Nutriverse

Booklet

Laboratory of Advanced Programming
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Contents

Introduction

Nutriverse is a web application that has the role of a common platform for nutritionists and their clients. Its aim is to facilitate and digitalize the management of appointments for check-up, the creation of personalized food plans, the tracking of each client's progress, the lookup of recipe ideas. Therefore the application is addressed to two types of users: in the registration phase, the user has to specify whether he/she is a nutritionist or a client.
Clients can search for nutritionists in a specific city, contact them through a chat, check their available slots and days, book an appointment for a check-up for a chosen slot, visualize their food plan and their progress in time, search for recipes suggestions containing the desired ingredients, read and write reviews about nutritionists.
Nutritionists instead can chat with their patients, create personalized food plan specifying ingredients and the corresponding quantities for each meal of each day of the week, update a client's progress by inserting the weight, body fat, lean mass and body centimeters measured at the last check-up, read their clients' reviews, visualize their agenda together with their patients.

Requirements

User Stories & Mockups

In what follows, there is the list of all the User Stories from which we started realizing our application, and the corresponding mockups.

For the homepage, we have started from the following User Stories:

As a website visitor, I want to read information about the services, so that I can have an overview of what I can do.

This User Story is represented in the mockup of the homepage, as we can observe in the following figure.

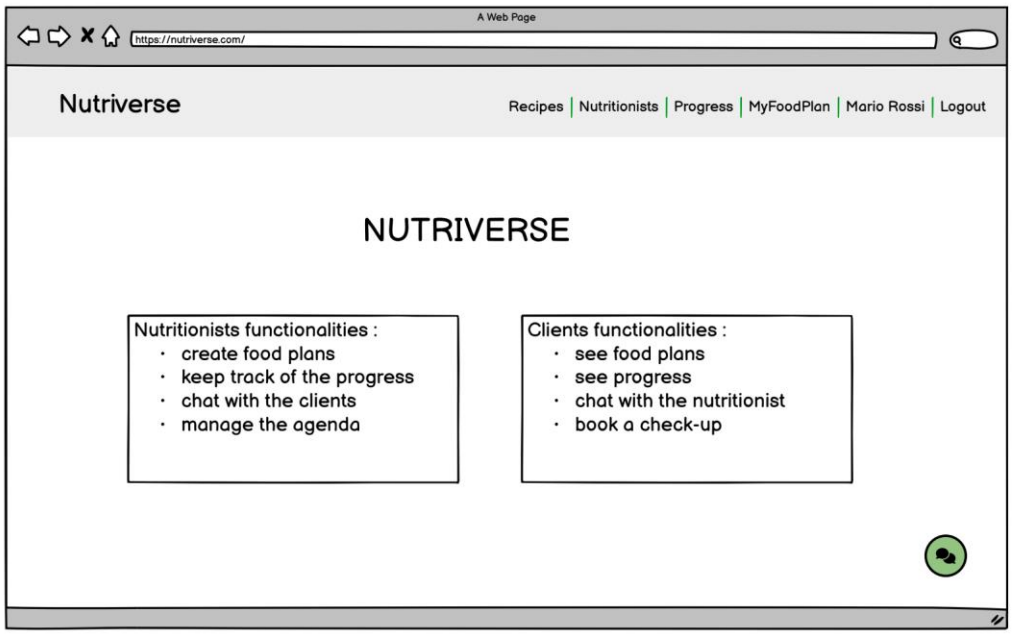


Figura 1: Homepage

For the login and registration, we have started from the following User Stories:

As a website visitor, I want to be able to register as a normal user, so that I can have a personalized experience.
As a website visitor, I want to be able to register as a nutritionist, so that I can have a personalized platform.
As a user, I want to be able to login, so that I can see my personal information.
As a user, I want to be able to log out, so that I can end my session.

All these User Stories of login and registration are represented in the mockups, as we can observe in the following figures.

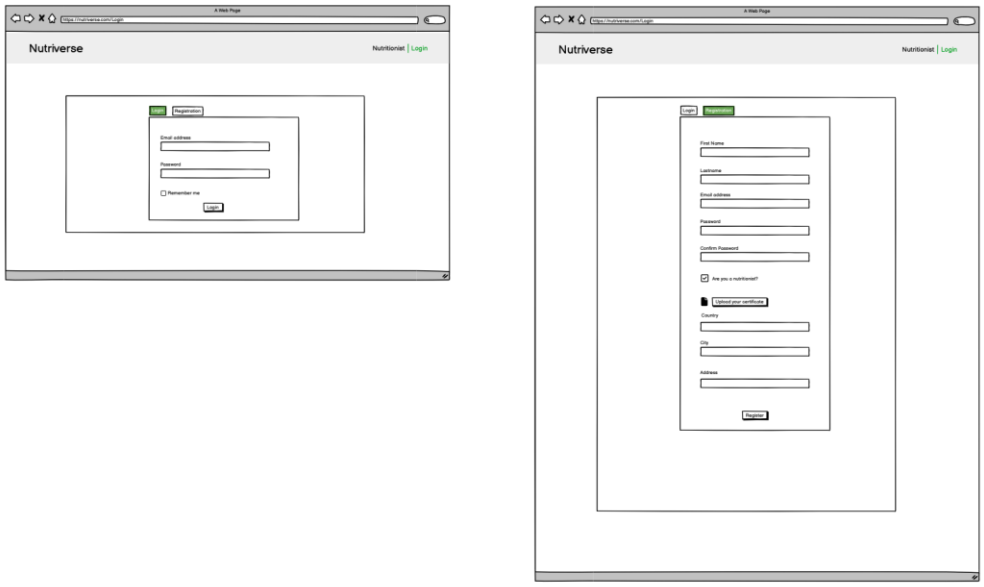


Figura 2: Login e Registration

For EditProfile, we have started from the following User Stories:

As a user, I want to be able to edit my profile, so that I can customize information about me.

All these User Stories for Edit Profile are represented in the mockup, as we can observe in the following figure.

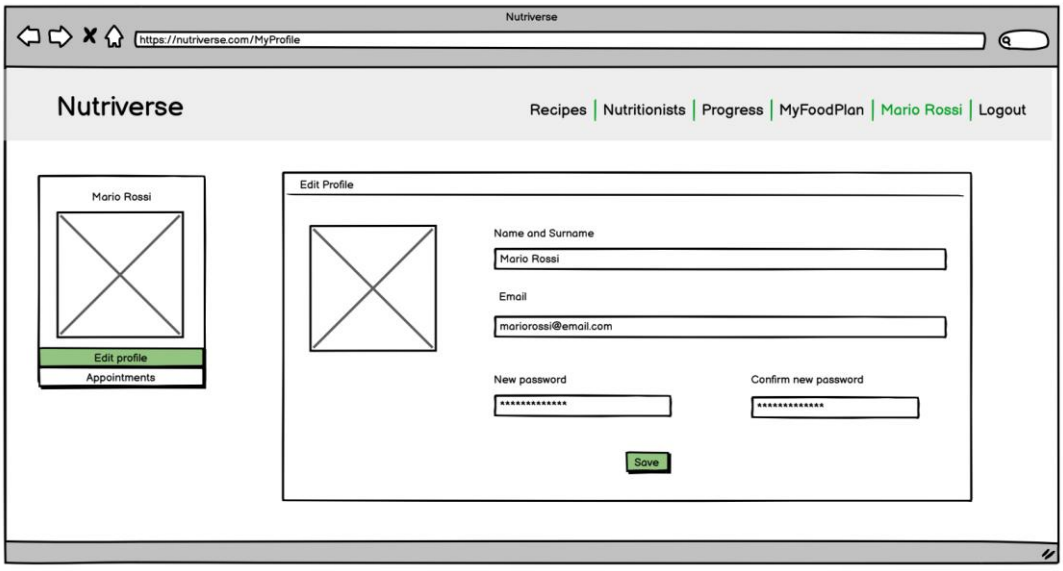


Figura 3: Edit Profile

Client section

Then, we have focused on the appointments, indeed we have formalized the following User Stories, and we have realized the corresponding mockup.

As a client, I want to be able to search for a nutritionist, so that I can find the ones near me.
As a client, I want to be able to contact a nutritionist, so that I can ask him/her more information.

All these User Stories for Search Nutritionists are represented in the mockup of the Nutritionists as we can observe in the following figure.

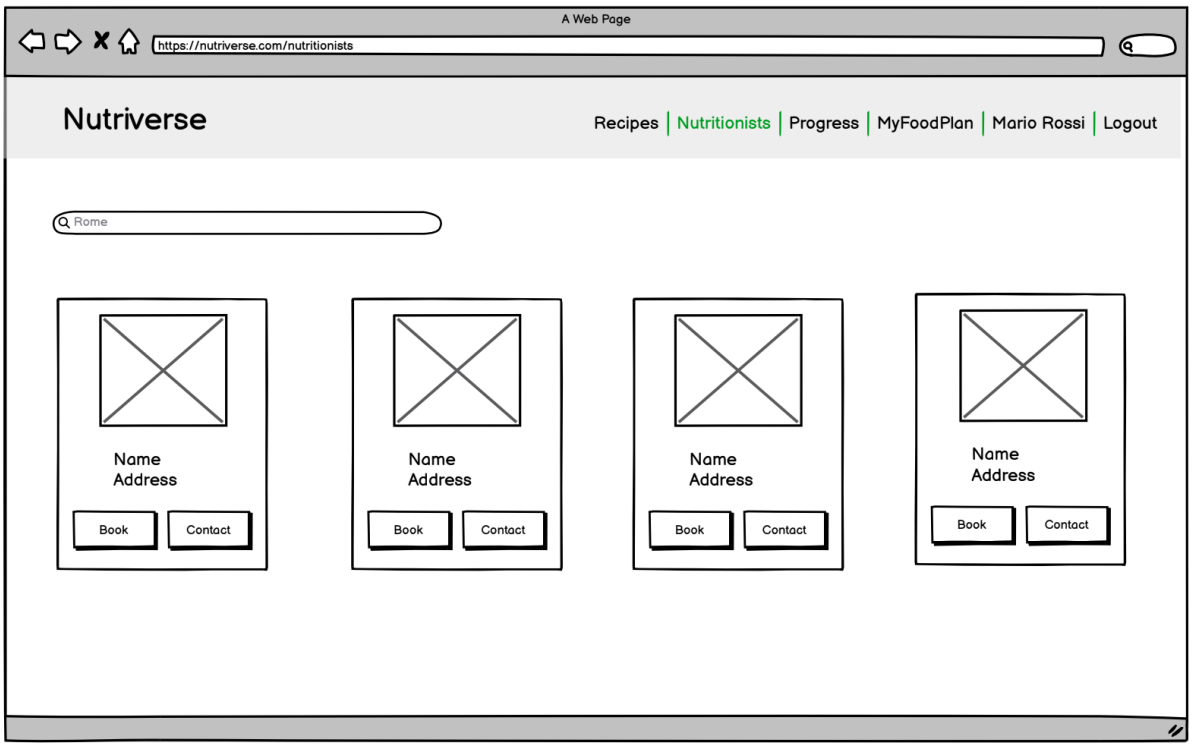


Figura 4: Nutritionists

For Booking, we have started from the following User Stories:

As a client, I want to be able to see the available slots of a nutritionist, so that I can choose one among them for booking.
As a client, I want to be able to book an appointment with a nutritionist, so that I can schedule a consultation without having to make a phone call or send an email.

