İstanbul Aydın University
Department of Computer Engineering

COM 438 – ENGINEERING PROJECT – 2

MY DIETICIAN

Advisor : Dr. Öğr.Üyesi ADEM ÖZYAVAŞ

Group Members:
SÜMEYYE TAŞTAN - B1605.010004
ŞEVVAL ÖZTÜRK - B1605.010008

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1   INTRODUCTION

Our project is an online dietitian program that creates a personalized diet list free of charge for those who do not want to go to hospitals and public places due to the pandemic and also want to lose weight. We designed a website that can be used by multiple users at the same time to create a personalized diet list. Within the website, each user will be able to create a profile by specifying a unique user name and password, thus logging into the system. The information prepared specifically for the person and given to the system by the person can be kept in the database in the form of monthly or annual data. At the same time, machine learning is used while preparing diet lists of people on this site. In line with the data set we have created through the Google form, a diet list will be prepared for the users depending on the user's height, weight, age, gender, blood group and the region they live in.

In addition, this diet list will include information such as the user's ideal weight, body mass index, and daily calorie intake. On our website we also used an artificial intelligence chatbot with which you can communicate. The task of this chatbot is to be able to answer questions like a dietitian. We used programming languages such as HTML, CSS, JAVASCRIPT, PHP during the construction phase of the website, and MySQL language in the database part. We used the Python language for coding the artificial intelligence and machine learning part of the website.

1.1   PURPOSE

The Corona virus, which affected the whole world, was effective in designing this project. In line with the studies carried out in 2020, it was observed that the number of people who could continue the pandemic period without gaining weight was very low. [1] , [2] At this time when people are looking for a way to lose weight without leaving their homes, we decided to develop a personalized online dietitian for them. Our website is designed to be easy to use and free for those who want to lose or maintain their weight by eating healthy.

1.2   SCOPE

The information and features provided by our website to users are as follows:
1. Giving a Diet List
2. An AI chatbot
3. Body mass index
4. Daily calorie amount
5. Ideal Weight Determination
6. Whole Body water ratio

The system on our website will create a diet list and create a diet list for each week. The system will create the diet list individually according to the information provided by the person. It will ensure the formation of a diet list by asking the person's height, weight, age, eating habits, blood group and region of residence. According to several studies, people's blood types can also help with weight loss. [3] For example, when an individual from A and B blood groups eats the same product, the amount of fat and protein and the digestion time of this product will not be the same. For this reason, it will be more reliable to separate people according to their blood groups and other information and to create a diet list accordingly. There is also a chatbot in our project. The purpose of this chatbot is to enable users to ask all their questions about diet, nutrition or sports as if they were asking a dietitian. When a large number of users communicate with the chatbot at the same time, the response speed of the chatbot may decrease, and as we develop the system, such problems will be solved.

Our biggest concern in the security part of the website is that personal data can be stolen by others. In the working part of the site, users must create a profile, provide mail, password and private information.

This personal information provided by users is stored through the database. In addition, for additional security, users' passwords will be encrypted with hash encryption and will not be viewed by the administrator. Also, the activation system is available on our website to determine the authenticity of the user.

1.3   DEFINITIONS, ACRONYMS AND ABBREVIATIONS

HTML	"Hyper Text Markup Language" is a language but not a programming language. It allows us to add content to web pages.
CSS	"Cascading Style Sheets" web sitelerinin görsel olarak şekillenmesini sağlayan bir dildir.
Js	"JavaScript" can be used for animation, interactivity on a web page.
PHP	"Hypertext Preprocessor" is a program language running using the server. Php language can be written intertwined with html css and javascript, so it is very flexible and useful for the scribe.
MYSQL	It is an open source database. It is the management system of relational databases.
py	Although the "Python" language is a multi-purpose language, it is an object oriented language.
PHPMyAdmin	It is an open source database written using php. This database is used on the internet.It can also run SQL queries in it.
NLTK	"Natural Language Toolkit" is a Python library created with spoken language.
NLP	"Natural Language Process" is an artificial intelligence subcategory.
Client - Server	Client: opening files or performing certain operations by users. Server: is actually a computer we use. Thanks to Server, we can share the files on our computer on the internet.
VHK	weight to be lost
HGA	month in which the goal should be reached
YK	weight lost in 1 month
Agile	It is a software development process. Thanks to this software development process, we can get the most accurate result in our projects.
Pytorch	It is a python library that facilitates operations used for deep learning.
Neural Net	It is a machine learning. The human brain is essentially designed.
Visual Studio Code	The editor we use
Class Diagram	Describes the structure of a system
Statechart Diagram	Expresses possible states of a class (or a system)
Sequence Diagram	Shows one or several sequences of messages sent among a set of objects
Use-case Diagrams	Illustrates the relationships between use cases
Deployment Diagram	A special case of a Class Diagram used to describe hardware within the overall system architecture
Matplotlib	It is a library of Python. Used for data visualization.
Numpy	It is Python's math library. Creates numpy arrays.
Pandas	It is an extension of the numpy library. It is used in the data analysis part.
.csv	It is the extension of the text file where data is kept.
PhpMailer	It is the module of the php language used for mail.
CYK	Cocke - Younger - Kasami algorithm is a parsing algorithm for Grammars.

1.4   OVERVIEW

While preparing our project report, first of all, the purpose and working logic of our project are explained in certain steps. In the next step, information was given about the interface of the project whose working logic was explained and the add-ons determined according to the needs. The data flow chart of the project and information about the system are available in the project report. After explaining the general lines of the project, information is given under the heading of programming standard in the application part. With the Description of the Components, the algorithms that are planned or that can be used in the project are explained and the advantages and disadvantages of these algorithms are also included here. Finally, there is a table in the project report describing the project software requirements.

2   SYSTEM OVERVIEW

Figure 1 Web Site System Overview

Figure 2 Web Site Responsive Overview

The main screen of the website will be as in Figure 1. As seen in Figure 2, the website has a responsive design. As seen in Figure 1, the logo and menu will welcome you when you first enter the website. User

login, logout and account buttons in the menu will be located in the menu section according to the system needs. There are about us, blog, login and language selection buttons in the menu. Thanks to the language selection button, the website has been made suitable for use in English and Turkish. In addition, a Chatbot button has been added at the bottom of the site to make the site easier to use and to make users feel like they are talking to a real dietitian. The reason why we prefer artificial intelligence instead of working with real dietitians in the chatbot on our website is to make the system free and available to everyone.

