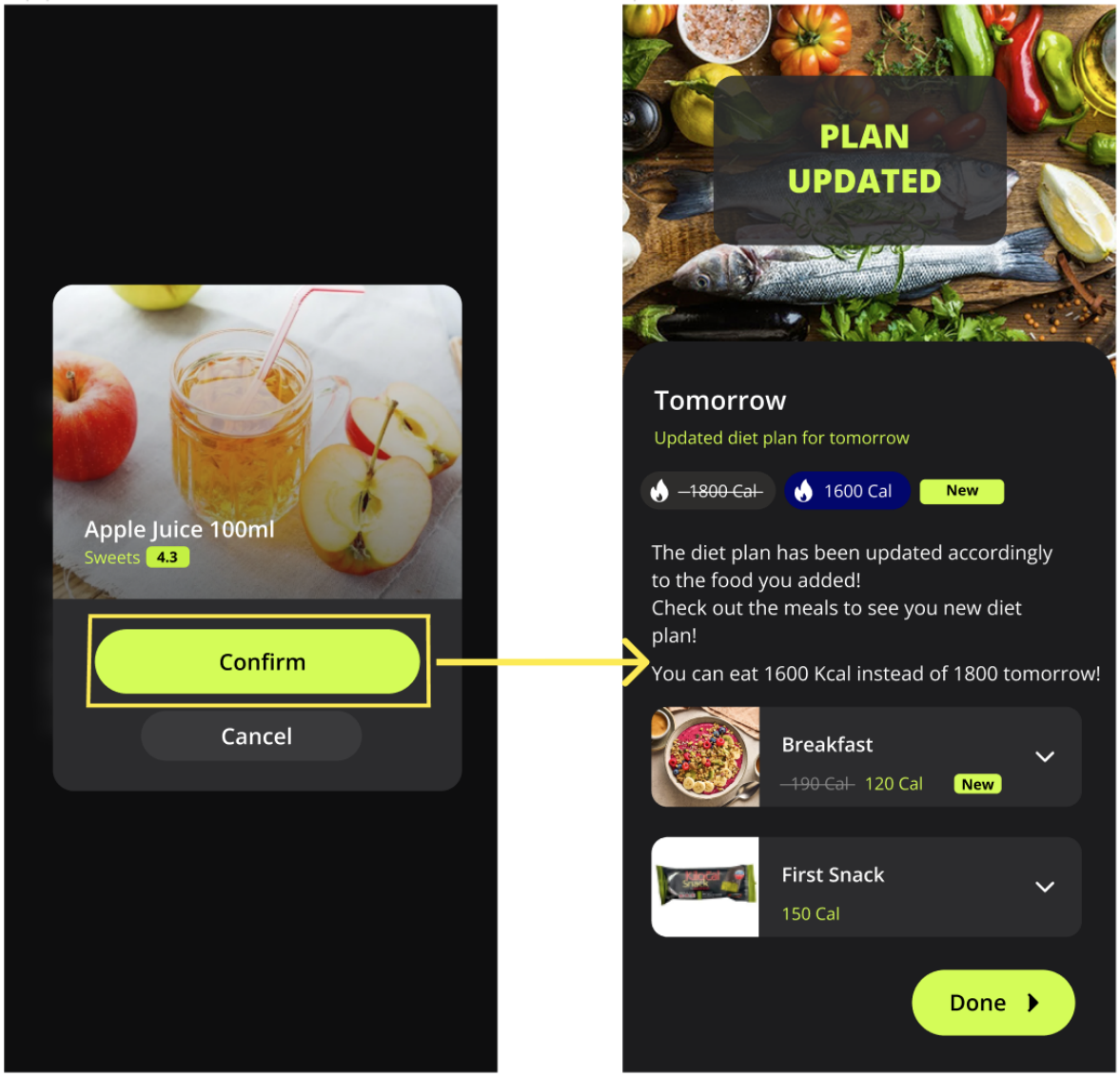
In general, the most common problems noted by the expert were some unnecessary buttons and other repetitions. More serious problems, however, were incorrect redirects and little response from the system after certain actions were performed

Frame: Diet section, Heuristic Violated: Recognition rather than recall
The problem was solved by changing the previous redirect to the homepage.



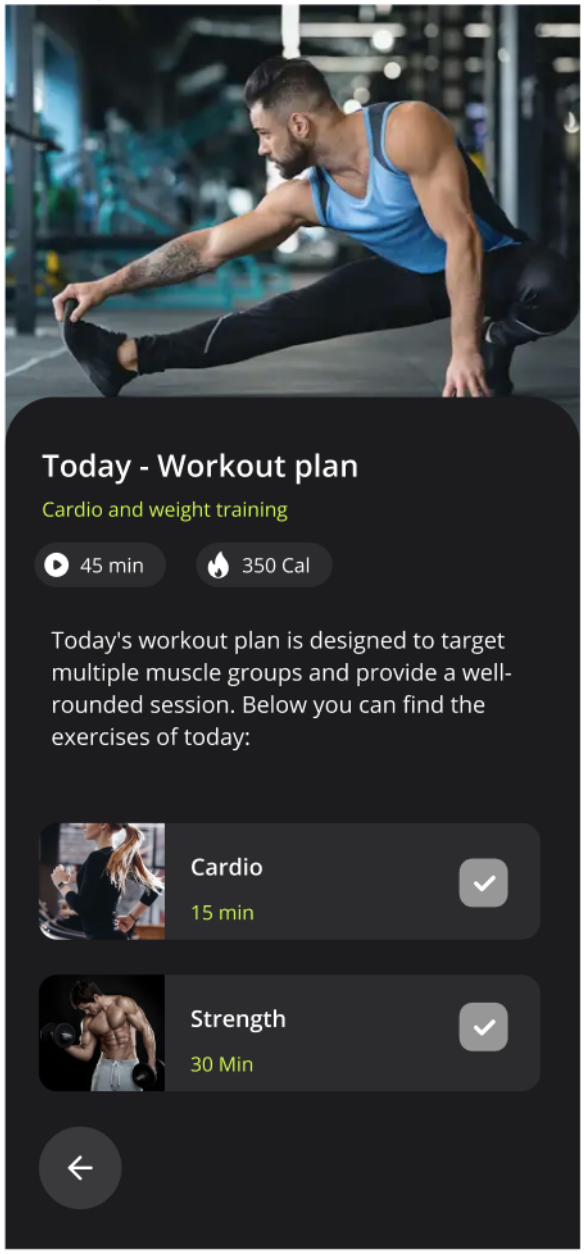
Frame: Extra meal feature, Heuristic Violated: Visibility of system status, Help users recognize, diagnose and recover from errors

The problem has been solved by adding a button with crossed-out lettering that indicates the old amount of calories provided by the diet for the next day. Next to it, a new blue-colored button was inserted containing the new calorie amount updated according to the food entered. In addition, new details were added that let the user know that after the extra food was added, his or her diet was updated according to the food.



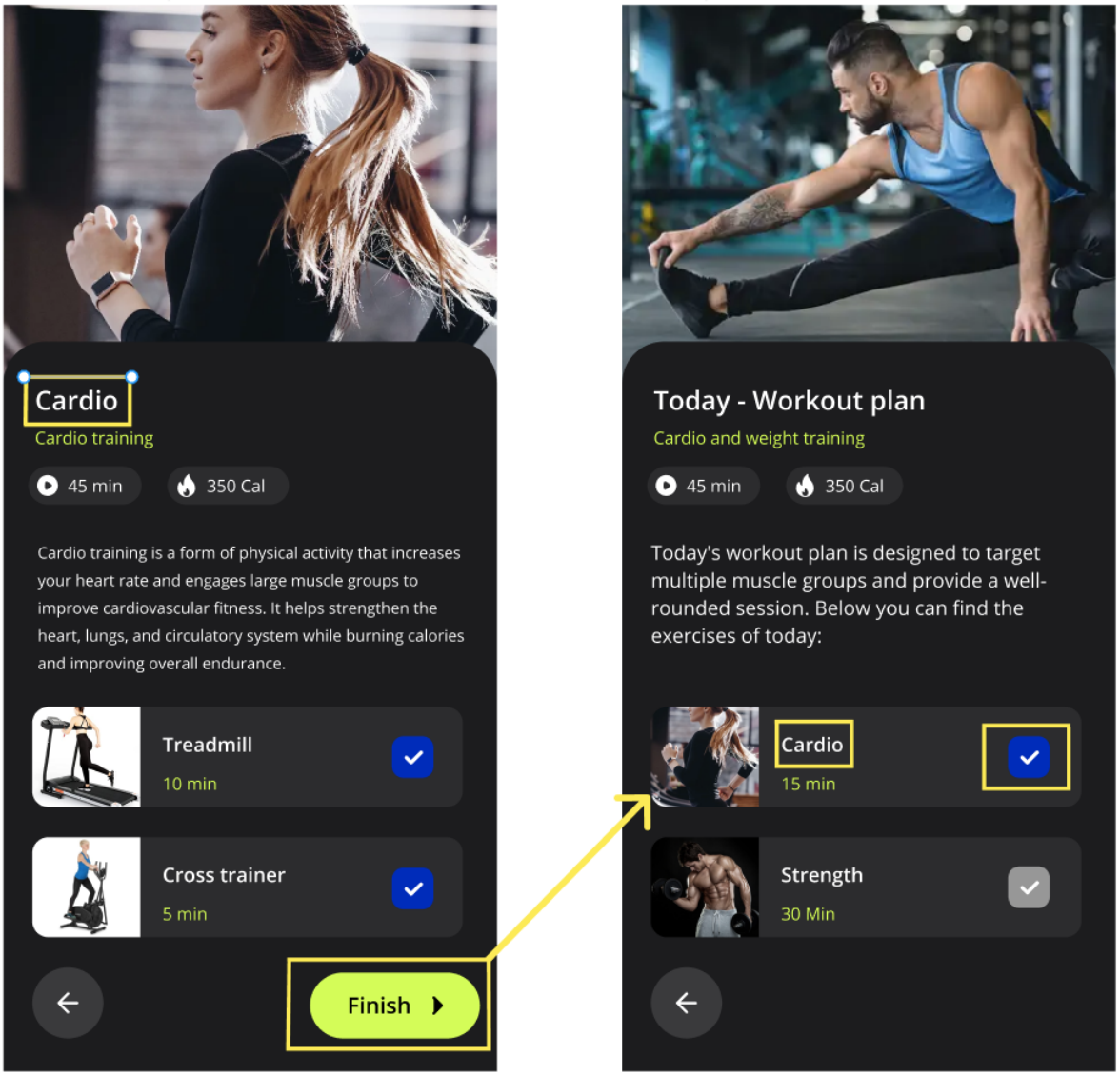
Frame: Workout detail page, Heuristic Violated: Match between the system and the real world

The problem was solved by removing the "done" button from the page, as it led to misleading flow.