All these User Stories for Appointments are represented in the mockup of the Nutritionists as we can observe in the following figure.

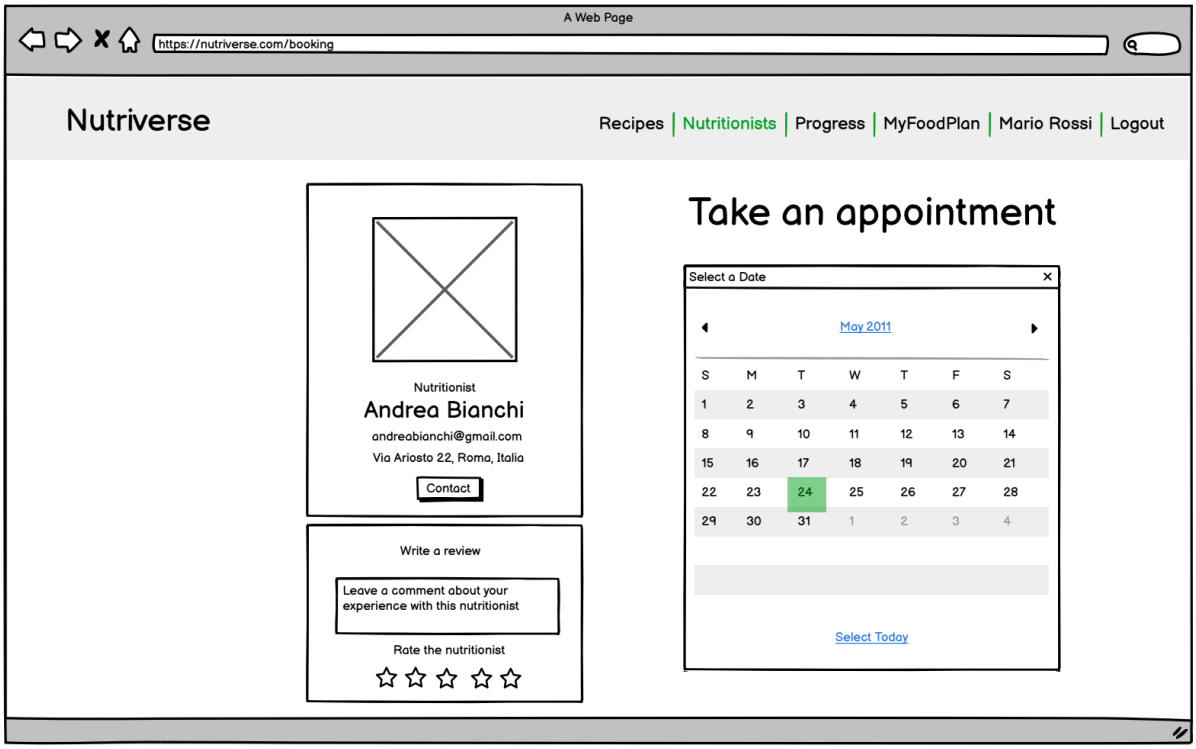


Figura 5: Appointments

To visualize the bookings, we have started from the following User Stories:

As a client, I want to be able to see my bookings, so that I can have a history of all my consultations.

The User Story to see the appointments is represented in the mockup as we can observe in the following figure.

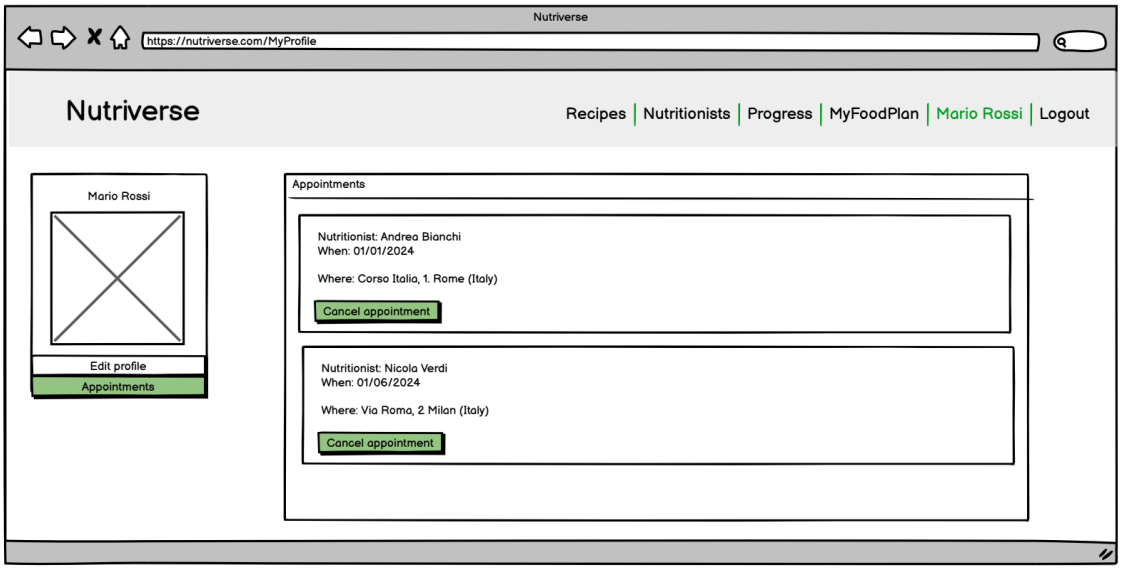


Figura 6: My Appointments

We also wanted to see a page about the food plans, hence we defined the following User Stories:

As a client, I want to be able to access my current food plan, so that I can understand what I should eat and how much.
As a client, I want to be able to search for recipes, so that I can vary meals depending on the ingredients of my food plan.

All these User Stories related to the food plan are represented in the mockup as we can observe in the following figure.

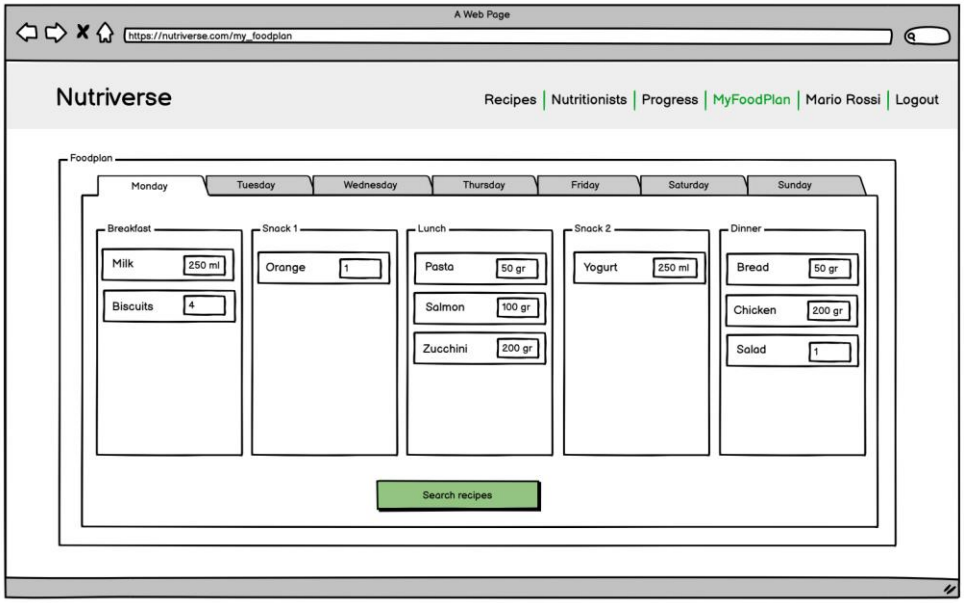


Figura 7: My Food Plan

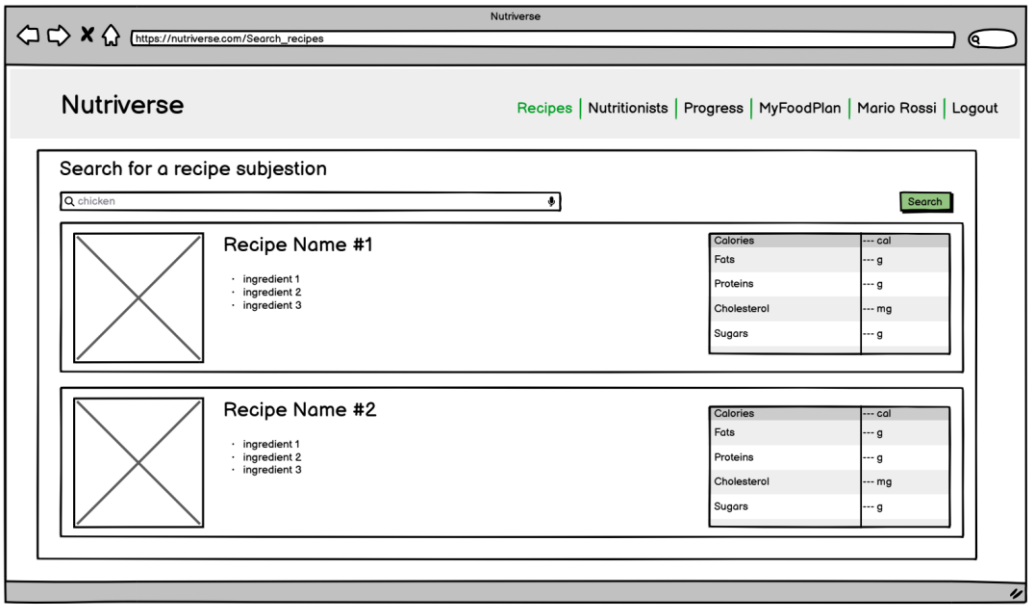


Figura 8: Search for a Recipe

We want to see a page with the progress, hence we defined the following User Story.

As a client, I want to be able to see my progress, so that I can see my changes in time about weight, body fat, body cm.

This User Story to see the progress is represented in the mockup as we can observe in the following figure.