In our project, we took the information we wanted from the user and stored it here by using the PHPMyAdmin database manager, which uses the MySQL language for the background of our website. The information stored in the database is as follows; user session information, user eating habits and diet lists, contract and mailer on the website, tables containing the necessary settings for the website. In the database, we have 9 different tables in the database in total.

We used PHP language to make database connections and perform back end operations. We used the NLTK library in Python and neural network for the background work of the chatbot. In order to create a personalized diet list, we used the Python language and benefited from machine learning and python language libraries.

System Characteristics

The website is intended to be offered to the user free of charge. Also our system has access to multiple users at the same time. The system will give users a personalized diet list each time. In order to protect user data, users' passwords are stored in the database in an encrypted manner against database theft. In addition, data backups are made once a week in order to avoid data loss. In order for the system to be maintained easily and the project to be easily developed by more than one software developer, the code was written within the framework of coding rules.

2.1 SYSTEM ARCHITECTURE

While designing our project, we used the Client-Server architecture for the system architecture part. We used web application, database, mail and authentication servers on the server side of the architecture we will use. On the processor side, users will be able to perform the transactions they want in line with the authorization given to the users by the server.

If we talk about the system architecture, the first screen you come across is the homepage of our website, which was created for informational purposes. In order to create a diet list, the user must first become a member of the website and log in. When the user creates a membership, an activation link will be sent to his e-mail address, thus completing the membership process. After the user enters the system, the screen specified in figure 3 will appear on the screen. You can choose each of the options available from this screen. If the user wants to create a diet list, it is checked whether the user's additional information is registered in the system, and if the user does not have additional information in the system, the additional information screen will appear first. The information provided by the user is kept in the database. Thanks to the chatbot button, which is another option, the user who wants to get help must first inform the system what he wants to do and receive appropriate feedback accordingly. The main purpose of the system is to create a diet list according to the information provided by the users. In order to create this list, first of all, the obtained data will be saved in a database, then the data used will be classified by machine learning, and the profiles of the people will be created and the desired diet list will be created.
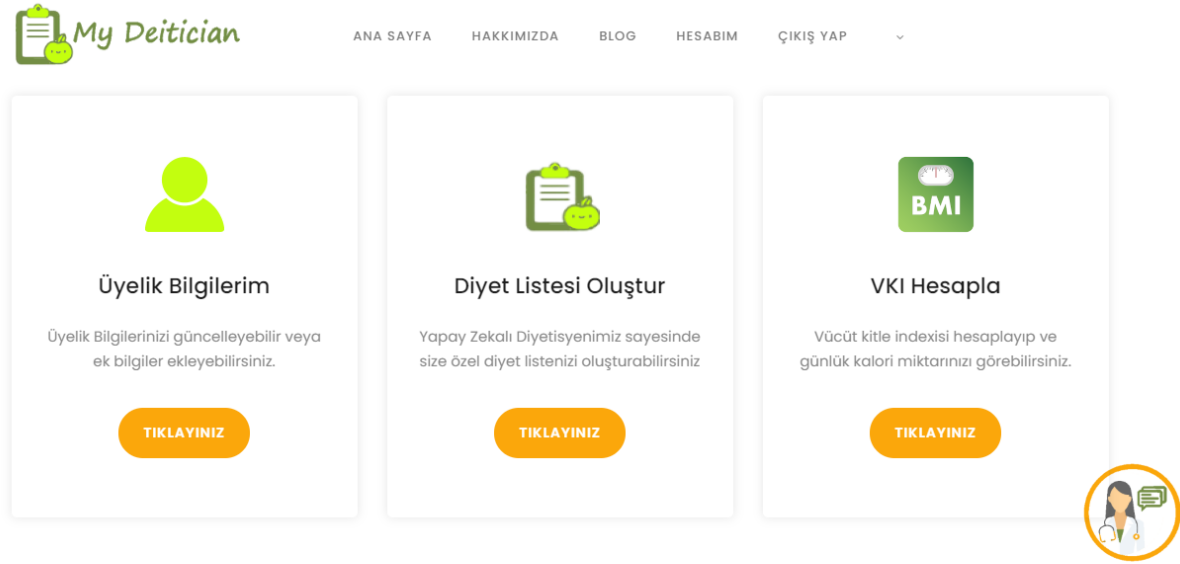
Figure 3 Web Site System Architecture
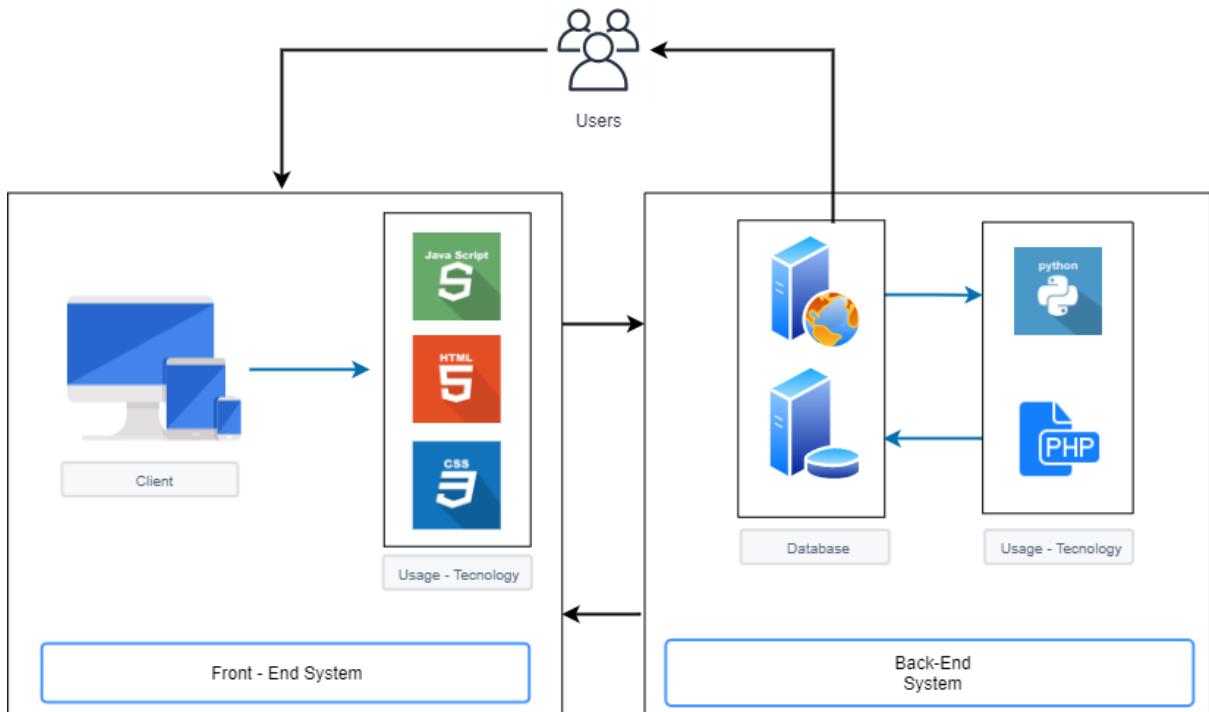
Figure 4 System Architecture