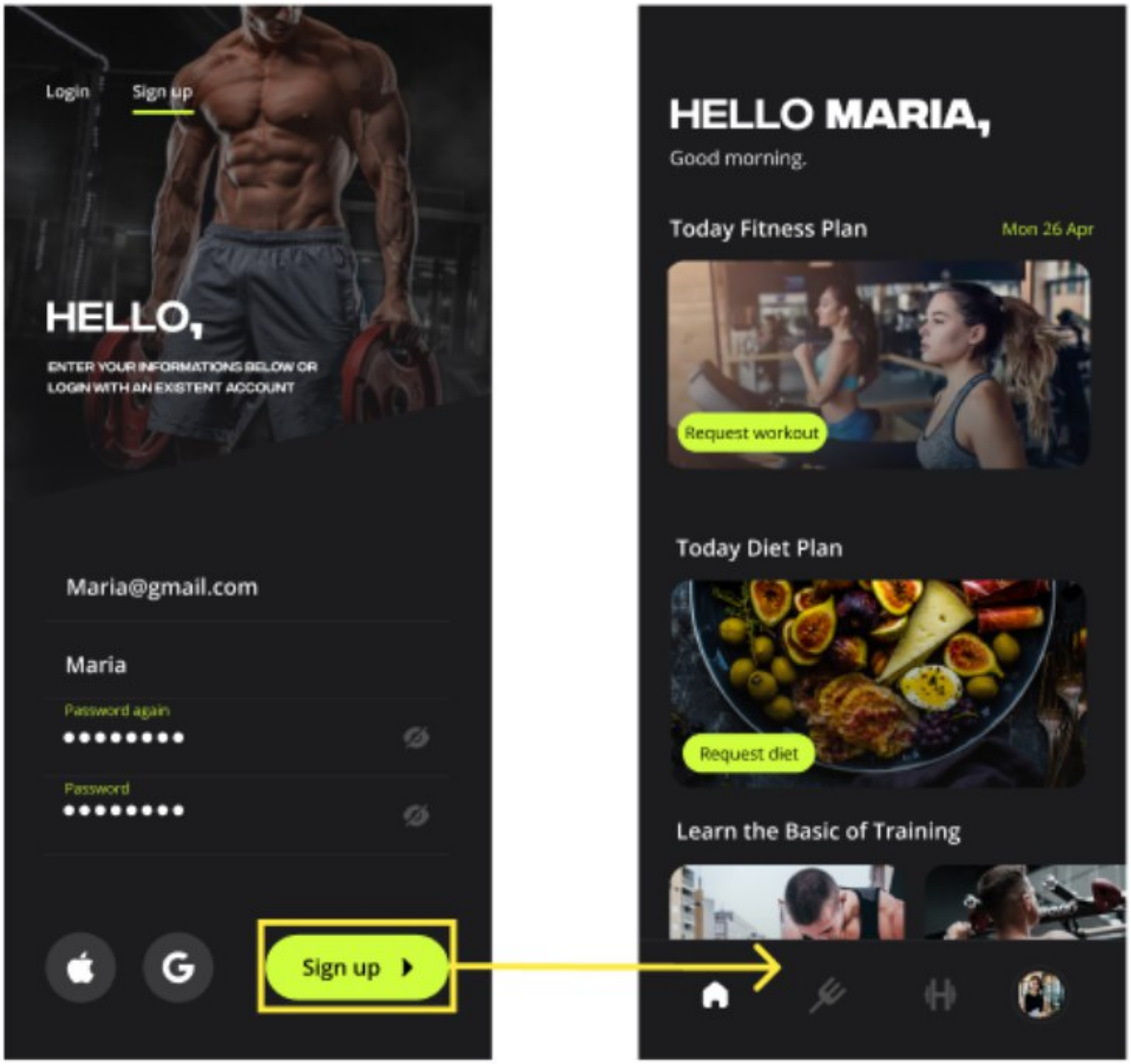
Frame: End of cardio workout page, Heuristic Violated: Recognition rather than recall, Consistency and standards

The problem was solved by inserting a "finish" button that, when clicked, returns the user to the full training plan and marks the relevant subcategory of exercises as completed. Also, the flow that results from clicking the button to return to the previous page has been corrected.



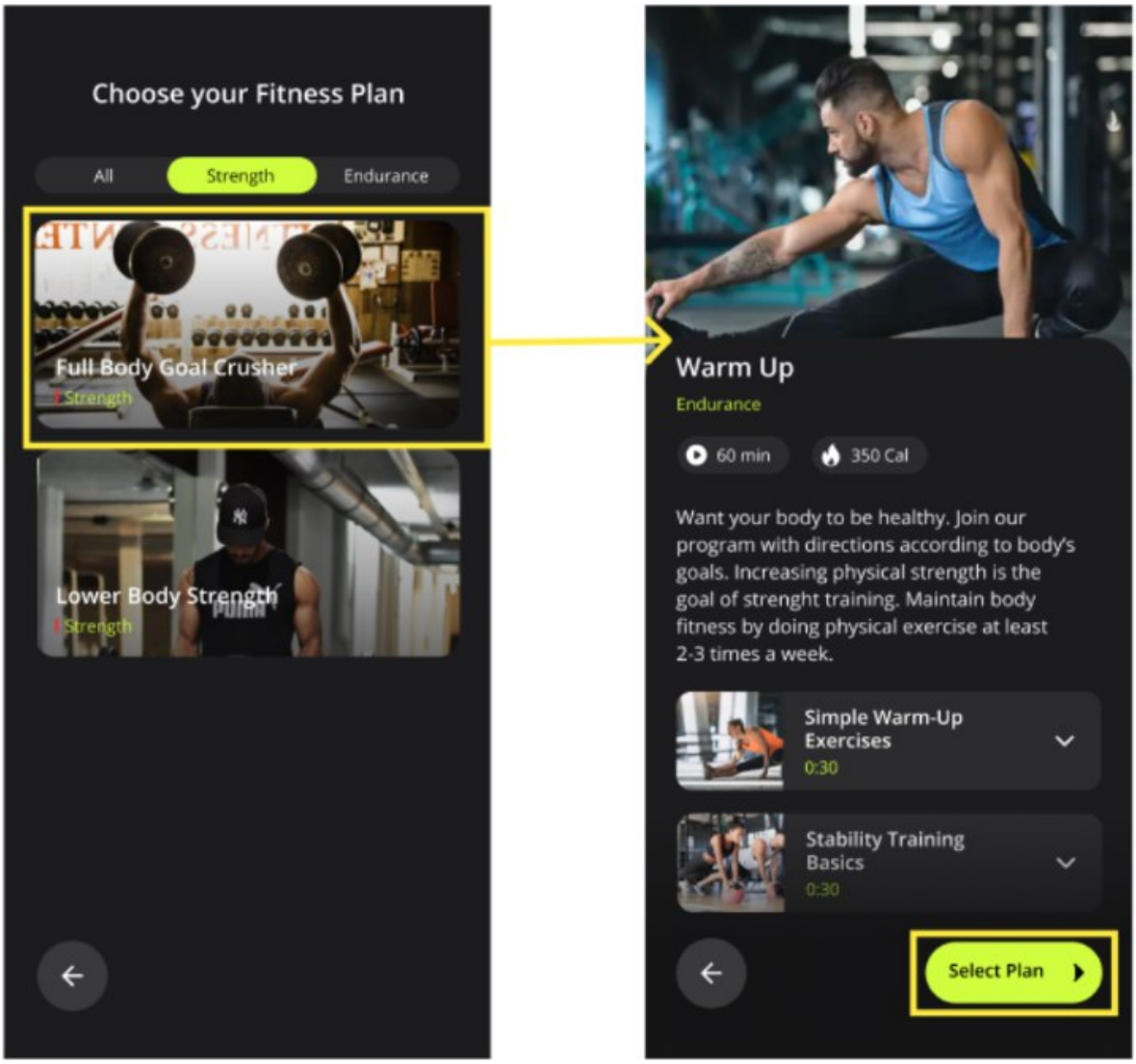
Frame: Sign Up page, Heuristic Violated: Flexibility and efficiency of use

Both problems are solved by redirecting the user to the Homepage after the Sign up process.



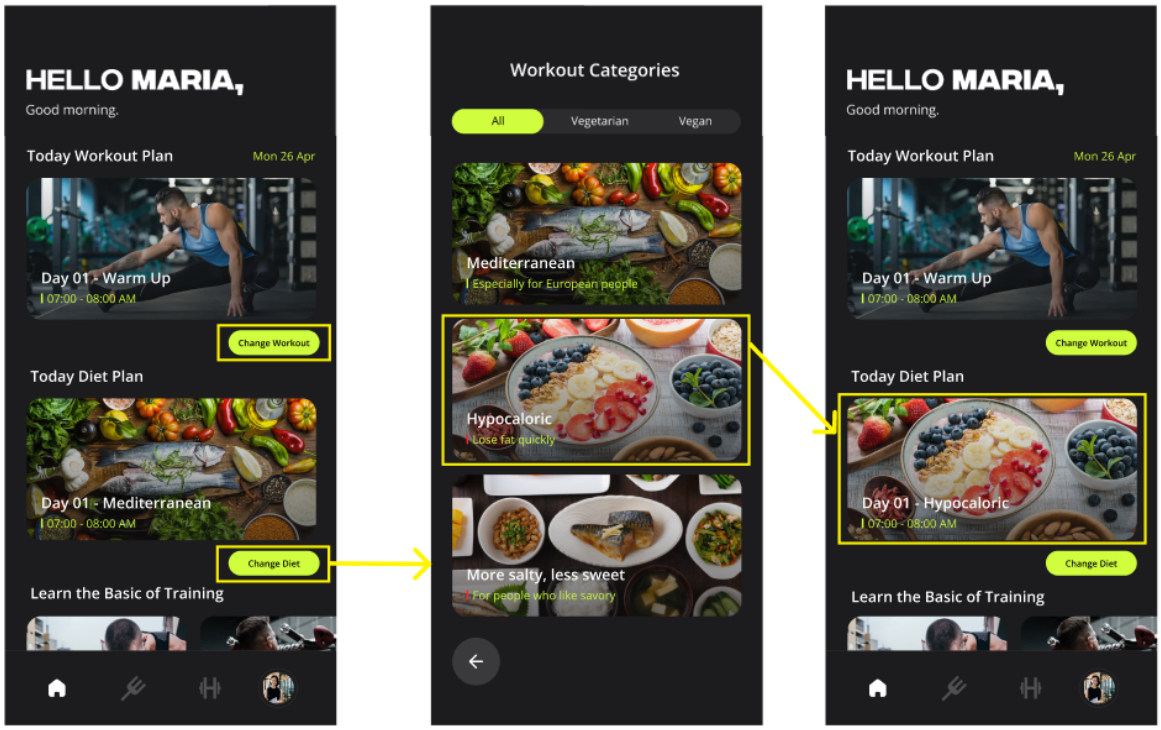
Frame: Detail page of a fitness plan, Heuristic Violated: Match between the system and the real world