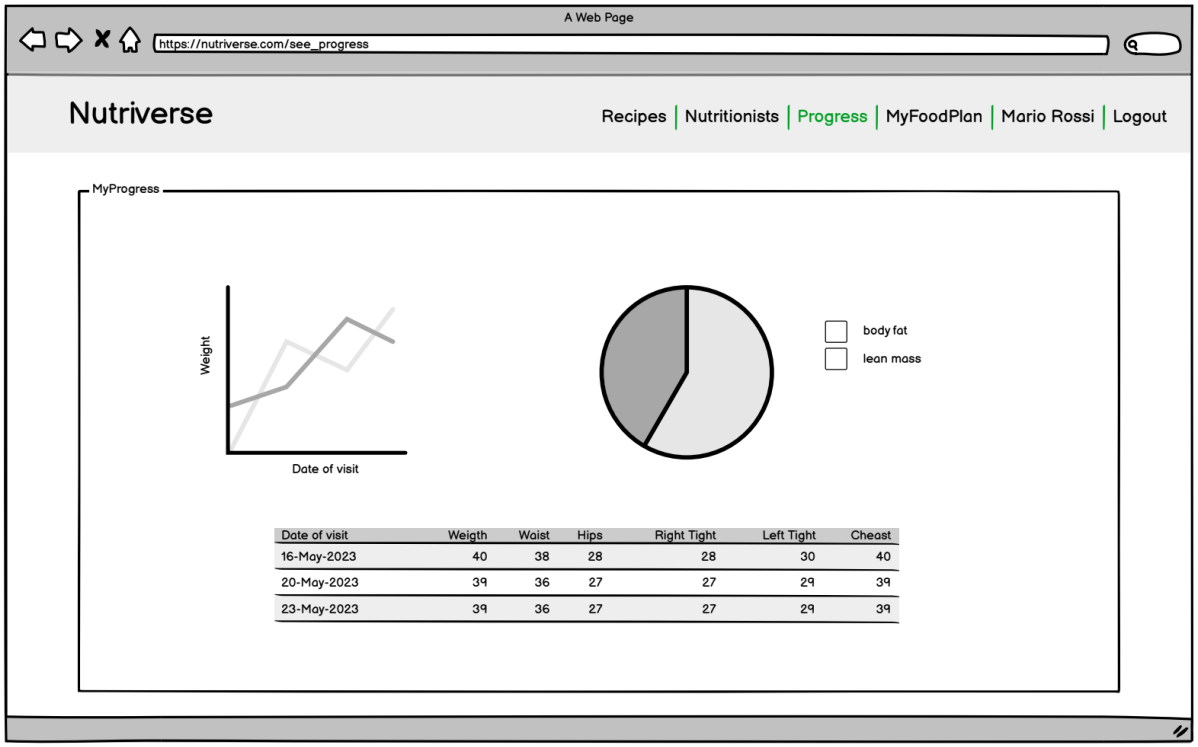


Figura 9: See progress

We want to see a page about the reviews, hence we defined the following User Stories.

As a client, I want to be able to see the reviews about a nutritionist, so that I can read other people's experience with him/her.
As a client, I want to be able to leave a review about a nutritionist, so that I can describe my experience with him/her.

All these User Stories to reviews are represented in the mockup as we can observe in the following figure

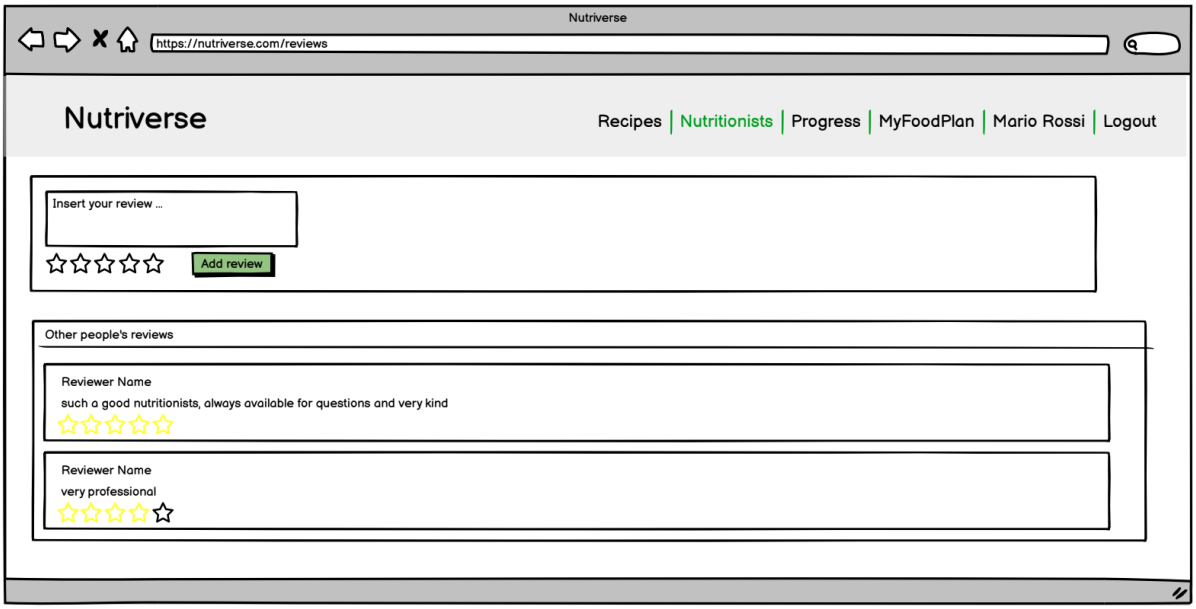


Figura 10: Reviews

Nutritionist section

For the patients we have formalized the following User Story, and we have realized the relative mockup.

As a nutritionist, I want to be able to see my patients, so that I can keep track of them.

This User Story for Patients is represented in the mockup of the Nutritionists as we can observe in the following figure.

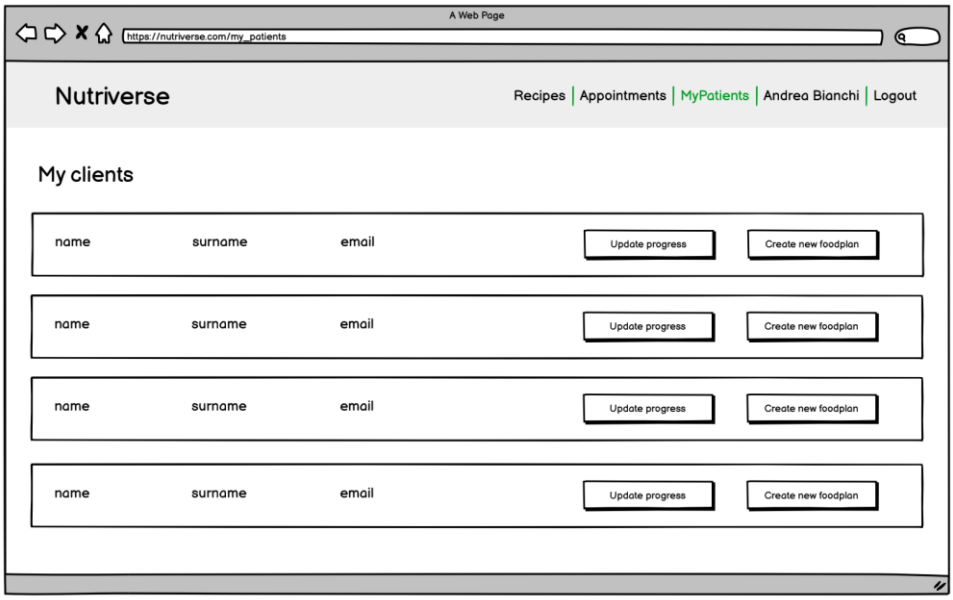


Figura 4: My Patients

For Appointments, we have started from the following User Stories:

As a nutritionist, I want to be able to see my agenda, so that I can see all the appointments with my patients.

This User Story for Appointments is represented in the mockup of the Nutritionists as we can observe in the following figure.

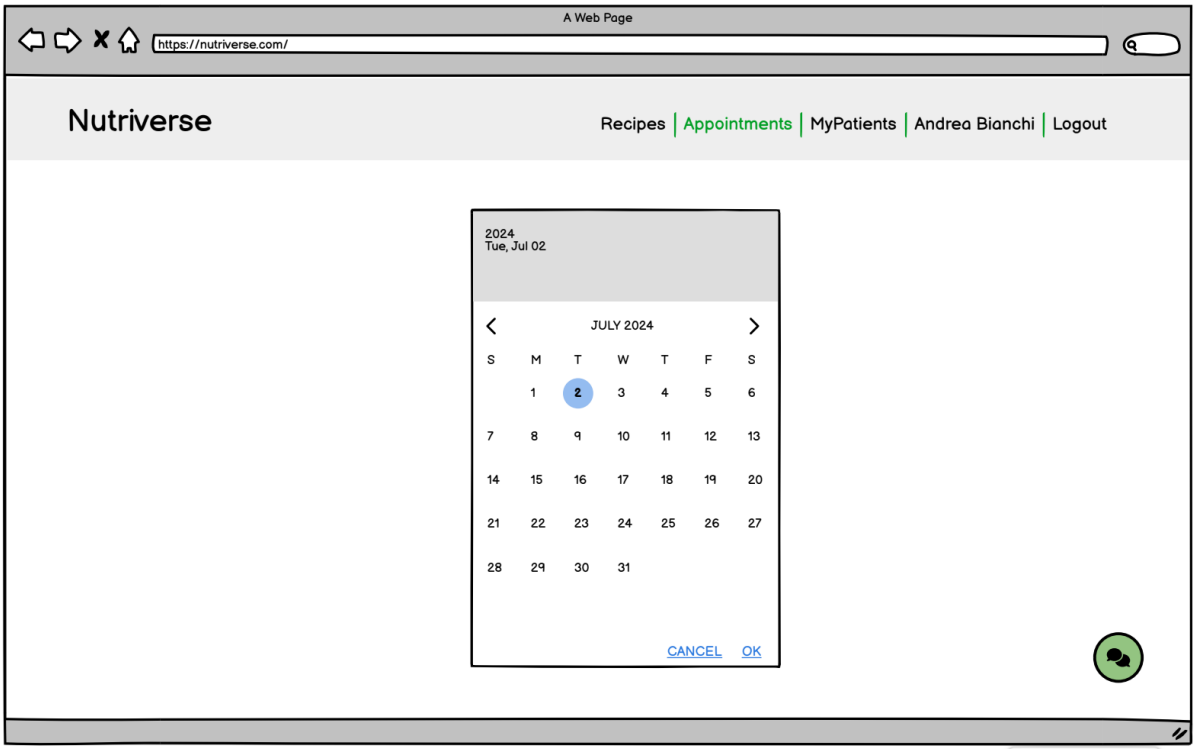


Figura 5: Appointments

We also wanted to see a page about the food plans, hence we defined the following User Stories:

As a nutritionist, I want to be able to create a food plan for a specific patient, so that I can schedule his/her meals.
As a nutritionist, I want to be able to search for a specific ingredient, so that I can insert it in the food plan with an associated quantity.
As a nutritionist, I want to be able to see the current nutritional values of the meals while creating a food plan, so that I can add/remove ingredients.

All these User Stories to see the food plan are represented in the mockup as we can observe in the following figure.