2.2   INFRASTRUCTURE SERVICES

Figure 5 Infrastructure Services

The infrastructure services we will use for our website are as in Figure 5. Our purpose of using networking infrastructure service in our project is that users need wired or wireless internet to access our website. Users need certain devices to access the website, so one of the infrastructure services is devices. We plan to use the communaciton services infrastructure service so that the diet list and monthly reports can be sent to the user. In order to protect the data privacy and passwords of the users, we plan to utilize the security service infrastructure service in our project. Servers infrastructure service is also required in order to present database system background applications to the user within our project. Finally, we plan to use a database system so that users' data can be safely stored and accessed at any time.

3 SYSTEM CONTEXT
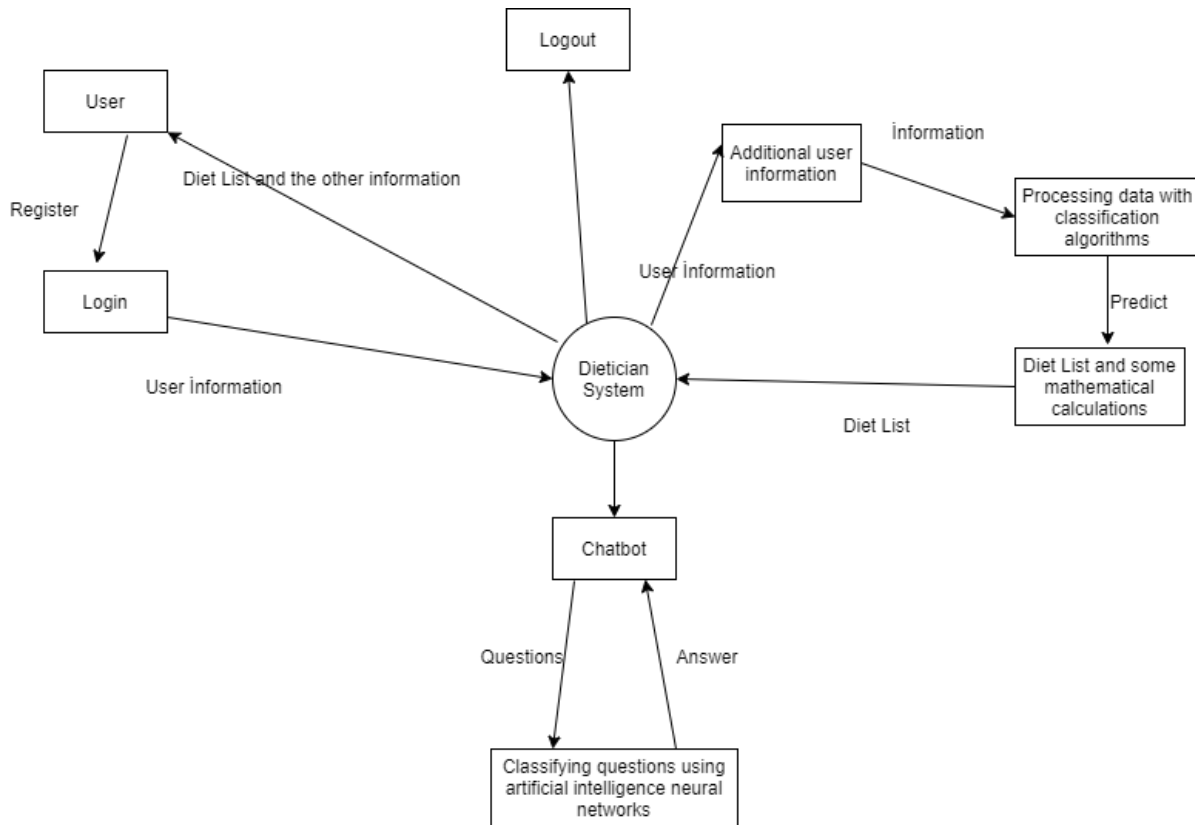
Figure 6 System Context

The system is an online diet system as stated in figure 6 above. In order for the system to work, a dataset will be created as a result of surveys conducted by collecting food habits and personal information with certain people. The data in this dataset will be taught to the system so that it is planned to ensure that the artificial intelligence system provides the correct diet list. Our online dietitian system first receives user information from the user through the interface. It stores this information in its database. After the user information is received, our online diet system sends this information to the artificial intelligence system in the background in a report. After the operations performed in the system, the diet list is created and this diet list is sent to the interface of the online diet system and also stored in the database. The latest online diet system delivers the created diet list to the user via mail.

4   SYSTEM DESIGN

It works by using the membership system of our Online Diet System. It is not possible to login to the system without being a member. After logging into the system, users can request a special diet list or get recommendations from the chatbot, such as a dietitian. In order for the online diet system to create a diet list for the user, some inputs will be requested from the user. These;

- user's age
- user's height
- user's weight
- The weight the user wants to reach
- User's blood type
- user's hometown

In the light of this information in the online diet system we have developed, it will give users the following output:

- Body mass index
- Weight Status: underweight, normal, overweight, overweight
- Target weight to lose: (kg)
- User's daily calorie amount [Kcal]
- User diet list
- The ideal weight of the user
- User's body water ratio
- User's lean body weight
- The amount of calories that the user can take in addition to the diet list

In our online diet system, the user has to ask the chatbot a question in order to get help from the chatbot. Thanks to the technology it uses, the chatbot will answer the user by separating the question word for word. For example, if the user asks the questions to be considered while dieting in the chatbot, he will give the most appropriate answer that appears as an answer.

4.1   DESIGN METHOD AND STANDARDS

While designing the Online Diet System, it is very difficult to predict the problems that will be encountered while integrating the system design and requirements into the system. For this reason, using the agile methodology in our project, thanks to Agile Methodology, solutions will be produced in response to the problems that arise in an organized way with system integration, and all systems will be able to be designed from the beginning again by returning to the project design phase.