Problem solved showing an overview of the plan and by replacing the button "Finish" with the button "Select the plan"

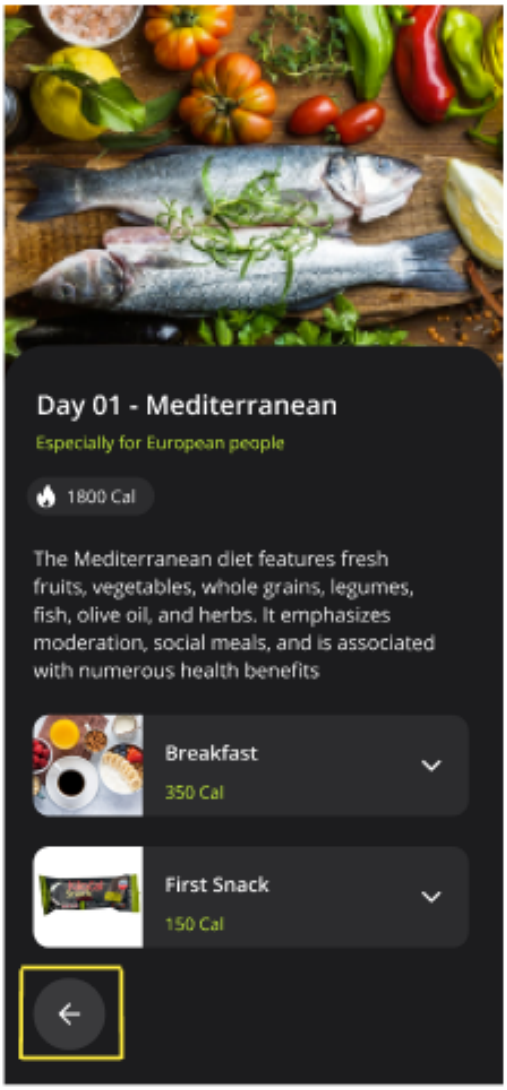


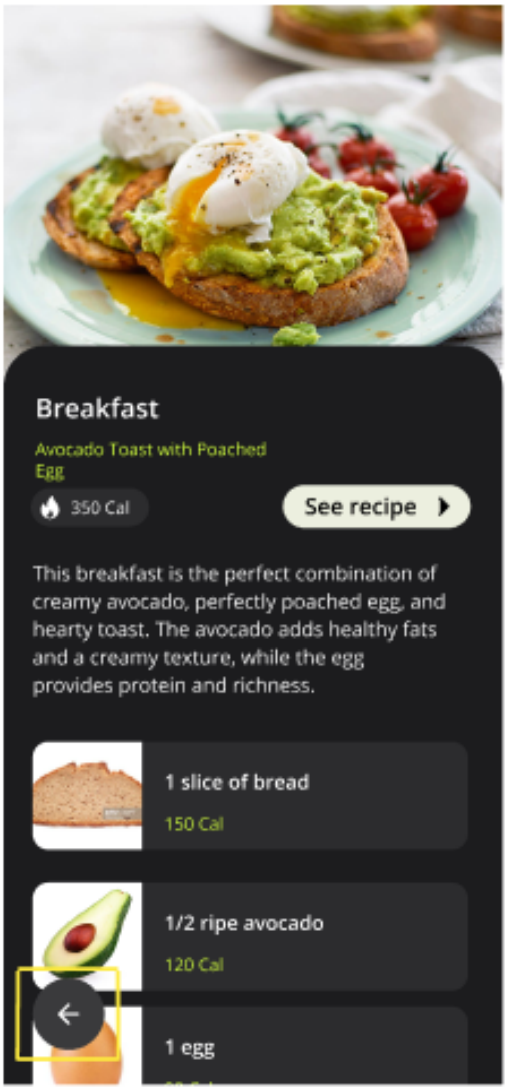
Frame: Home page after choosing fitness and meal plan, Heuristic Violated: User control and freedom, Flexibility and efficiency of use

These problems are solved by adding a button that permits the user to change the workout/diet plan, updating the questionnaire so he can choose any other plan.

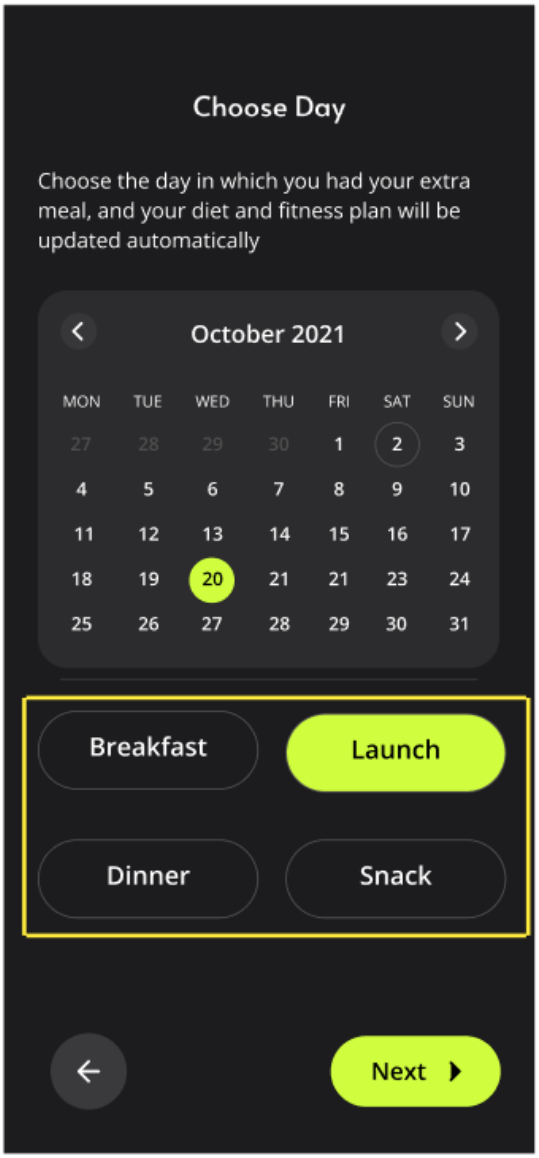


Frame: Diet plan of the day, Heuristic Violated: Match between the system and the real world, Aesthetic and minimalist design
Both problems are solved by deleting the Done button and using only the back button to return to the diet section. Before the user was misleading about having two buttons for the same thing.

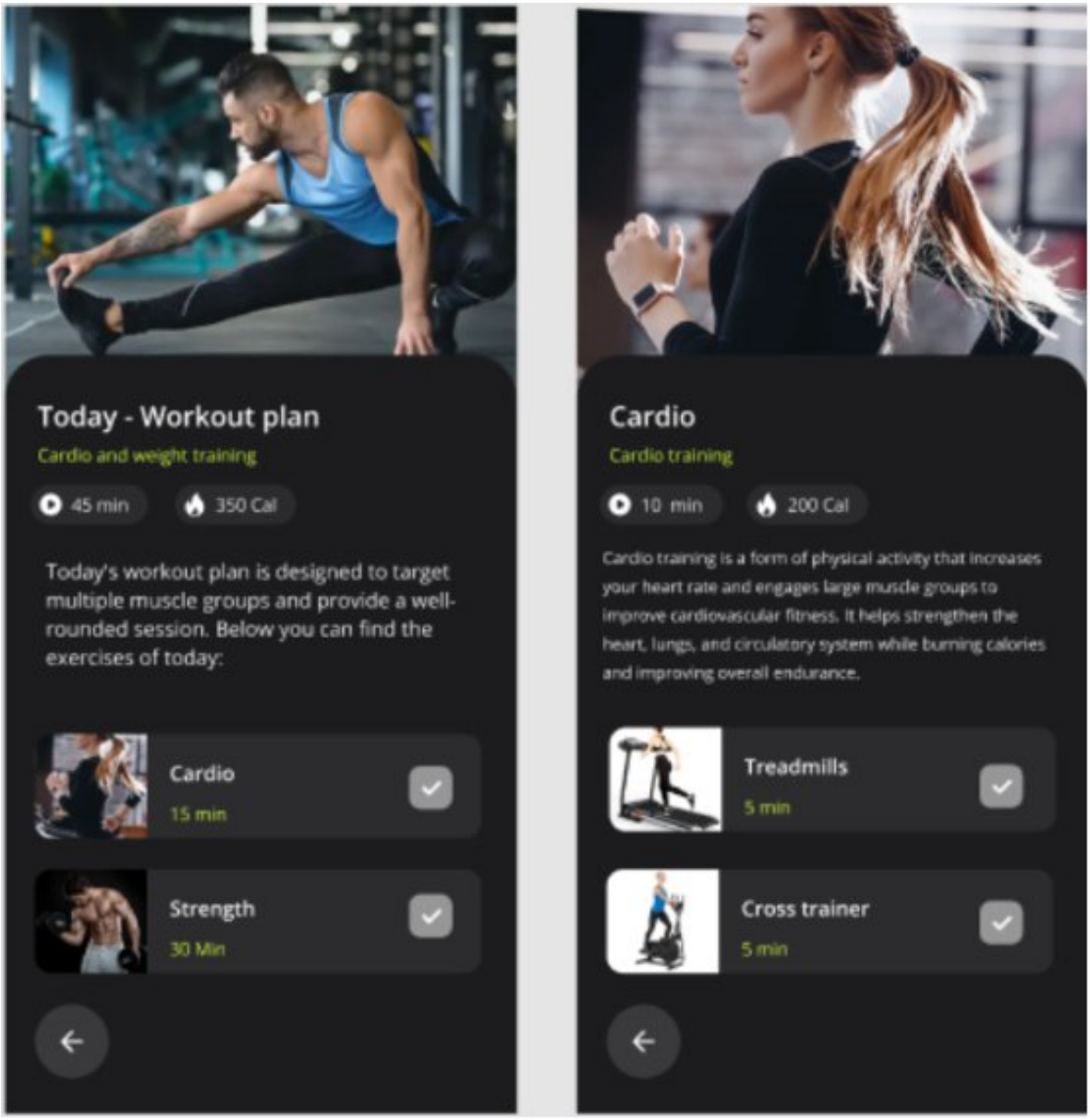




Frame: Extra meal feature, Heuristic Violated: Aesthetic and minimalist design
This problem is solved by using only one page instead of two for inserting the extra meal, like this the user can do the task more efficiently.