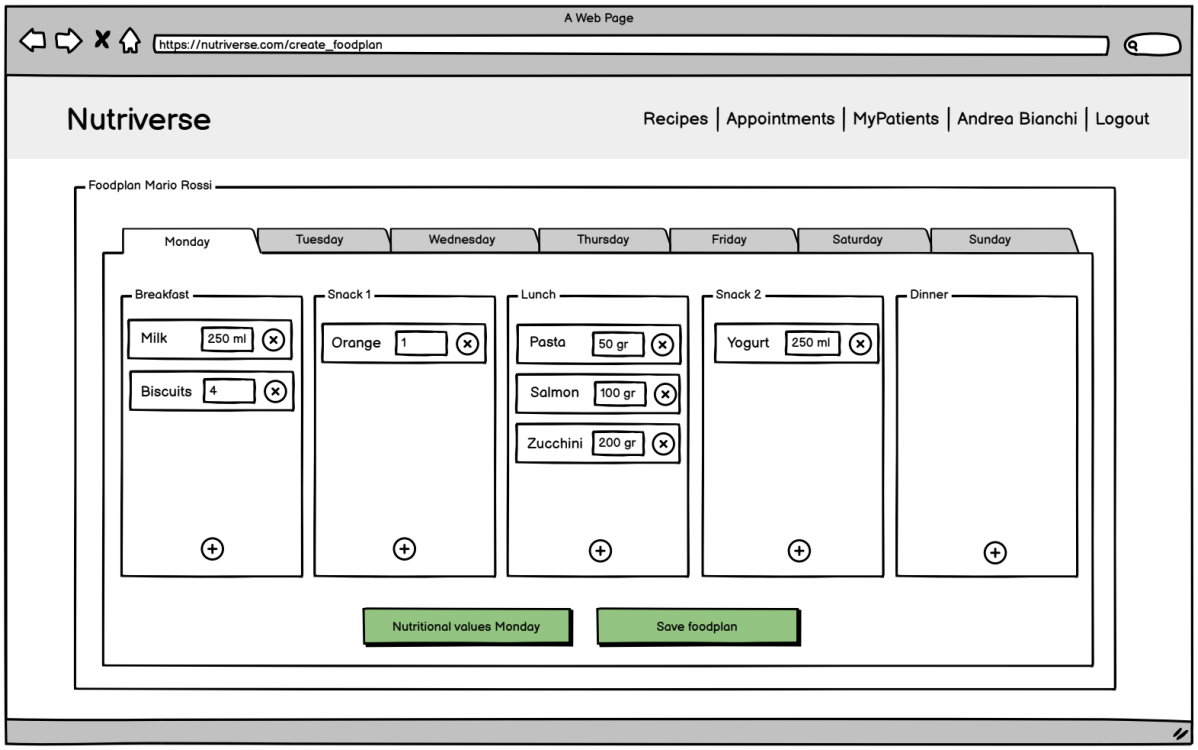


Figura 7: Create Food Plan

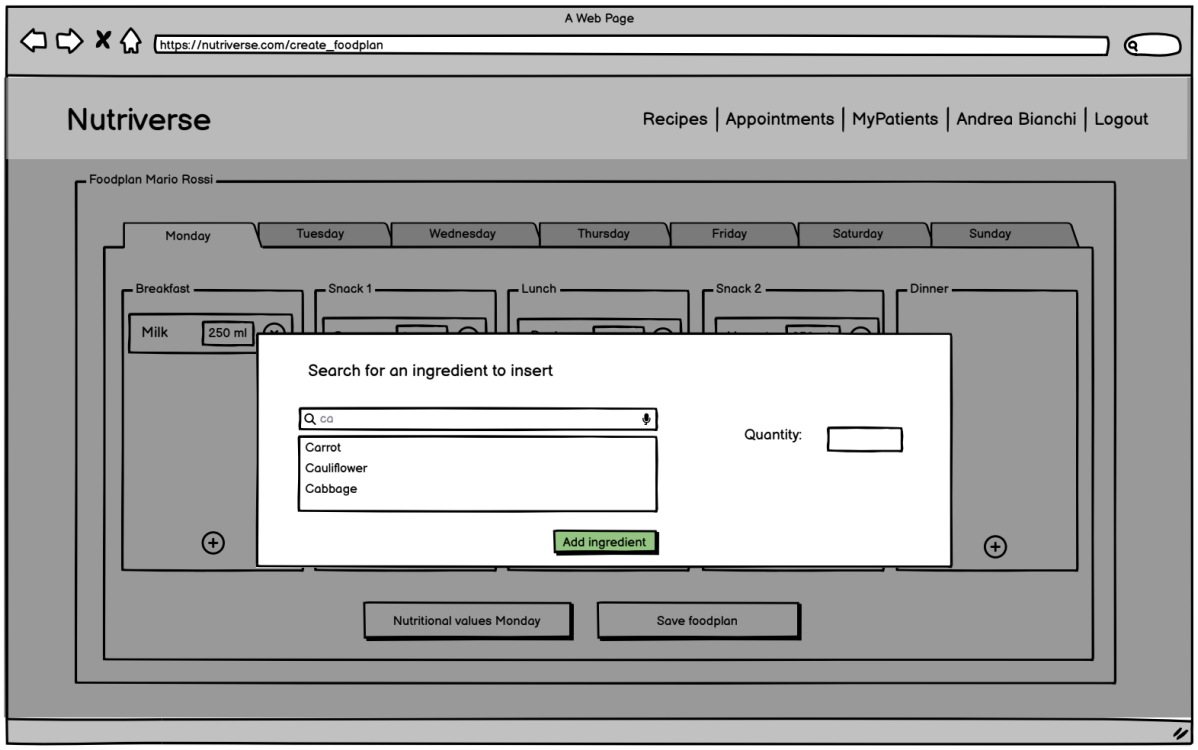


Figura 8: Search for an ingredient

We want to create a page about the progress, hence we defined the following User Story.

As a nutritionist, I want to be able to update the progress of a patient, so that I can keep his/her information up to date.

This User Story to see the progress is represented in the mockup as we can observe in the following figure.

Figura 9: See progress

We want to see a page about the reviews, hence we defined the following User Stories.

As a nutritionist, I want to be able to read the reviews about me, so that I can see my patients' opinions.

All these User Stories to reviews are represented in the mockup as we can observe in the following figure:

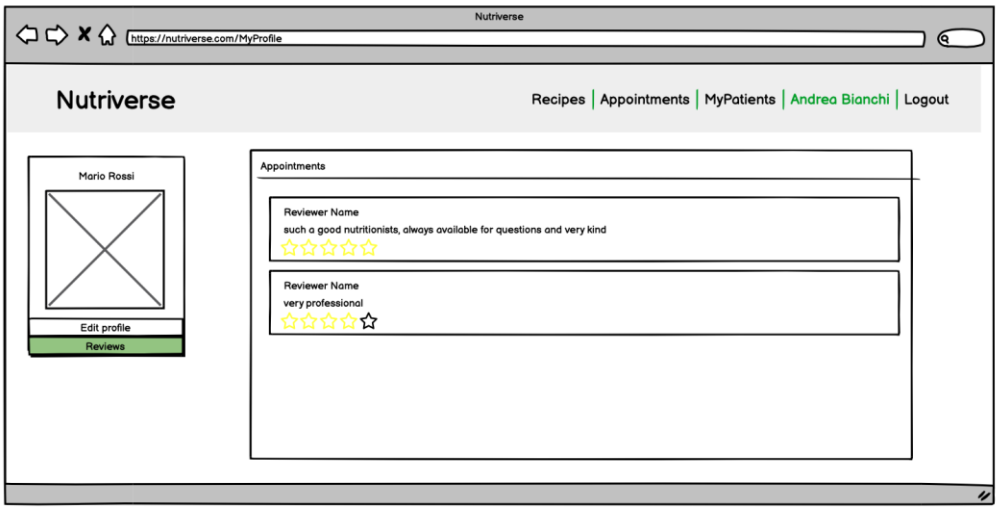


Figura 10: My Reviews

Function points

- **ILF** used to store the data of the application:
  - 1 ILF to store the normal users' account with 1 RET and 5 DET (first name, last name, email, password, image) = **7 FP**
  - 1 ILF to store the nutritionists' account with 1 RET and 9 DET (first name, last name, email, password, image, city, country, address) = **7 FP**
  - 1 ILF to store the bookings with 1 RET and 10 DET (user email, user first name, user last name, nutritionist email, nutritionist first name, nutritionist last name, nutritionist address, nutritionist city, nutritionist country, date) = **7 FP**
  - 1 ILF to store the list of ingredients with 1 RET and 2 DET (ingredient name, category) = **7 FP**
  - 1 ILF to store the progress of the clients with 1 RET and 8 DET (date of visit, weight, waist, hips, right thigh, left thigh, chest) = **7 FP**
  - 1 ILF to store the reviews with 1 RET and 3 DET (text, rating, reviewer) = **7 FP**
  - 1 ILF to store the food plans with 1 RET and 4 DET (nutritionist, patient, plan, date) = **7 FP**

- **EIF** used for the API data referenced by our application (Edamam):
  - 1 EIF to retrieve the nutritional values about the ingredients currently inserted in a food plan from Edamam API with 1 RET and 10 DET (calories, fats, carbohydrates, sugars, cholesterol, proteins, fibers, calcium, magnesium, potassium) = **5 FP**
  - 1 EIF to retrieve recipes suggestions with 1 RET and 8 DET (recipe name, picture, label, ingredients, calories, fats, cholesterol, proteins, sugars) = **5 FP**

- **EI** that processes data or control information that comes from outside the application boundary:
  - 1 EI for the creation of a client account with 1 RET and 5 FTR = **3 FP**
  - 1 EI for the creation of a nutritionist account with 1 RET and 9 FTR = **3 FP**
  - 1 EI for the login with 1 RET and 2 FTR = **3 FP**
  - 1 EI for the user profile edit with 1 RET and 3 FTR = **3 FP**
  - 1 EI for the nutritionist profile edit with 1 RET and 5 FTR = **3 FP**
  - 1 EI for the logout 1 RET and 1 FTR = **3 FP**
  - 1 EI for sending a message with 1 RET and 3 FTR = **3 FP**
  - 1 EI for inserting a new appointment with 2 RET and 10 FTR = **4 FP**
  - 1 EI for associating a quantity to an ingredient with 1 RET and 1 FTR = **3 FP**
  - 1 EI for the creation of a food plan with 2 RET and 3 FTR = **3 FP**
  - 1 EI for updating the progress with 2 RET and 8 FTR = **4 FP**
  - 1 EI for the insertion of a review with 2 RET and 3 FTR = **3 FP**

- **EQ** that sends data or control information outside the application boundary:
  - 1 EQ for searching a nutritionist in a specific city 1 RET and 1 FTR = **3 FP**
  - 1 EQ for retrieving the available slots of a nutritionist with 2 RET and 2 FTR = **3 FP**
  - 1 EQ for retrieving the appointments with 2 RET and 10 FTR = **4 FP**

- 1 EQ for searching for an ingredient with 1 RET and 1 FTR = **3 FP**
- 1 EQ for retrieving the food plan with 2 RET and 3 FTR = **3 FP**
- 1 EQ for retrieving the progress with 2 RET and 8 FTR = **4 FP**
- 1 EQ for retrieving the reviews about a nutritionist with 2 RET and 4 FTR = **3 FP**
- 1 EQ for retrieving all patients with 2 RET and 2 FTR = **3 FP**

- **EO** that processes data or control information that comes from outside the application boundary, performing at least one mathematical formula or calculation, creating derived data or altering the behavior of the system. :
  - 1 EO for visualizing the plot of the weight in time with 2 RET and 3 FTR = **4 FP**
  - 1 EO for visualizing the average rating of a nutritionist with 2 RET and 2 FTR = **4 FP**

Summing all those values, we obtained 124 unadjusted FP, and using the COCOMO II tool we obtained a total of 9920 SLOC.