The Agile methodology has both advantages and disadvantages for our project. The disadvantages of Agile methodology can increase the project delivery date and increase the workload. The advantages are that the system can be tested multiple times and the design can be reconfigured. As a result, quality software will emerge.[4]If we look at the advantages and disadvantages, the advantages are overwhelming. Therefore, it will be beneficial for us to use the agile method. The agile methodology logic is as in figure 7 below.
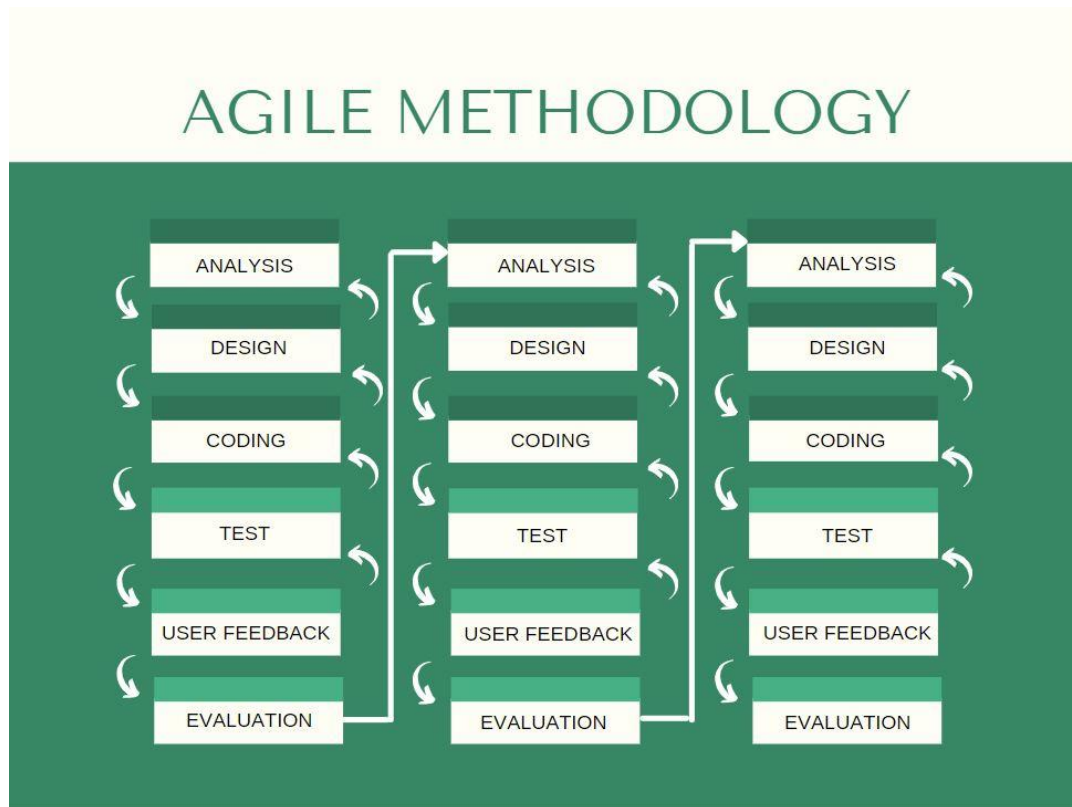
Figure 7 Agile Methodology

If we briefly talk about the steps of the Agile methodology:

Analysis: First, the system is analyzed. System requirements are determined.

Design: After analysis, a plan is created and designed for the system.
Coding: From the code part, the software team is engaged. Implementation process is done at this stage.

Test: At the stage after the coding of the designed work, it is tested by the test experts to check whether it is progressing in the direction that the customers want and at the same time whether the back-end part is working correctly.

User Feedback: This stage is the stage where users test the system and provide feedback for the parts they like and dislike.

Evaluation: After all these stages are completed, if everything has progressed smoothly, the system is delivered to the customer. However, if there is an error, the system goes back to the analysis phase and the same processes are repeated. These iterations are continued until the system runs smoothly.

4.2 NAMING CONVENTIONS

The file type and identifier types we use in our project will be named as shown in the tables below.

TABLE 1 File Naming

File Type We Use	File Extension	Formatting	Names
Php	.php	two-words	kebap-case, dash-case
Python	.py	two-words	kebap-case, dash-case
JavaScript	.js	two-words	kebap-case, dash-case
CSS	.css	two-words	kebap-case, dash-case

TABLE 2 Identifier Type

Identifier Type	Formatting	Names
Class	TwoWords	PascalCase
Function	twoWords	camelCase
Variable	Twowords	flatcase
Constant	Twowords	flatcase

4.3 PROGRAMMING STANDARDS

In this section, there are explanations of indenting and layout, language Constructs to use and Commenting parts.

TABLE 3 Indenting and Layout

	BRACE PLACEMENT	STYLES
Girinti Stili	while (x == y) { something (); somethingelse (); }	GNU

TABLE 4 Language Constructs To Use

PROGRAMMING LANGUAGE	LANGUAGE STRUCTURES
PHP	```<?php $name='online dietician system'; print $name; print("Hello World"); ?>```
JAVASCRİPT	```<script> var name ; name="online dietician system"; console.log(name); console.log("Hello World"); </script>```
PYTHON	```name = "online dietician system " print(name) print('Hello World')```
SQL	```create table Test(id integer, title varchar(100)); insert into Test(id, title) values(1,"online dietician system"); select * from Test;```

PROGRAMMING LANGUAGE	COMMENTING	EXAMPLE
JAVASCRIPT	Used before single-line comments: // Used for multi-line comments: / * /	var x = 5; var y = 3; // y is a variable. / * We assign the value 5 to the variable x. We assign the value 3 to the variable y * /
PHP	There are two marks used for a one-line comment: // Used for multiple lines: / * * /	```<?php $name = "Hello"; // name değerine Hello değerini atadık . print($name); // Atadığımız değeri yazdırdık. /*name değerine Hello değerini atadık.Atadığımız değeri yazdırdık. */ ?>```
PYTHON	Single-line codes are also used: # For more than one line used: """ """	# Prints hello World on the screen. print ("Hello World") "" "This is a python programming assignment." ""

SQL	Single line used: -	SELECT * FROM customer WHERE city = 'Ankara' - Bring all customers and print the ones whose city is Ankara.
HTML	Used in: <! - ->	<! - is the beginning of the footer-> <footer> </footer>

TABLE 5 Commenting

4.4 SOFTWARE DEVELOPMENT TOOLS

We used 3 different languages while making the website. These languages are Php, Phyton and Javascript languages. The reason we use PHP is that it can be used with javascript while developing web and it is a very flexible language. It is an easy and fast working language because the PHP code is very similar to other languages. The purpose of using the Javascript language is that we want to benefit from the jquery library in our project. We use the Python language because it is the most comfortable language to use for developing artificial intelligence and machine learning applications. It can also be done in web development with python language. We developed our project using these 3 languages.