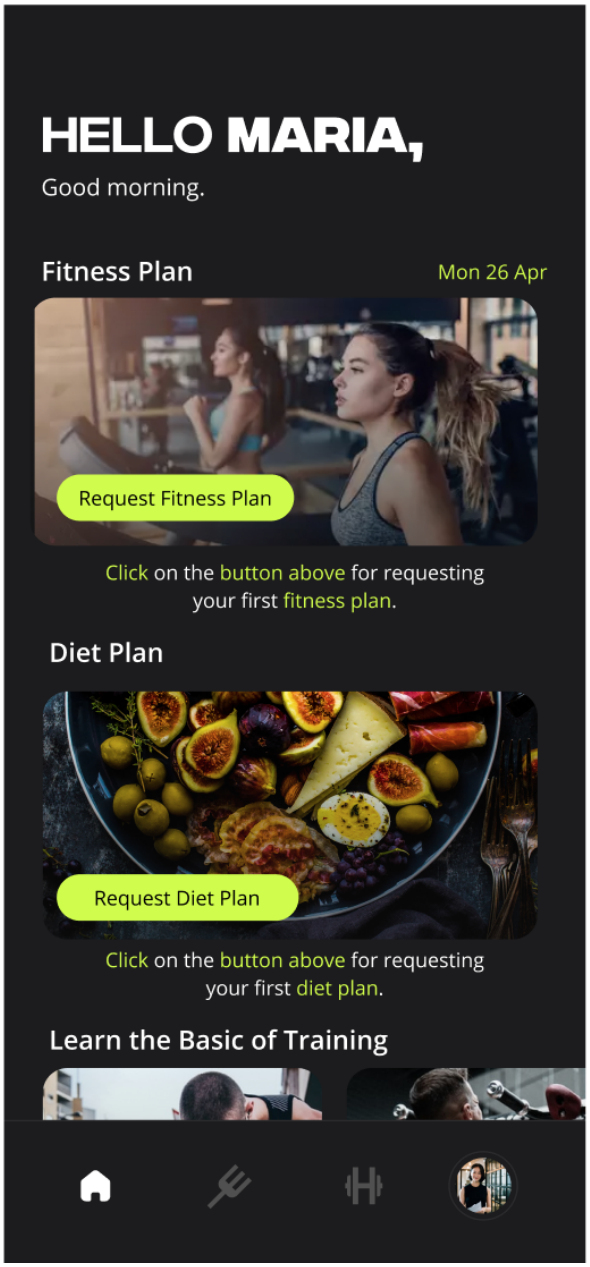
Frame: Workout plan of the day page and subsection detail page, Heuristic Violated: Match between the system and the real world, Aesthetic and minimalist design
Problem solved by removing the done button from the involved pages



6.2 Correction of CW detected defects

From the CW expert's evaluation, it emerged how there are some labels that can be misunderstood. In addition, we improved the user's perception of the homepage:

- all labels that included the word "workout" were changed to the words "fitness plan".
- two phrases have been added to the homepage that indicate exactly where the user should click to request a fitness plan or diet plan.



7 Think Aloud

Think Aloud is a technique used in user research and usability testing to gather insights into a user's thought processes and decision-making while they interact with a system or complete a task. The technique involves asking the user to verbalize their thoughts, feelings, and actions as they navigate through the interface or perform specific actions. Even though it has to be considered that the act of describing can alter the task performances of the user.

7.1 TA session

To evaluate the new application prototype, we held a Think Aloud session, with both young people, from 18-30 years, which were our colleagues or housemates, and also with people in the range 40-55 which were our relatives. All the people presented characteristics described in our user profile.

- First of all, we explained how our application works and what it does.
- Each user has to accomplish the following tasks individually:
  - Request a fitness plan.
  - Request a diet plan.
  - Insert an extra meal.
  - See the details of the "today" diet plan.
  - See the details of the "today" fitness plan.
- Each person had his own smartphone and performed the task on the interactive prototype 2 using Figma.
- Each user talked aloud and during the experiment we took notes about their experience and impressions.

7.2 Conclusions of the think aloud session

The conclusions drawn from the think aloud session are:

All the users really liked the interface and the features of the app, in particular the possibility to add a meal which was not scheduled by your plan, and the fact that the plan is updated automatically.

Most users, upon arriving at the homepage, attempt to request the fitness plan or diet plan by clicking on the entire image box and not on the yellow button. Only after a few attempts the user understand that one must click on the yellow button to request the plan.
So we decided to remove the yellow button and make the entire image box clickable.

Some people, especially the ones between 40-55 seemed to be really confused by the fact that the first time the user tries to enter the fitness section or diet section, they are sent to the questionnaire to create a fitness plan or a diet plan. Some users then associate those buttons with the create a new plan feature.

The solution is to send users to the diet section or fitness section, showing an image box to create the plan for the first time.

Almost the majority of the users expected the image box “Your health status” in the fitness section to be clickable.

So we decided to make the button clickable showing the chart in detail.

8 Controlled Experiment

Controlled Experiment is a research method used to systematically investigate the effects of specific factors or interventions on user experience, performance, or other relevant variables. It involves manipulating independent variables under controlled conditions while measuring the resulting changes in dependent variables. By using controlled experiments, researchers can systematically investigate the effects of specific variables or interventions on user behavior and experiences. This allows them to draw more reliable conclusions about the causal relationships between factors and outcomes and make informed design decisions based on empirical evidence.

8.1 Insert Extra Meal

Initially, the feature of entering an extra meal consisted of selecting the day and meal through a calendar and 4 buttons. Since we were not sure how the user would perceive the calendar, we thought of replacing the calendar element with four sliders, one for the day, one for the month, one for the year and one for the meal. In this way, we thought the user would more quickly associate the action of choosing the day and the meal through the four sliders.

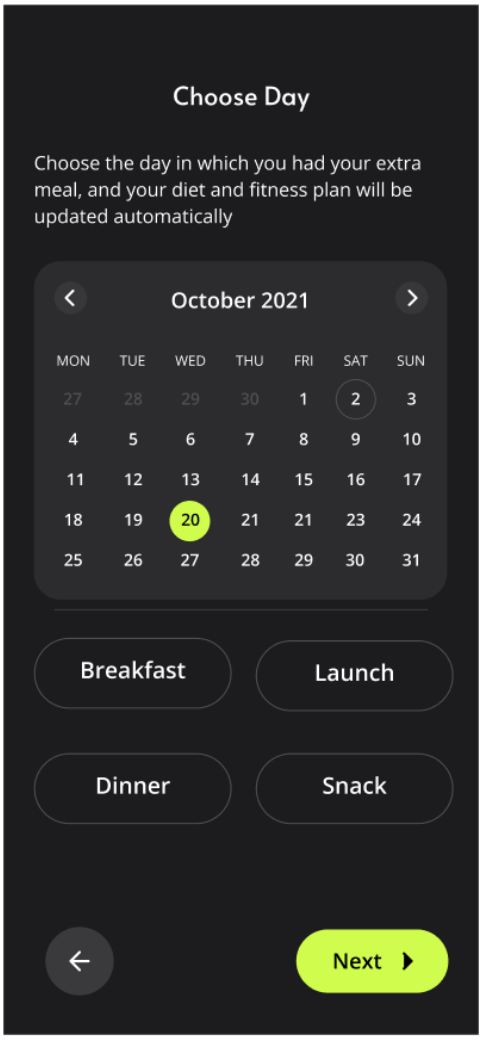


Figure 12: Interface 1

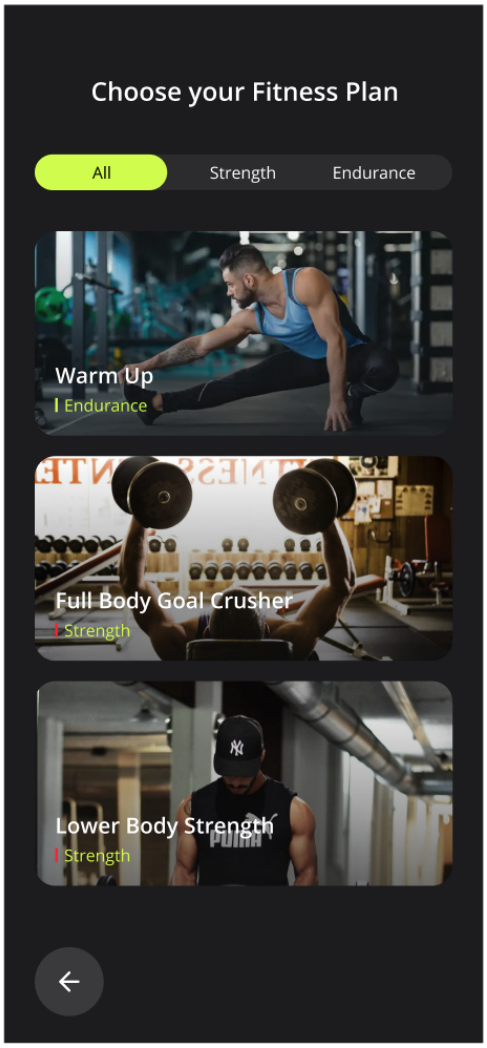


Figure 13: Interface 2

8.1.1 ANOVA One-way Analysis

The controlled experiment has been performed with ANOVA One-Way analysis. We asked 16 different people to perform the task. We performed the experiment with the option "between groups", so we divided the users into 2 groups, each one of 8 users, and each user performed the task only under one condition, with no transfer of learning.

- **Who?** We searched for people according to our user profile (14-50 y), also relying on the data collected through the questionnaire.
- **Variables:**
  - independent: the two interfaces;
    - interface 1: Choose day with a calendar and buttons for meal.
    - interface 2: Choose day and meal with sliders.
  - dependent: the time in seconds to execute a task.
- **Hypothesis:**
  - null: no differences between two interfaces;
  - our: users will complete the task in less time using the interface with sliders (interface 2).
- **Experiment:**
  - task: "Insert Extra Meal";
  - assumptions: user is already logged and is on the diet page.
- **Apply ANOVA:** We measured how much time each user takes to perform the same task requested with the two different interfaces using a chronometer.

Interface 1	Interface 2
13,4	16,7
12,5	18,1
11,7	15,2
16,8	21,5
12,4	19,8
12,8	17,4
14,1	14,9
15,3	16

Figure 14: Seconds to complete the task with the 2 different interfaces

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	8	109	13,625	2,902142857
Column 2	8	139,6	17,45	5,225714286

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	58,5225	1	58,5225	14,40047456	0,001971	4,600109937
Within Groups	56,895	14	4,063929			
Total	115,4175	15				

Figure 15: ANOVA Results

Analysis of Anova results

As shown in Figure F > F-crit and so the null hypothesis, stating that there are no differences between the interfaces, can be rejected. So, our data have statistical relevance and the two examined populations (the groups of times collected using interface one, and the other using interface two) are not equal. The threshold used to perform the analysis is 0,05 significance level. The significance value here is 0,001971 which is smaller than 0.05. Analyzing the means of the two population (representing the average time needed to complete the task) we can see that the mean of interface 1 is much smaller than the one of interface 2: 13,625 < 17,45. We can so, disprove our initial hypothesis for which the interface 2, the one with the slider, has better performances compared to the interface 1, without sliders; so we keep interface 1.

8.2 Request Fitness Plan

During the implementation of the feature of requesting a fitness plan, we wondered whether it would be faster and more intuitive if the user scrolled through the plans to choose his or her favorite or filtered the plans by a criteria and then chose the plan. For this reason, we decided to run a controlled experiment to understand which methods were more easier and faster to adopt it.