Development

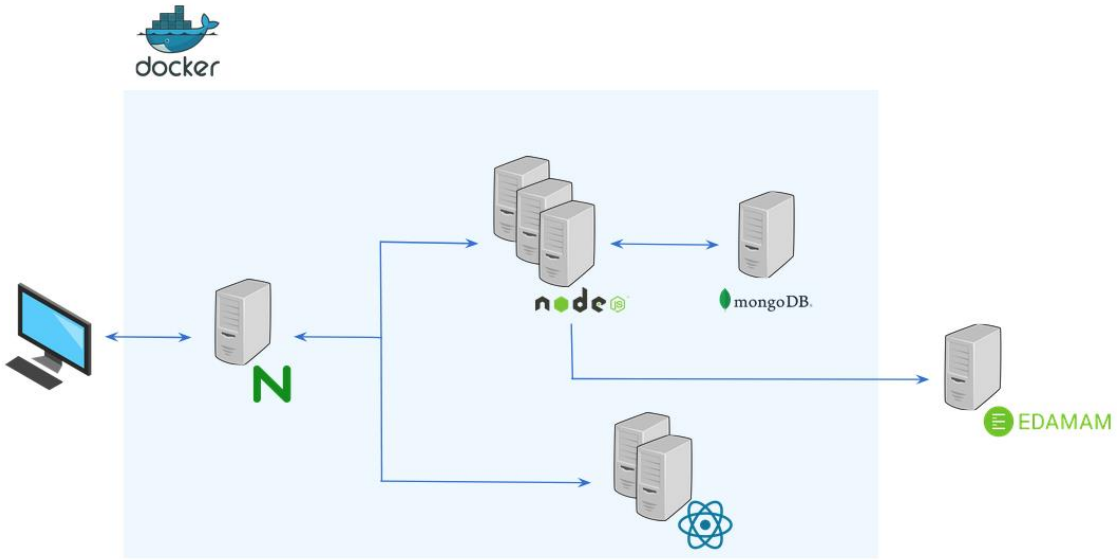
To guarantee an efficient development of the entire application, **SCRUM** has been used to self-organize and manage the workload towards a common goal through a set of values, principles, and practices.
The whole work has required 5 sprints, each one focusing on a macro-functionality:

1. **Account management**: this sprint implements the main functionalities of an account both for normal users and nutritionists, such as registration, log in, log out, profile update, nutritionist certificate upload.
2. **Booking section and chat:** this sprint implements the possibility for a logged user to search for nutritionists in a specific city, to contact one of the found nutritionists through a private chat or to check directly the available days and slots in order to book an appointment with him/her for a check-up. The normal users also can see a history of all their bookings. From the nutritionist point of view, they can read and answer the messages received in the private chat, they can check their own agenda and the list of their patients.
3. **Food plans and recipes:** this sprint implements the core functionality of the application, which is the possibility of nutritionists to create personalized food plans for their patients, by choosing ingredients from a rich database and their associated quantities for each meal of each day of the week. They can also check the daily nutritional values of what is currently added to the plan. The patients instead can visualize their current food plan and also search for recipes by typing the ingredients of their food plan.
4. **Progress:** this sprint implements the management part of users progress, so a nutritionist can add the measurements of a patient and also patients have a chart to see their own progress.
5. **Reviews**: this sprint implements the insertion and the visualization of reviews and ratings that a user can write about a nutritionist.

The whole development lasted 10 weeks, enclosing 180 hours of work.

Infrastructure

The application is built on top of an infrastructure that was implemented using Docker and Docker Compose, as we can see in the following figure:



- 1 container **NGINX,** that is a web server used as a reverse proxy, that implements load balancing in a round-robin manner to distribute requests among the different instances of the server.
- 3 containers **NODE** as back-end, used for performing internal requests and API requests to external servers, as Javascript makes it very simple to perform HTTP requests and handle JSON objects and manage data from the database.
- 2 containers **NODE** as front-end, to host **REACT** that is a very versatile framework to build dynamic and modular web interfaces.
- 1 container **MONGODB** for the application data storage like user and nutritionists accounts, appointments, foodplans, ingredients, progresses, reviews. MongoDB was chosen because it's a very flexible and versatile NOSQL database.

Deployment

The deployment of the application is very straightforward thanks to the use of Docker, whose containers are lightweight and contain everything needed to run the application, so there is no need to rely on what's installed on the host.
More precisely, in the ***docker-compose.yml*** the services/containers used to make up the application are specified: for each of them we specify the name, the image which it's built from, the volumes, the port it is exposed on, the networks it is connected to, ecc.
This efficient deployment makes the running process of the application easy as well: the command **docker-compose up** automatically builds the needed images and starts the containers the application relies on.

Feature Overview

In this section, the main features are shown and described.

- As soon as the containers are started, the landing page (i.e. the homepage) is displayed. Here the main functionalities for both clients and nutritionists are listed in order to make clear to the users which are the services our application provides.

Figura 11: Homepage

- In what follows, there is the sign up page, that allows visitors to create an account in order to take advantage of the application services. Simple clients are asked to insert only basic information like name, email and password. Nutritionists instead are asked to insert also the country, city and address of their studio and their certificate.

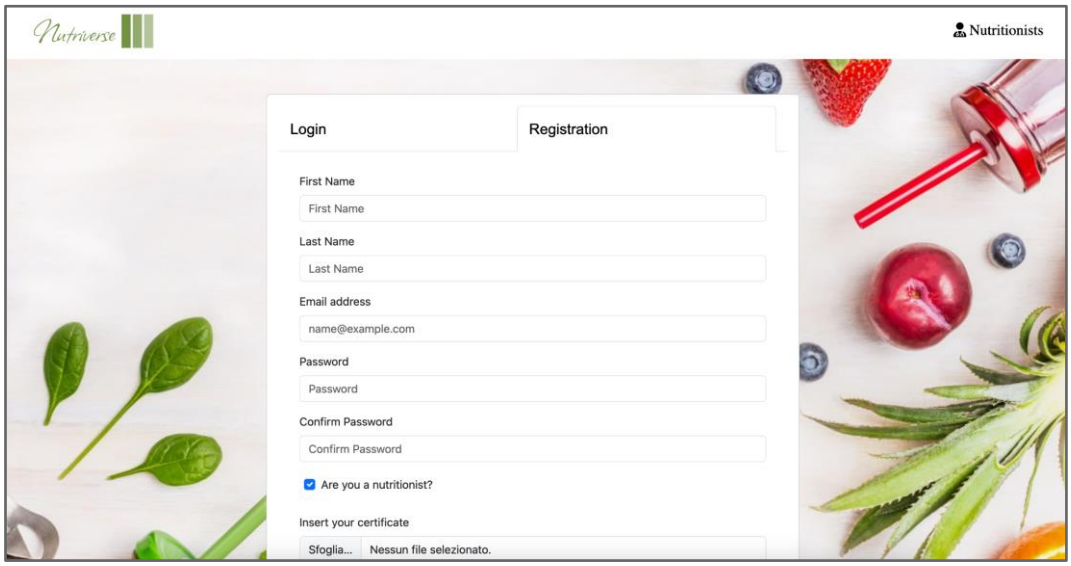


Figura 12: Registration 1

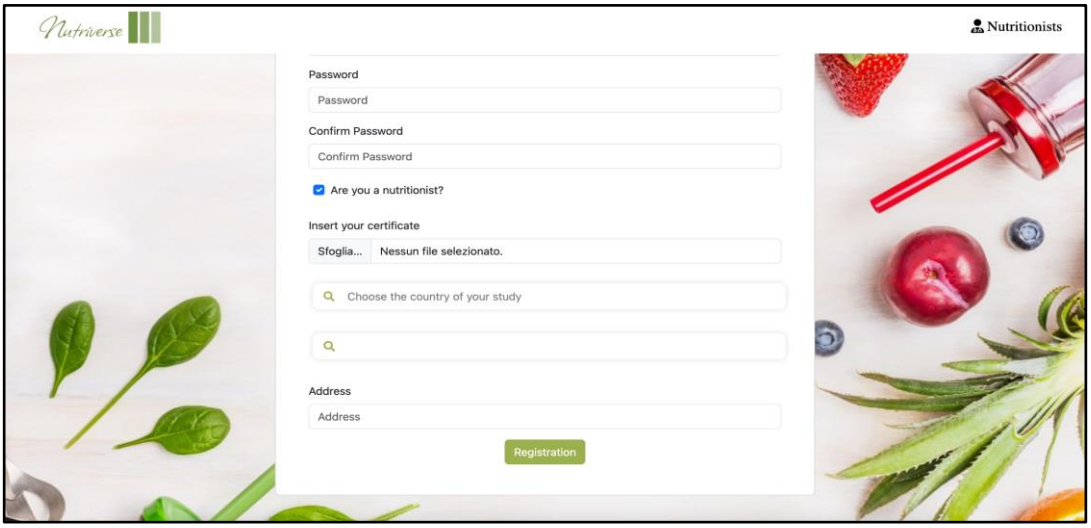


Figura 13: Registration 2

- The login page instead asks only for the email and the password of the registered account.

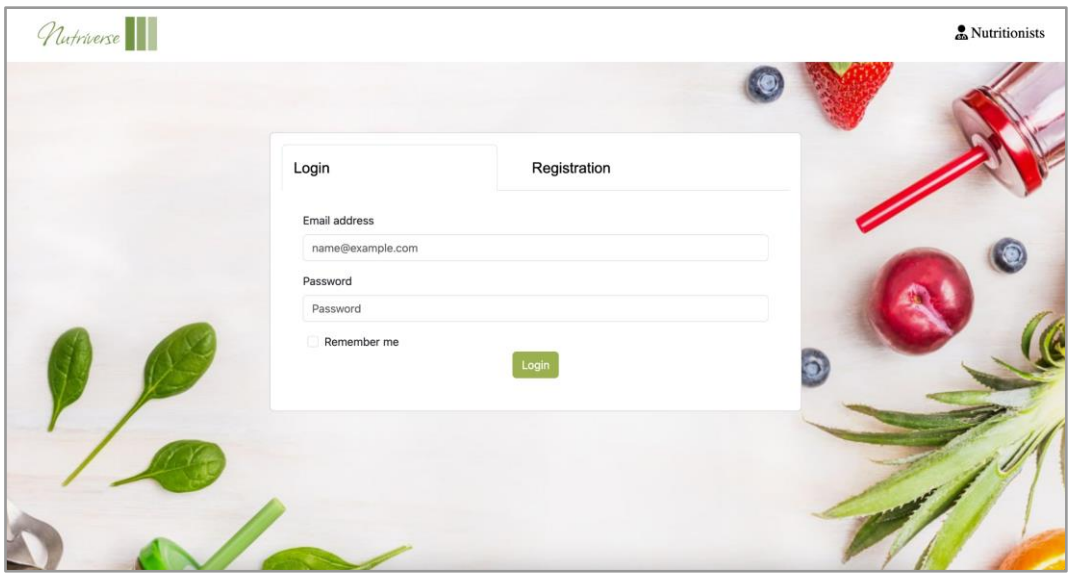


Figura 14: Login

- Once a user has correctly logged in, he/she can access its own profile and update it, by changing the picture, the password. Nutritionists can also update the address of their studio.