LANGUAGES WE WILL USE IN OUR PROJECT	PHP , PYTHON , JAVASCRIPT
EDITOR WE WILL USE IN OUR PROJECT	VISUAL STUDIO CODE EDİTÖRÜ

TABLE 6 Software Development Tools

While developing our project, we used the PyCharm editor for data visualization while Visual Studio Code used machine learning to create a diet list during the visual design of the website and the construction of the chatbot part. With the Visual Studio Code editor, it supports php, javascript and also phyton language.

We drew the Uml diagrams we drew to describe our project system with the help of the drawing editor in draw.io. The reason we use the Draw.io site is that there are many UML diagram ready templates and all the icons and shapes needed to draw diagrams are in the system.

4.5 OUTSTANDING ISSUES

We used a mixed PHP and Python language to create a diet list on our website. We had a lot of trouble exchanging data between the two file types. We had to somehow run your python file through the website. For this, we used the shell_exec() command in php. In addition, we had difficulties in transferring the results from the pyton file we used to classify the data to the website. As a solution to this, we wrote the data we received from the python file into a file and read the data written to the php language file we use in the background of the website.

In order to create a diet list, we had difficulties in making the data obtained from the user suitable for analysis with the Google form before. We used certain functions to digitize and group the data. In order to make the correct classification with these data, we continued our operations with the data group tables that provided the highest success, noting the rate of reaching the correct result, if the selection of the tables we will use was directed.

4.6 DECOMPOSITION DESCRIPTION

The first of the UML diagrams we made for our project is the Class Diagram. Here, the relationship between the classes we will use in our project and the other classes is shown. You can also see the parameters taken by the classes.
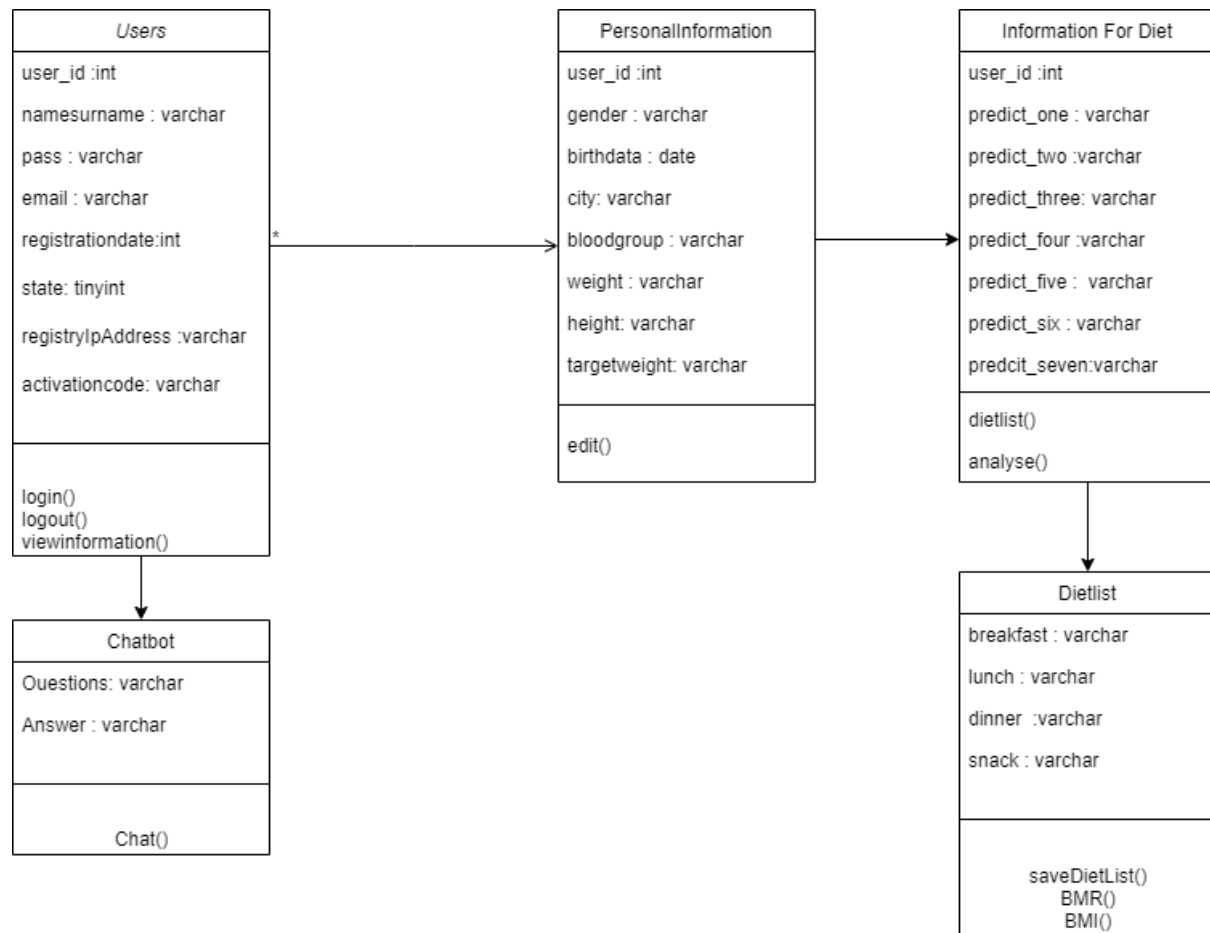