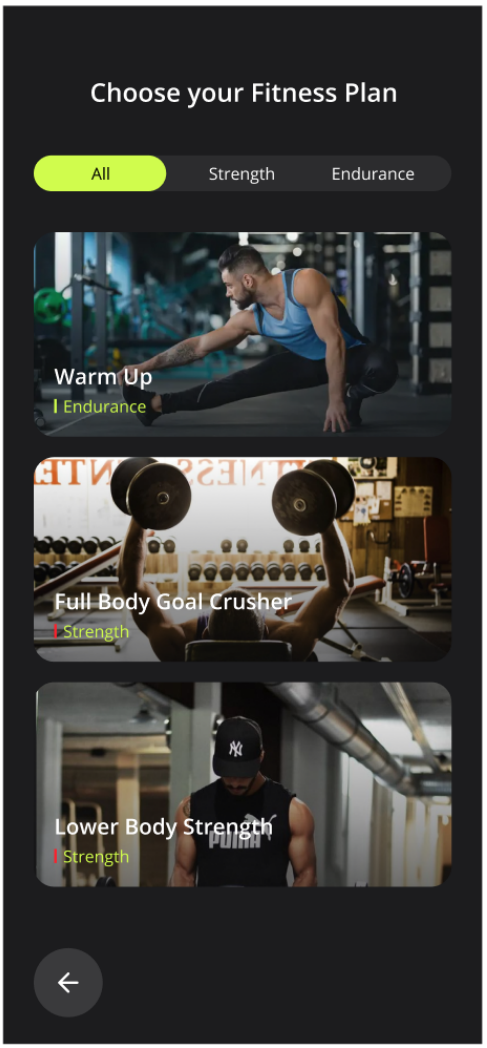


Figure 16: Interface 1

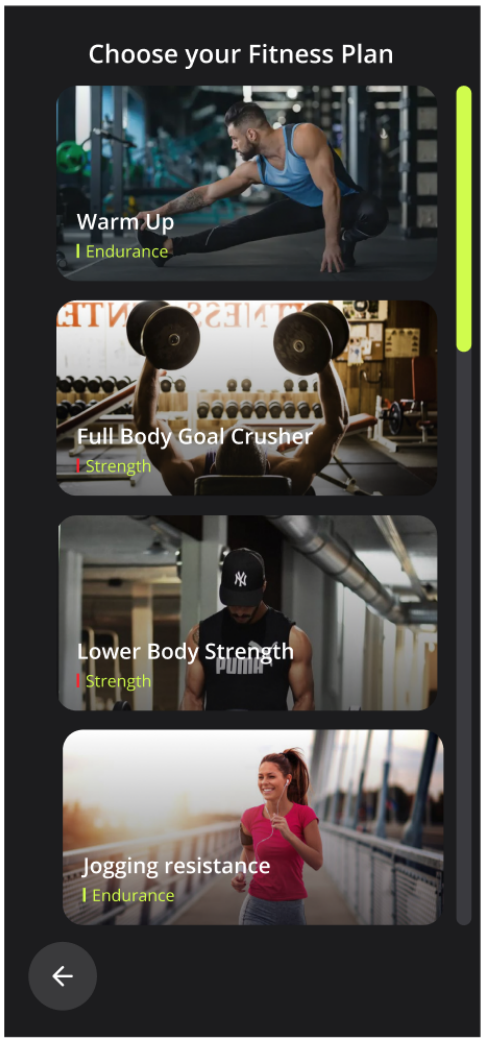


Figure 17: Interface 2

8.2.1 ANOVA One-way Analysis

As before, the controlled experiment has been performed with ANOVA One-Way analysis. We asked 16 different people to perform the task, divided into 2 groups.

- **Who?** We searched for people according to our user profile (14-50 y), also relying on the data collected through the questionnaire.
- **Variables:**
  - independent: the two interfaces;
    - interface 1: Choose the plan filtering filtering by category through 3 buttons.
    - interface 2: Choose the plan scrolling the screen.
  - dependent: the time in seconds to execute a task.
- **Hypothesis:**
  - null: no differences between two interfaces;
  - our: users will complete the task in less time using the Interface 2, scrolling the screen.
- **Experiment:**
  - task: "Request Fitness Plan";
  - assumptions: user is already logged and is on the Homepage.
- **Apply ANOVA:** We measured how much time each user takes to perform the same task requested with the two different interfaces using a chronometer.

Interface 1	Interface 2
27,7	37
30,2	32,1
21,5	29,9
26,1	33
32,8	36,5
29,6	34,2
28	37,3
33,4	30,1

Figure 18: Seconds to complete the task with the 2 different interfaces

SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Column 1	8	229,3	28,6625	14,5769643		
Column 2	8	270,1	33,7625	8,90839286		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	104,04	1	104,04	8,85998875	0,010005338	4,600109937
Within Groups	164,3975	14	11,74267857			
Total	268,4375	15				

Figure 19: ANOVA Results

Analysis of Anova results

As shown in Figure, also in this case F > F-crit and so the null hypothesis can be rejected. The two examined populations (the groups of times collected using interface one, and the other using interface two) are not equal. The significance value here is 0,01 which is smaller than 0.05. Analyzing the means of the two populations we can see that the mean of interface 1 is much smaller than the one of interface 2: 28,6625 < 33,7625. We can so, disprove our initial hypothesis for which the interface 2, the one with the scrolling, has better performances compared to the interface 1, with buttons filter, so we keep interface 1.

9 Final Product: Fit Match

9.1 Technological information

The Final Product of FitMatch has been implemented utilizing the Figma Framework, a cloud-based design and prototyping tool used for creating user interfaces (UIs), graphics, and interactive prototypes. This exceptional framework not only offers a seamless and efficient approach to crafting a product but also enables it to function as a fully immersive application. With a set of powerful tools, Figma provides a remarkable simulation of user interactions with its intuitive interface.
Figma empowers our team to effortlessly share the project, granting unrestricted access to anyone eager to experience the application firsthand. In addition to its user-friendly nature, the Figma Framework ensures that the final product of FitMatch possesses remarkable stability, responsiveness, and versatility. Its extensive capabilities enable the application to adapt seamlessly to evolving user needs and emerging technological advancements.

9.2 Storyboard

In this subsection, we present a visual journey that brings the final product of FitMatch to life. Through a series of storyboards, we aim to provide an immersive glimpse into the seamless user experience and the extensive functionality of FitMatch.
These storyboards serve as dynamic snapshots, capturing the key moments and interactions within the application. Each frame showcases the innovative features and intuitive design that make FitMatch a game-changer.
From initial on-boarding and profile setup to personalized workout, the storyboards illustrate the full spectrum of FitMatch's capabilities.