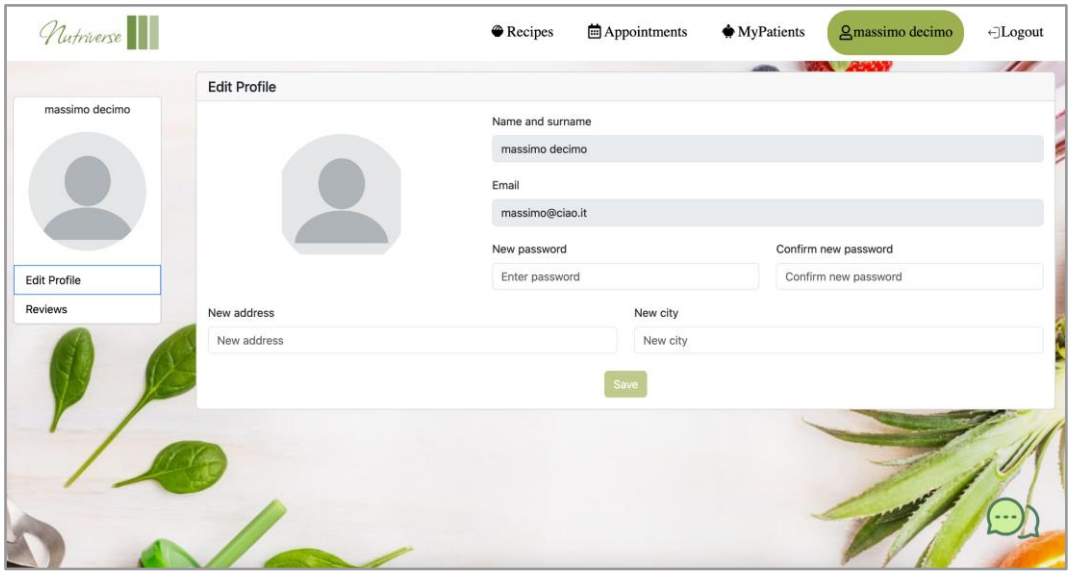


Figura 15: Edit Profile

Client Section

- Once clients have correctly logged in, they can access the Nutritionists page, where they can type a city in order to see the nutritionists whose studio is located in that city.

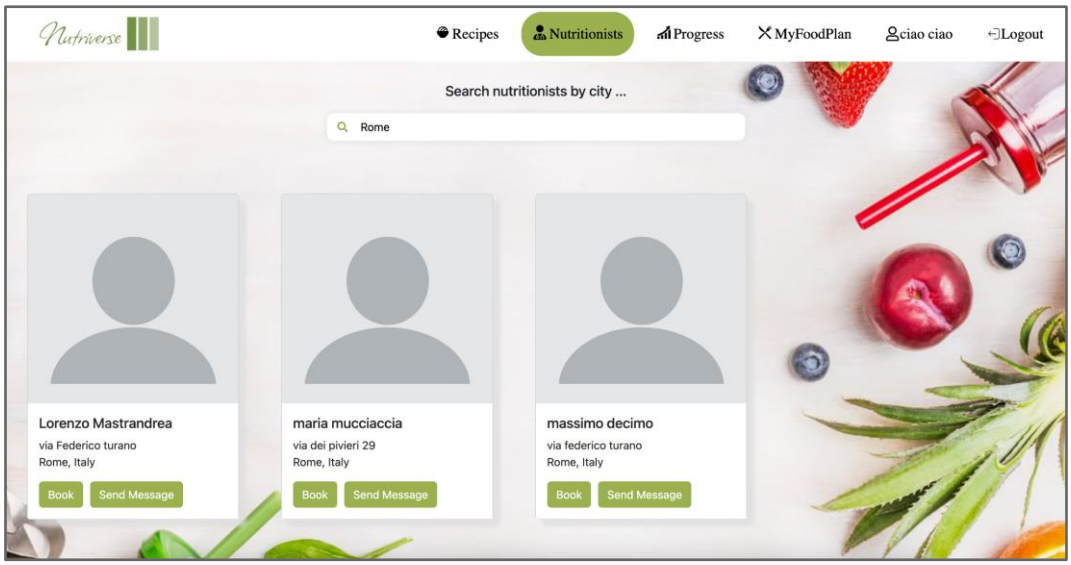


Figura 16: Search Nutritionists

- Clients can contact a specific nutritionist by sending him/her a message that will automatically start a chat with that nutritionist. This can be done if clients want to ask for some information without taking an appointment.

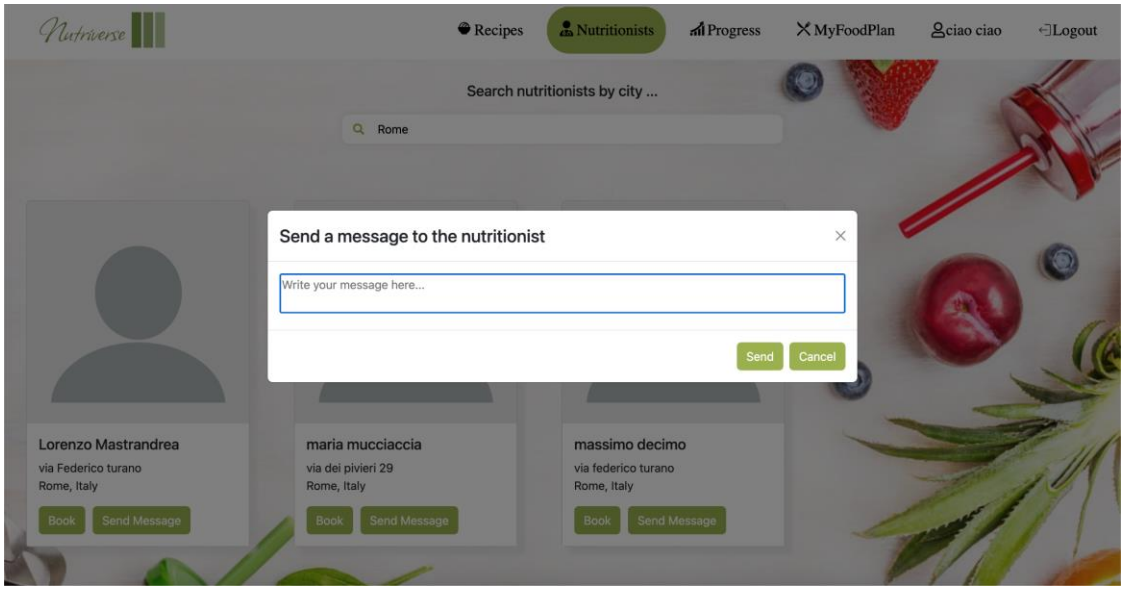
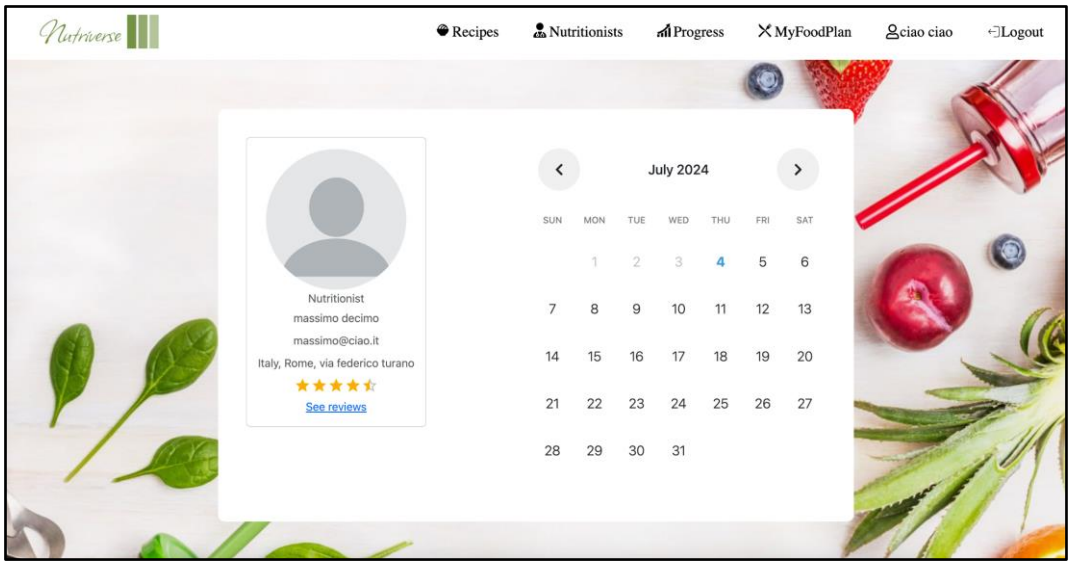
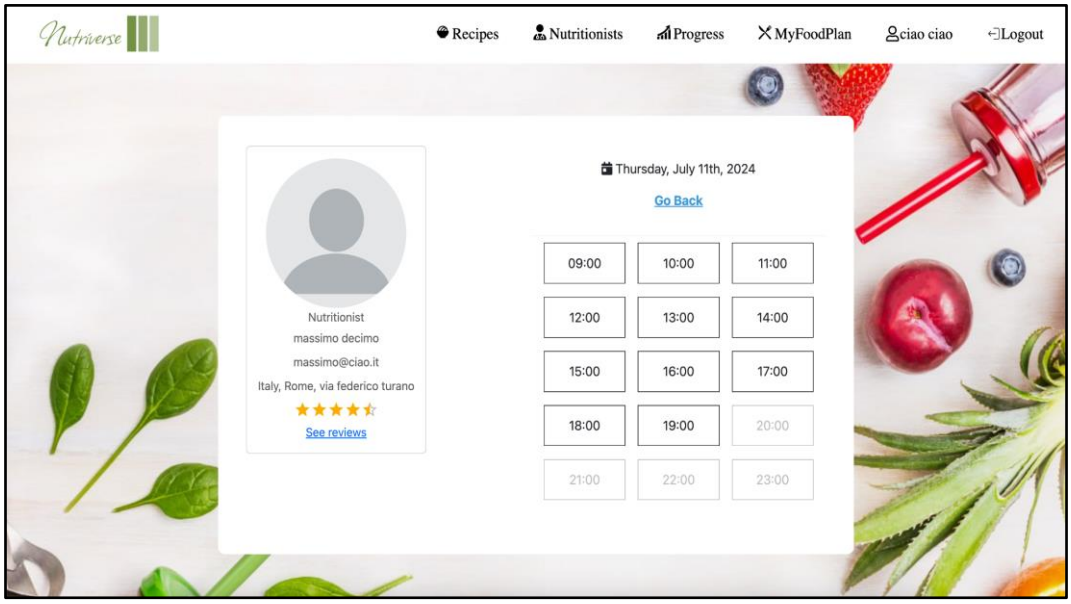