Figure 8 Class Diagram for My Dietician

Figure 9 below shows the behavior of our system for the State Chart Diagram for My Dietician. The behavior of objects in the system, events and transitions are described.
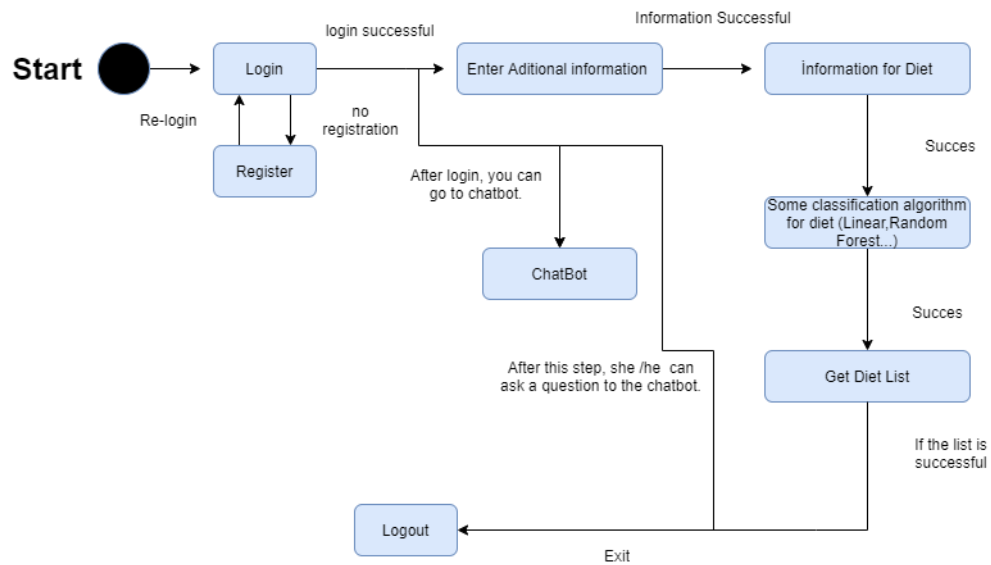
Figure 9 State Chart Diagram For My Dietician

If we explain the Use Case Diagram visual; The first option when the user logs into the system is to register. After registration, you will start using the system by logging in. The user will be able to ask questions to the chatbot on our website and will also have the right to direct. At the same time, if the user selects the diet list, there will be a diet list output, including breakfast, lunch, dinner and snacks in this diet list. At the same time, some calculations will be made in order for the diet list to be correct.
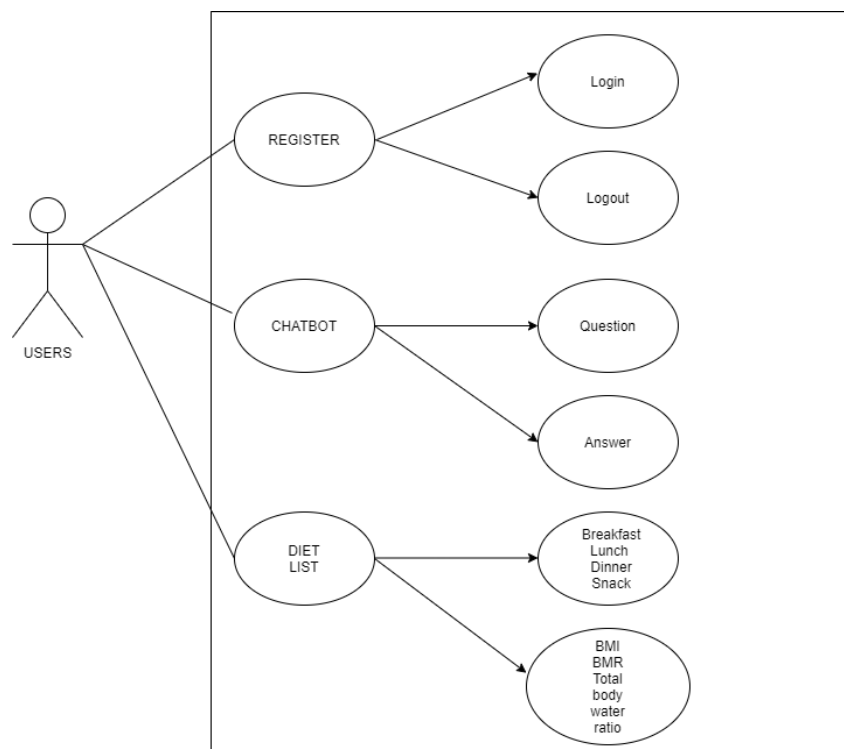

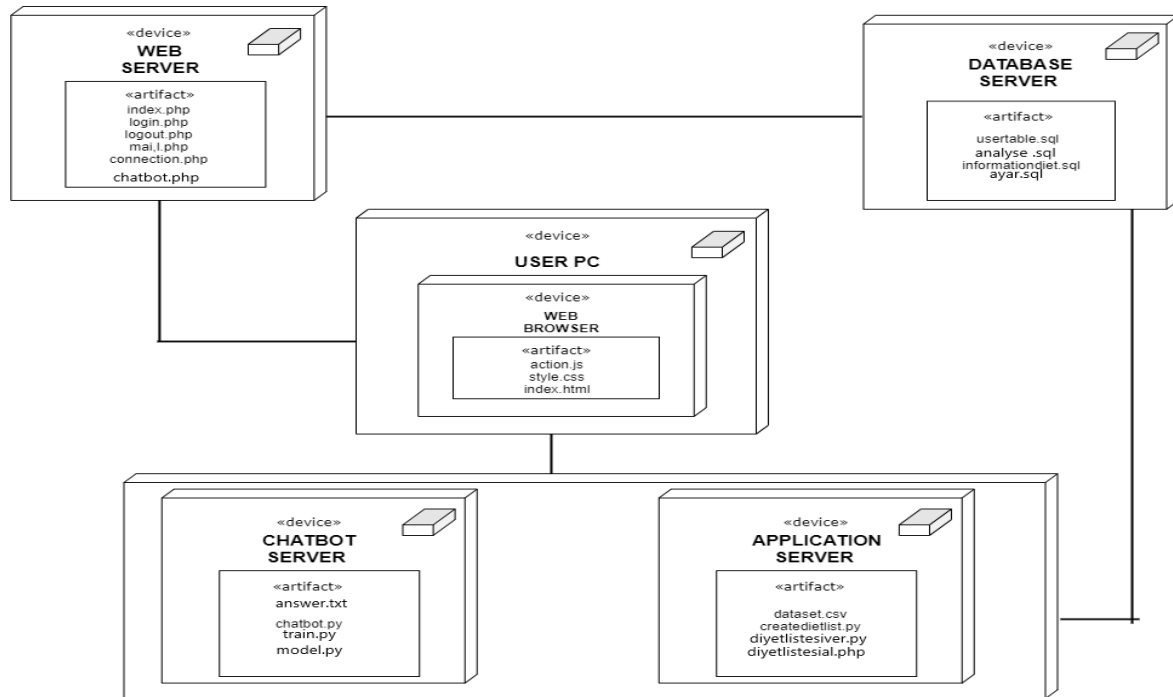*Figure 10 Use Case Diagram For My Dietician*

Figure 11 Deployment Diagram For My Dietician

It is the diagram in which we visualize the hardware we will use in our project and these hardware components and express the relations between them. The data and information received from the user's computer are transmitted to the web server. The information and data processed on the web server are transmitted to the database server this time. Back from the database server, the data can be transmitted to the user pc via the web server, and also the data is transmitted to the Chatbot server and application server via the database server. After the necessary operations are done here, the data is sent to the user pc.