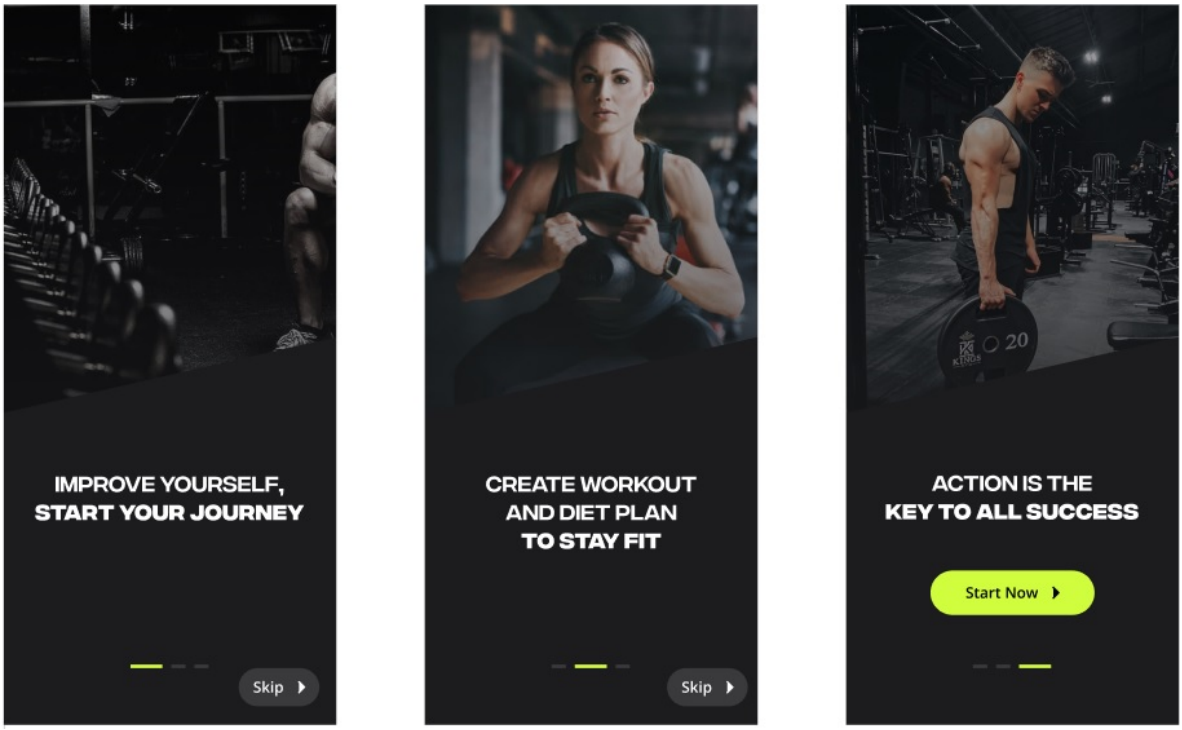


Figure 20: Intro pages

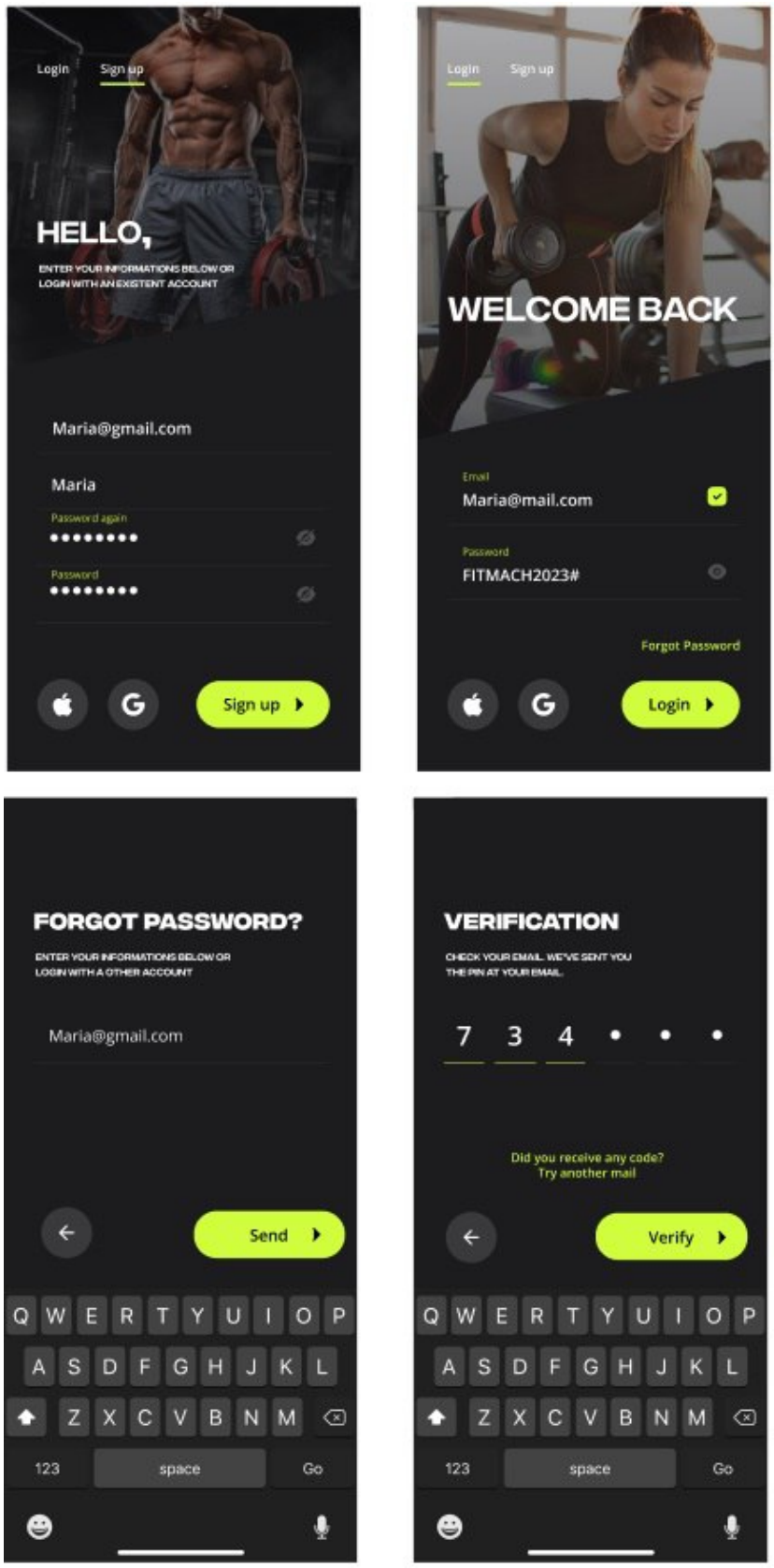


Figure 21: Authentication

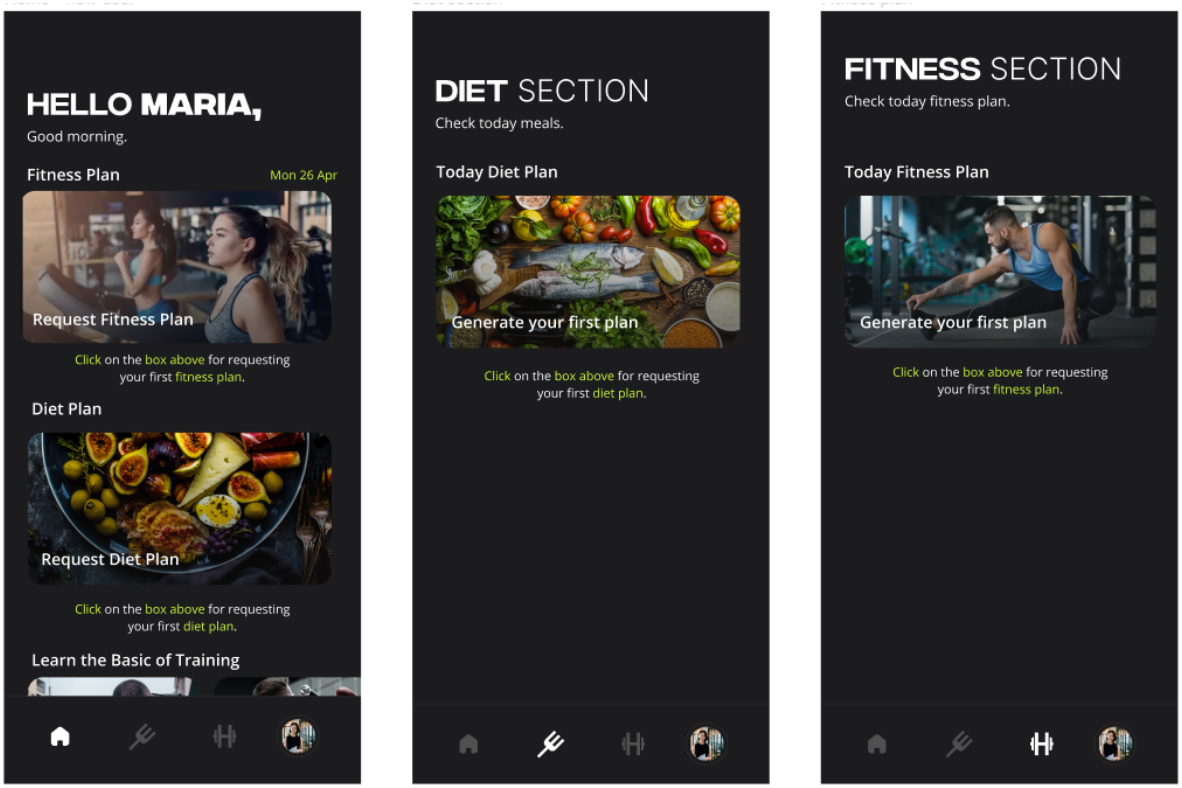


Figure 22: Homepage

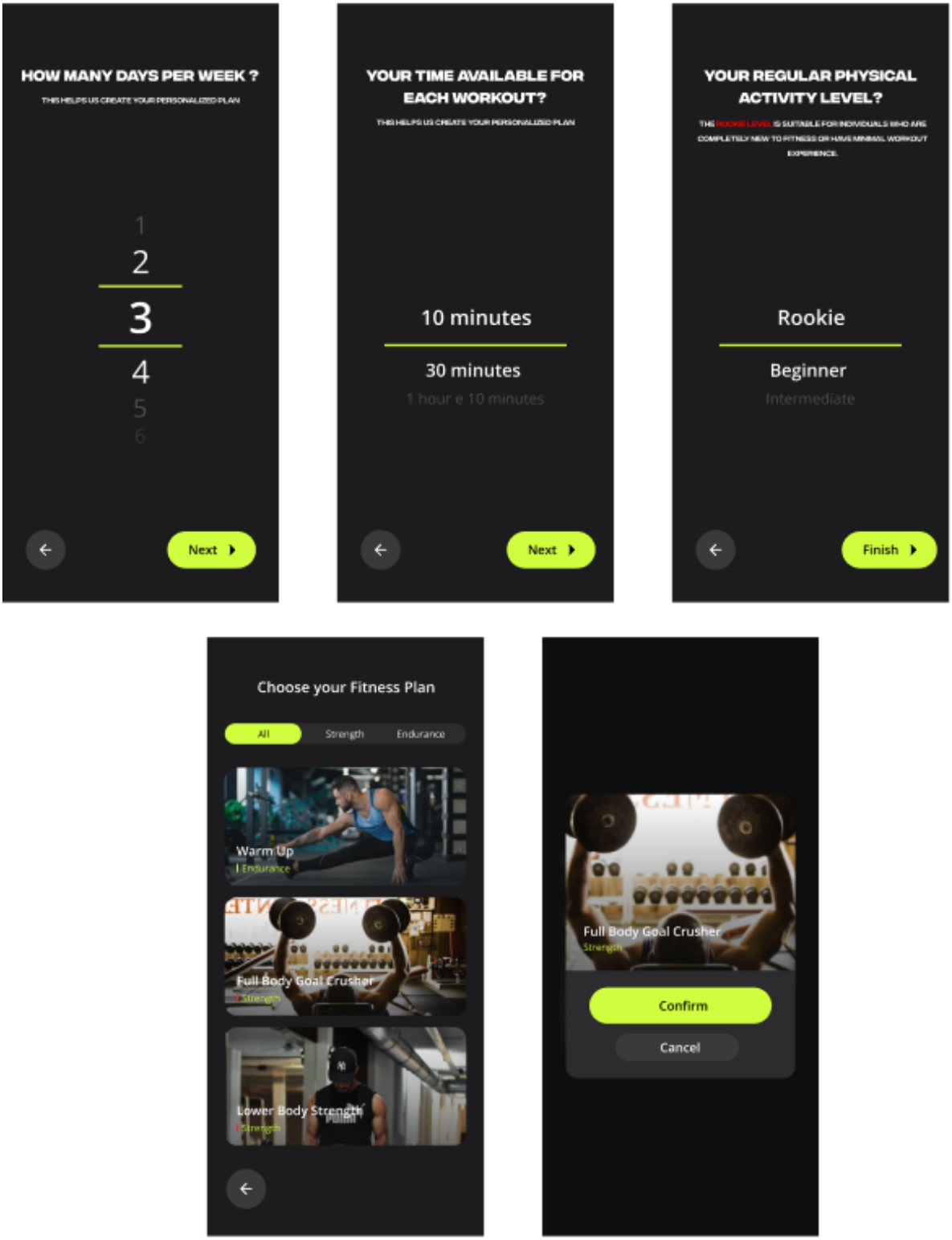


Figure 23: Request fitness plan

Figure 24: Request diet plan

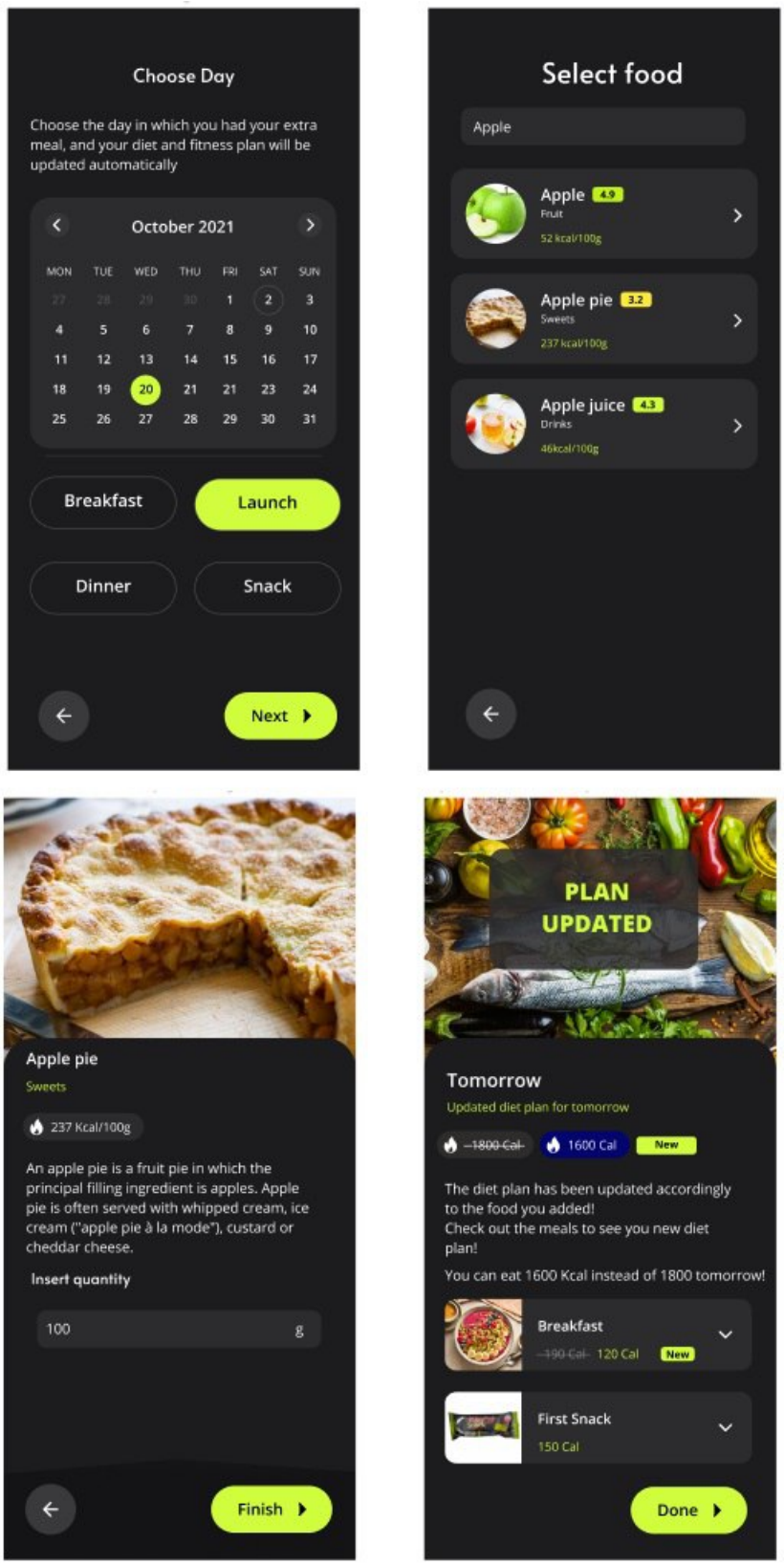


Figure 25: Insert extra meal

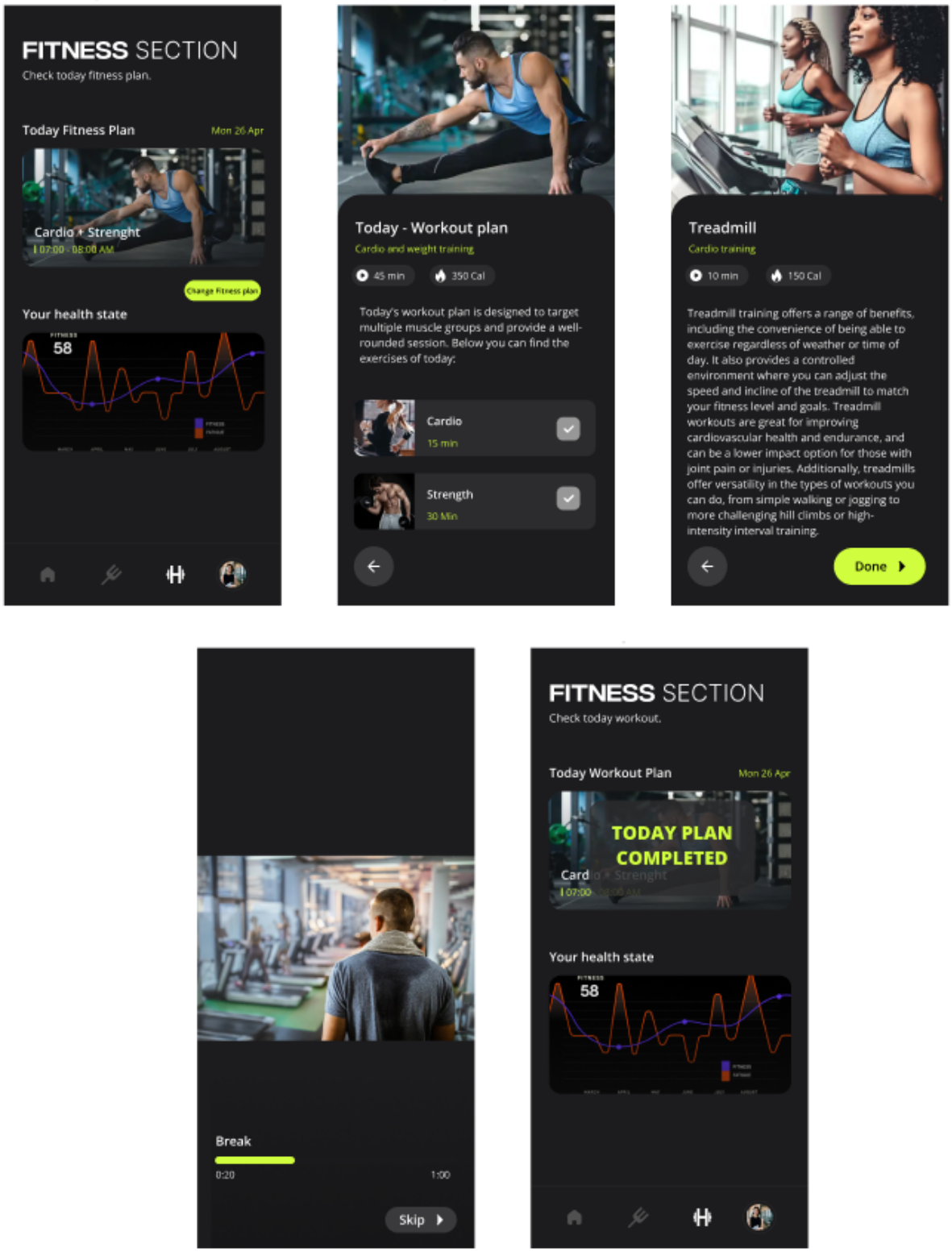


Figure 26: Show today's fitness plan

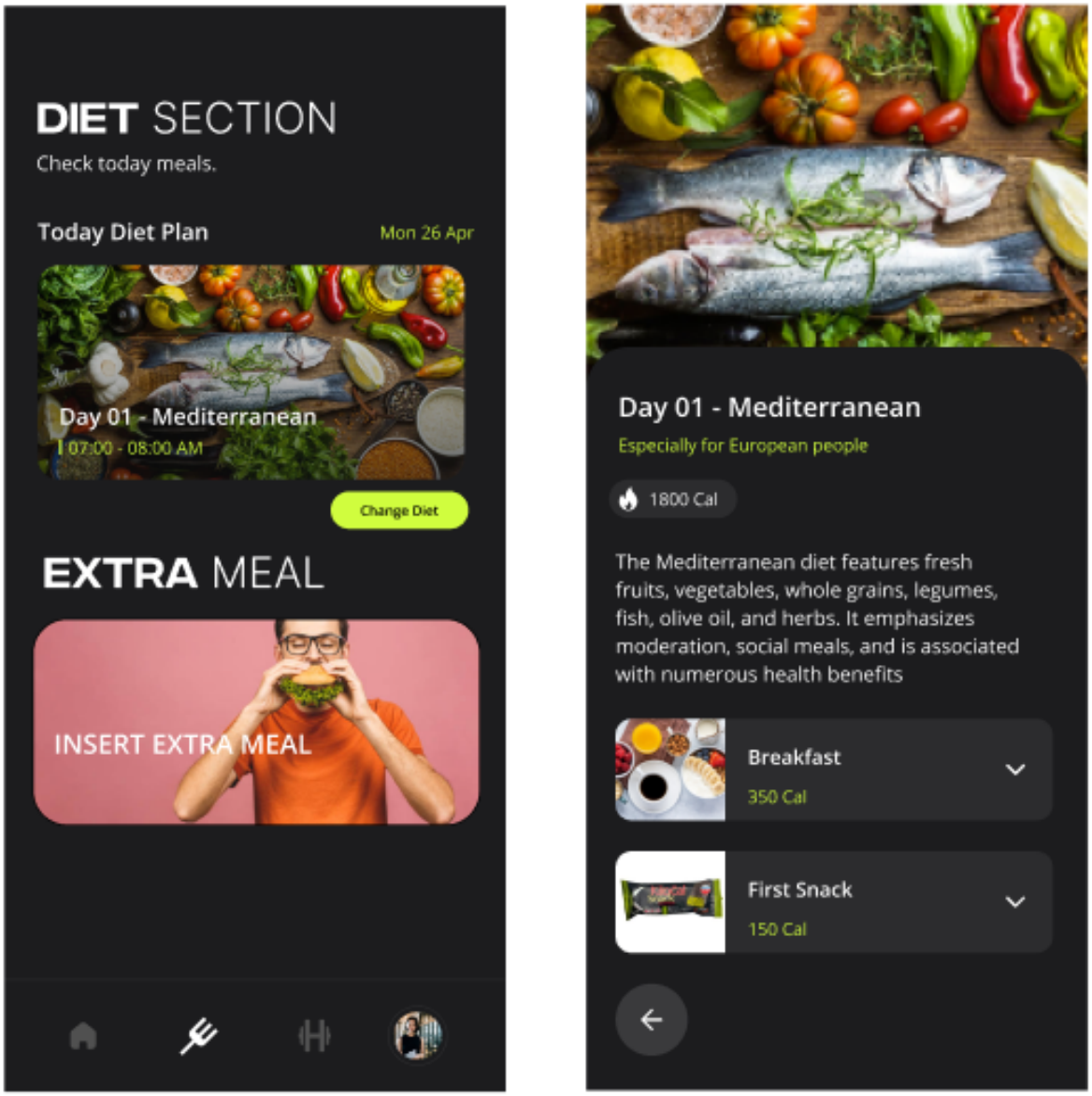


Figure 27: Show today's diet plan

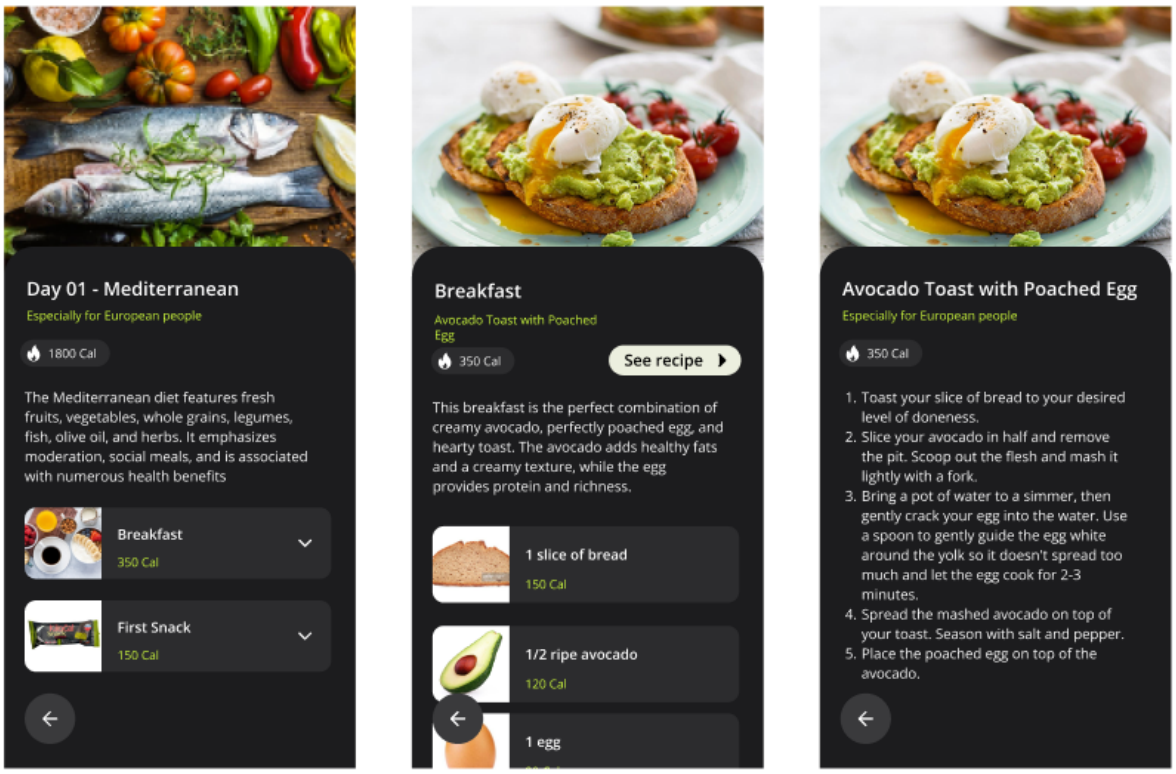


Figure 28: Show recipe details

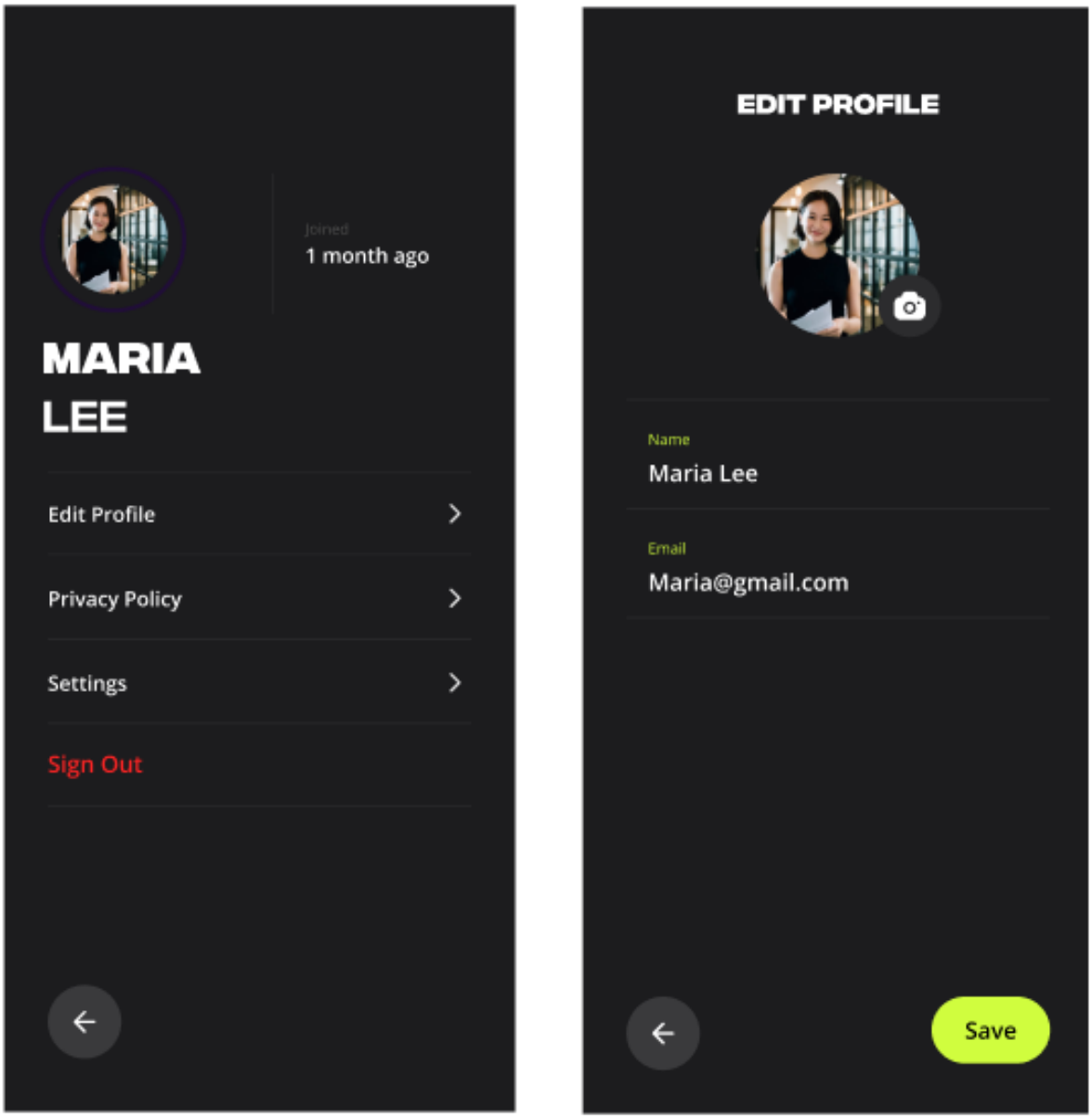


Figure 29: Account

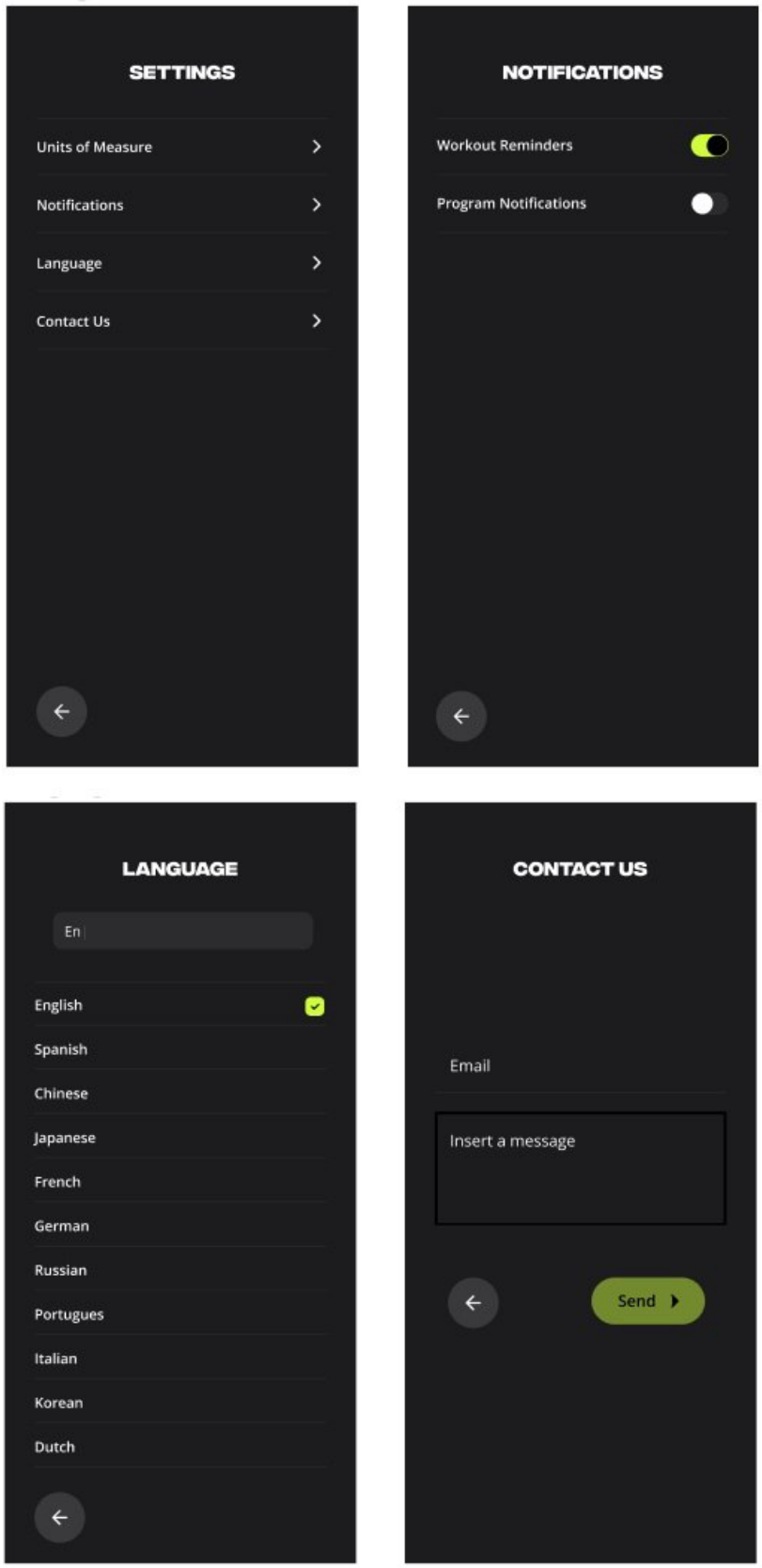


Figure 30: App settings and contact us

10 Conclusion

Employing a User-Centered Design approach throughout the project proved instrumental in gaining a deep understanding of the users' needs and crafting an application that truly serves their purpose. It marked a significant milestone as it was the first time our team directly engaged with users to gather requirements, elicit suggestions, and obtain invaluable feedback on general usage concepts.
This immersive user interaction experience revolutionized our workflow, enabling us to refine and tailor the application to precisely address the users' requirements. By placing the user at the center of our design process, we not only met their expectations but also exceeded them.
While the product is not yet ready for widespread use, as it is currently implementing in Figma and not available in any mobile store, further efforts are required to make it accessible to all users. We recognize the importance of additional work to distribute the application effectively and make it available to a broader audience. Rest assured, we are committed to undertaking the necessary steps to ensure the seamless distribution and widespread utilization of our product in the future.

10.1 Future Works

We want to develop the final product using Flutter Framework for publish it on the Play store and Apple Store.
As an additional functionality we want to develop an AI algorithm that create personalized fitness plans and diet plans, based on the information obtained from the user. Once the product is really finished the goal is to always keep getting feed-backs from the user in order to improve and to spread the application as much is possible.