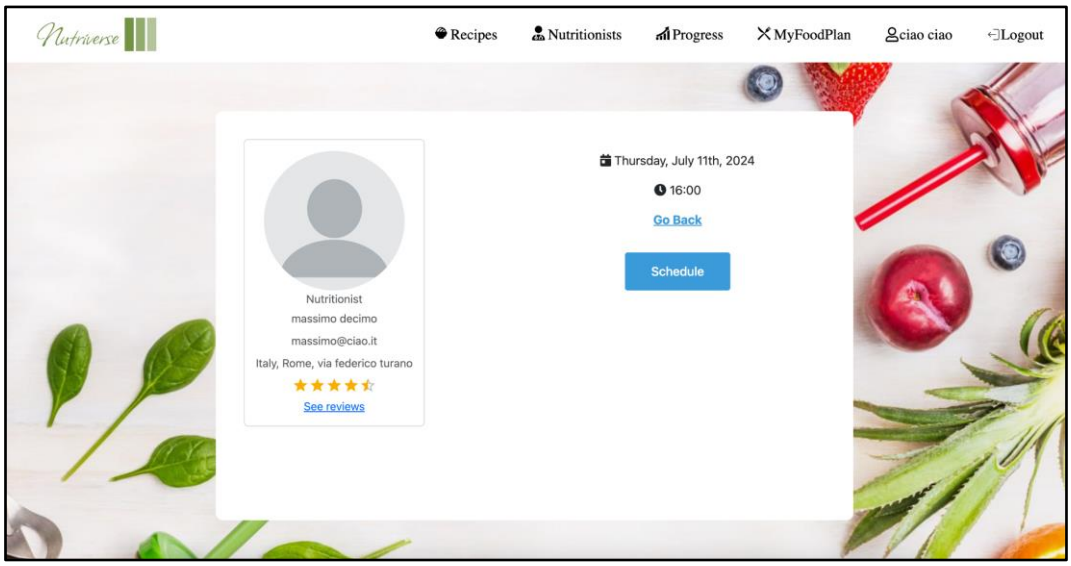
Figura 16: Send a message to Nutritionists

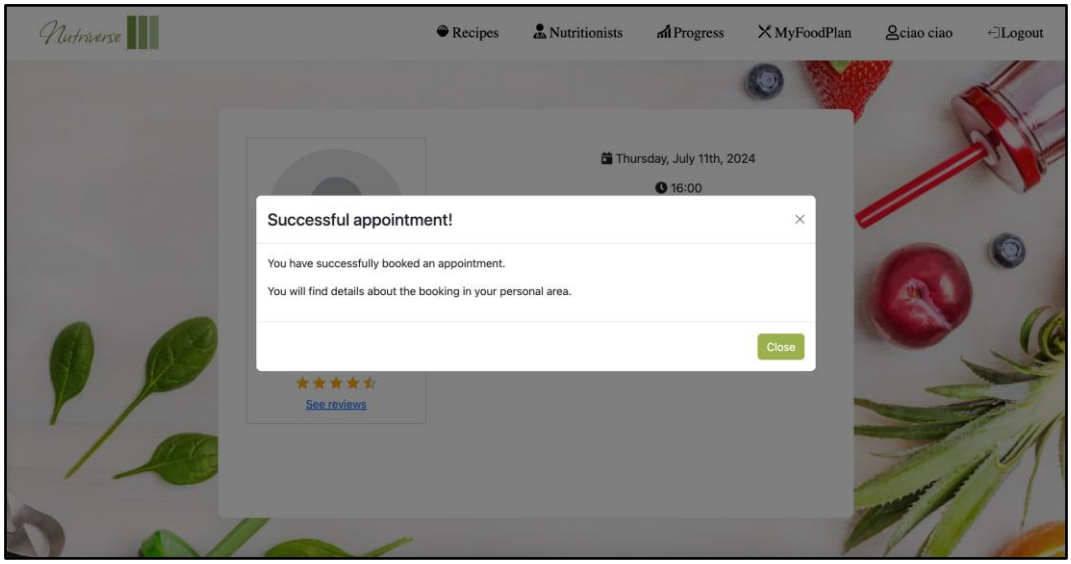
- Alternatively, clients can access the booking section of a nutritionist and check her/his available slots of a chosen day.



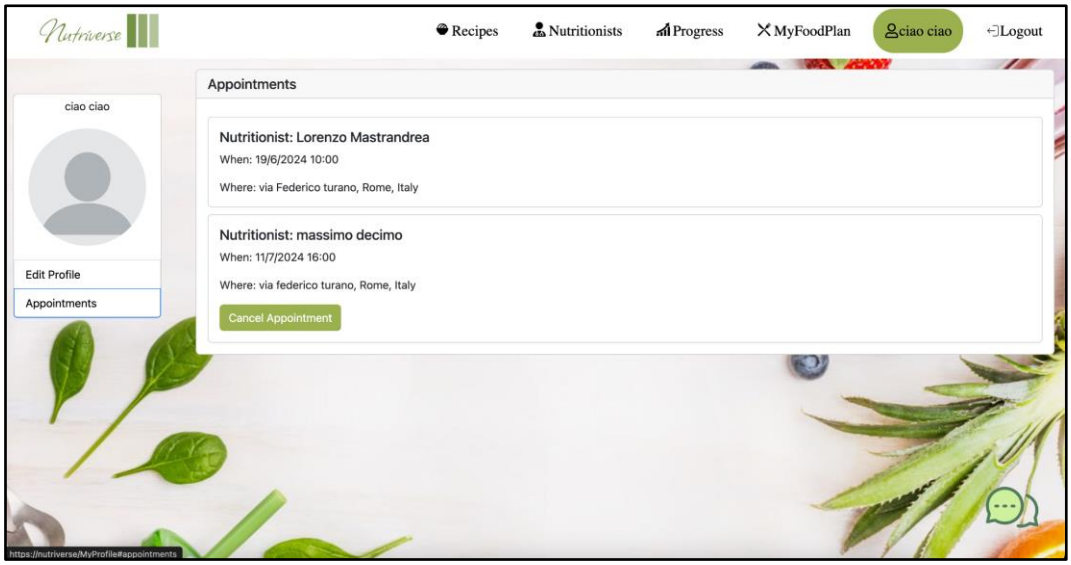


- Once a slot is chosen, clients can confirm the appointment, receiving a notification of the successful booking.

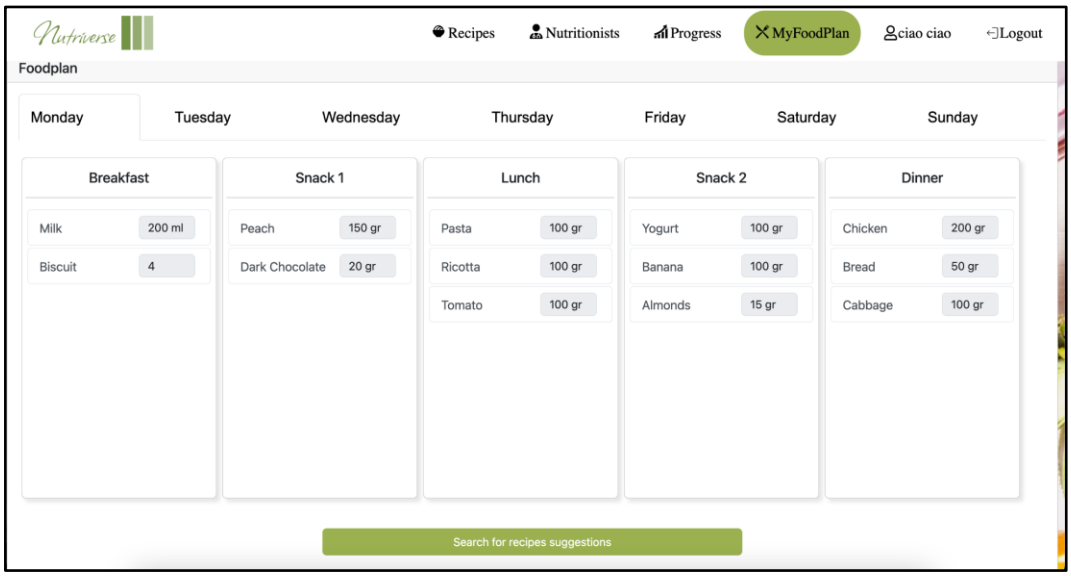




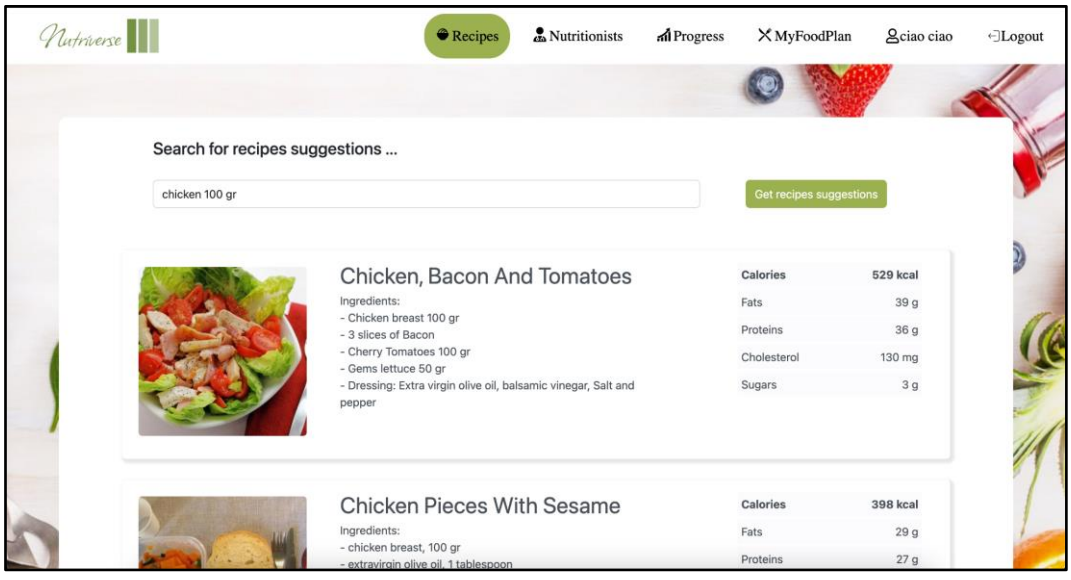
- Clients can see the history of their past appointments but also the one to come.



- Clients can access their own food plan that has been previously created by the nutritionist they had a check-up with.