The diagram showing how the objects in our project follow between systems and subsystems is like in Figure 12 Sequence Diagram for My Dietician.
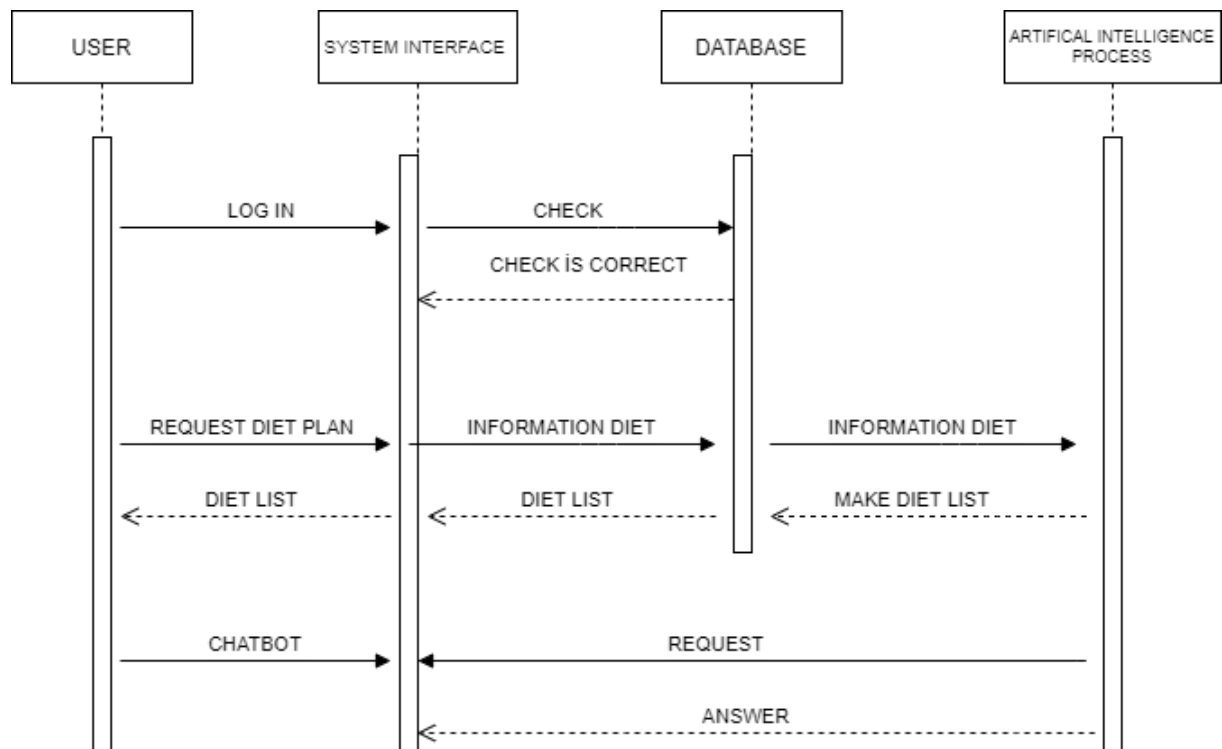
Figure 12 Sequence Diagram for My Dietician

5   COMPONENT DESCRIPTION

In line with the goals and requirements of our project, we have developed a 3-layer development method for our website. Since we used multiple pages and structures while developing our application, we used multi-layer client-web server architecture in our system. A multi-layer client-server structure is like the figure below in Figure 13 Multi-Page Application Architecture.
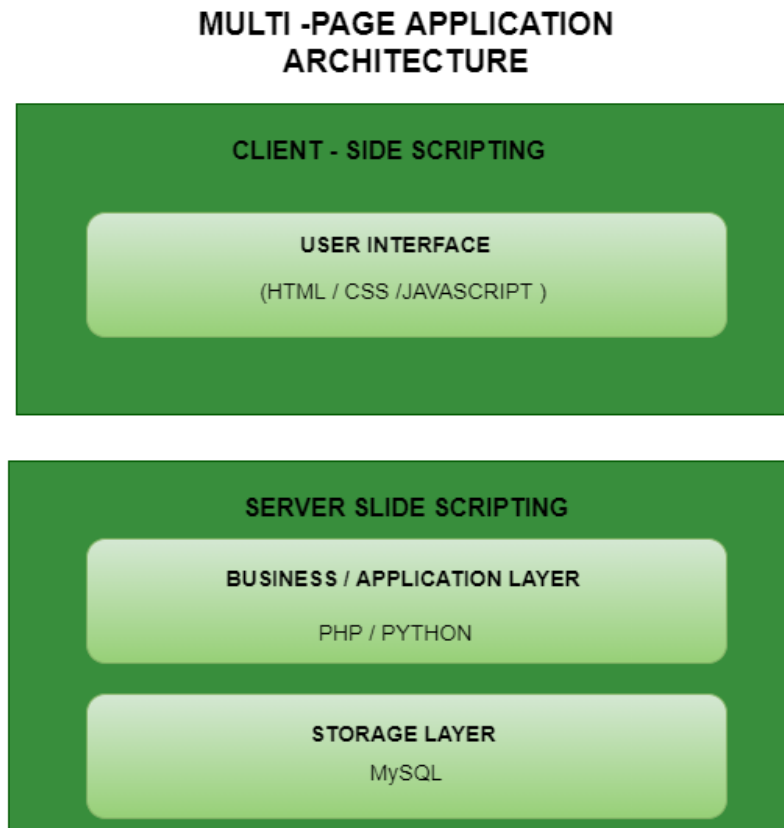
Figure 13 Multi-page Application Architecture

In our project, we used html-css and javascript technologies for the user interface part of the multi-layered structure. The server side consists of two parts. The first part is the part where the logic of the application is processed and the background work is done for the application to run. We used php and phyton languages to do background work in our project. The second part is the part where all the data will be kept so that the application can run dynamically. We preferred Mysql to store data in our project.