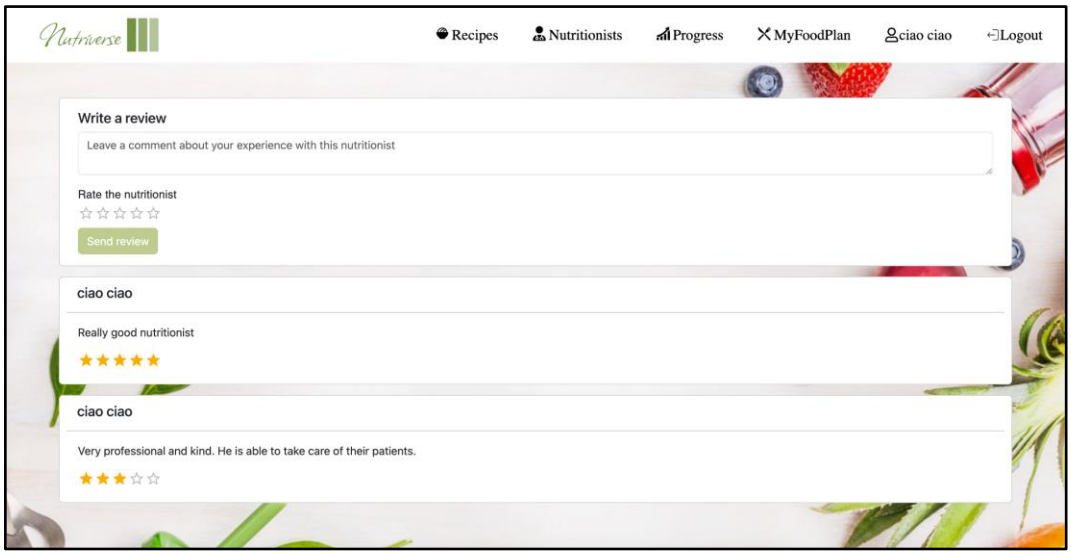


- Clients can search for recipes suggestions by typing the desired ingredients and optionally the corresponding quantities (i.e. the ones that they have in their food plan).



- Clients can have an overview of their progress in time, where they can see all the measurements taken by the nutritionist at each of the check-ups done with that nutritionist. The measurements refer to the weight, body fat, the lean mass and the body centimeters like chest, waist, thighs.

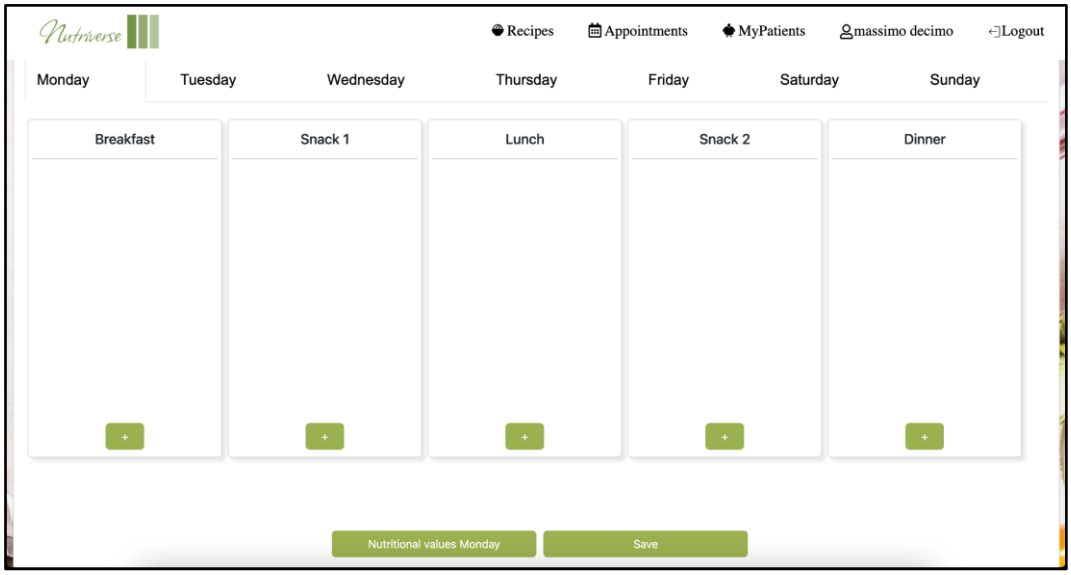
- Clients can access the reviews and ratings other people wrote about a nutritionist and also insert themselves a new review about him/her.



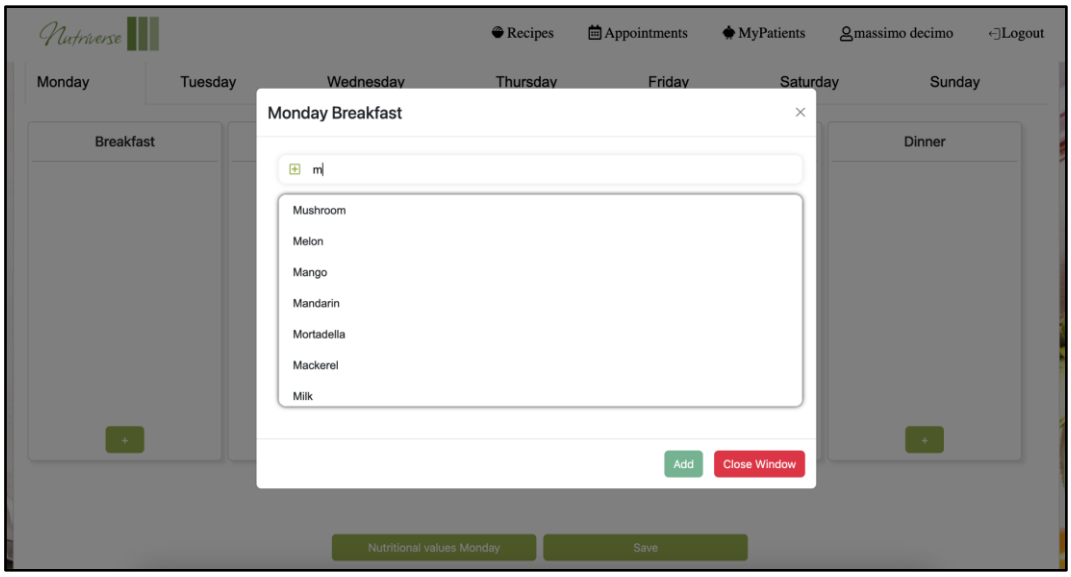
Nutritionist section

- Once nutritionists have correctly logged in, they can access the list of their patients (the users that have booked at least an appointment with them) so they can create a new food plan or update the progress.

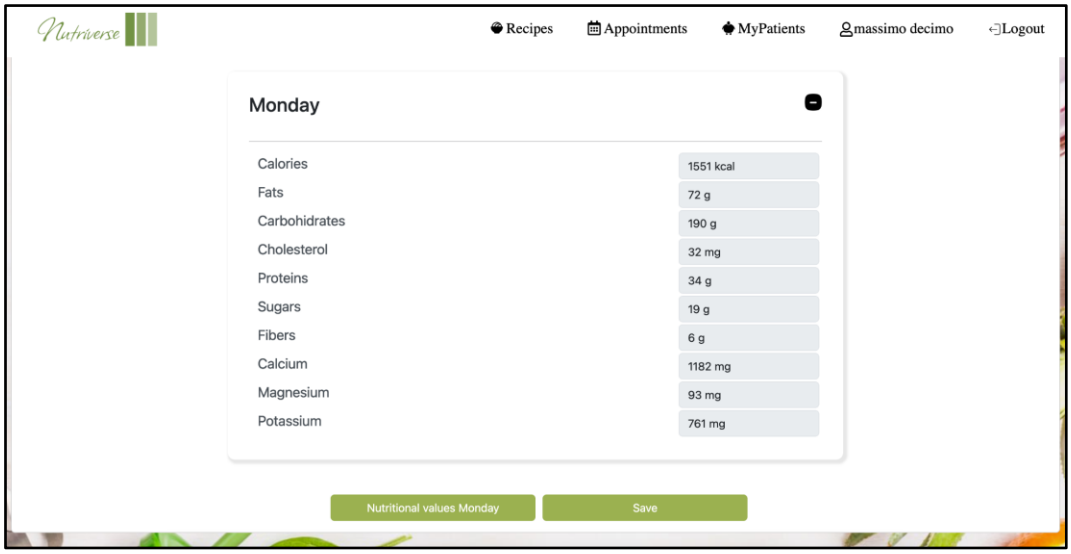
- Nutritionists can create a new food plan for a specific patient by inserting an ingredient and an associated quantity to a specific meal of a specific day of the week.



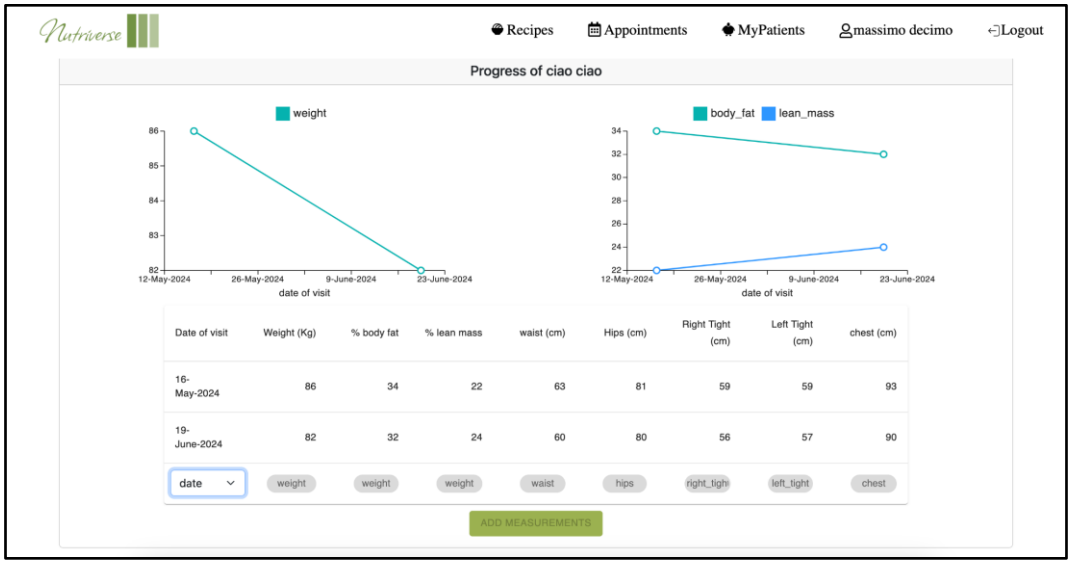
- While creating a food plan, nutritionists can search for a specific ingredient to be added to a meal of the day.



- While creating a food plan, nutritionists can visualize the nutritional values like calories, fats, carbohydrates, sugars, proteins, ecc of the ingredients of a specific day that are being currently added into the food plan.



- Nutritionists can update the progress of a specific patient by inserting new measurements like weight, body fat, lean mass and body centimeters registered during one of the check-ups done.



- Nutritionists can access a page with their clients' reviews.