5.1   COMPONENT IDENTIFIER

It is JQuery which is a library of HTML, CSS and Javascript. HTML is the cornerstone of the web page. HTML is the tool that allows us to integrate the content we need when creating a web page, such as titles, text, lists, tables, photos, etc. CSS, on the other hand, is a tool that allows us to make adjustments such as the layout of the website, the colors of the website, font sizes, fonts, image sizes and visually improve the website. JQuery is the library we use for the visual design of the site, small animations and effects to be added.

Php is an open source scripting language that we use to perform the website's operations on the server side. Php language can be intertwined with html css and javascript so it is very flexible and useful from the author. PHP language is often used to create a dynamic website. With PHP, you can get file, get post, form mail, session etc. transactions can be made.

Although Python is a multi-purpose language, it is an object-oriented language. Another reason to use Python is its modular structure, thanks to this structure it supports every input. Thanks to its standard and general libraries, it serves a wide area in terms of functionality in the codes written. Phyton can be used for web development, mathematical functions and machine learning etc. can be used for Python is more like an everyday language than any other language. We used Phyton in analysis studies and in building chatbot for artificial intelligence application.

5.1.1 Type

The types of file systems in our project are as in table 7 below.

TABLE 7 File Types

| File Types	Description
.php	The file type in which the database connection of web pages is configured.
.py	It is the file type in which the chatbot and user data are analyzed.
.html	The file type of the pages on the website.
.css	It is the type of file that the pages on the website are designed for.
.js	The type of file where animation is added to the pages on the websites.
.sql	The type of file in which database structures are kept.
.xml	It is the file type that contains information about the project.

5.1.2 Interfaces
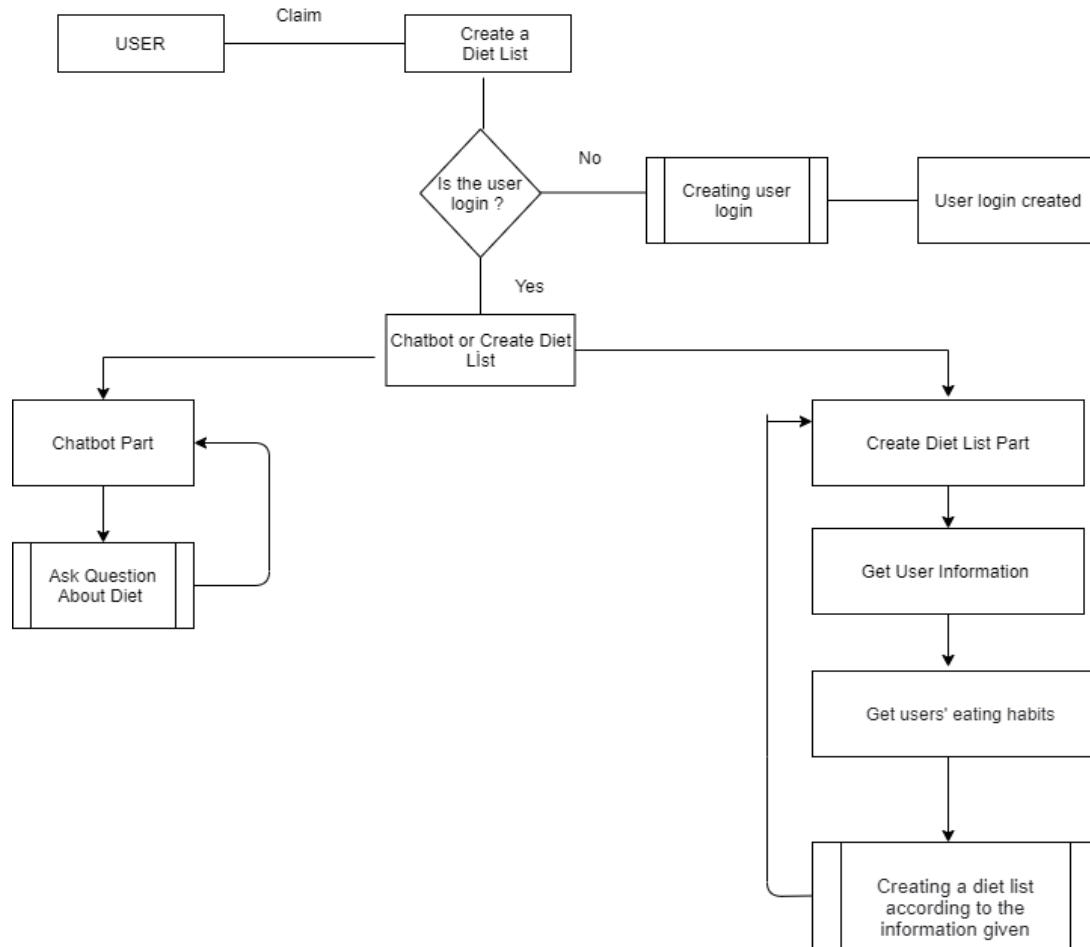
Figure 14 Data Flow Diagram For My Dietician

You can see the data flowchart diagram in Figure 15 above, where the system interface and operating logic are visualized. If we explain the system, the system opens with user login and cannot create a diet list without user input. After users create a membership with their name, surname, e-mail and password and log in to the system, the My Account page appears on the screen. You can view the user information, create a diet list and have the body mass index calculated on the My Account page. In order to get the diet list, the system will ask for some information from the user and ask about the eating habits in the diet list. After these are answered and classified using artificial intelligence, a diet list will be given to the user. The artificial intelligence section of our site is chatbot. The chatbot will act as a dietitian and answer questions from the user.

5.1.3 Resources

The resources we used during the construction phase of our project are as stated in the article below. In order to create a diet list, users had to analyze the data. For this, up to 500 people's food habits, as well as age, weight, height, blood group, etc. We used two different excel files containing personal

information. In addition, we used a remote database where the data of the users who will use the system will be kept and where we can upload and retrieve data when requested. In order for users to use the system, an electronic device such as a tablet, phone or computer with an internet connection will be needed.

5.1.4 Processing

The operations are as in Figure 15 above. User login operations in the system will be done in .php extension files using php language. At the same time, if users do not have accounts, user accounts will be created in .php files. During the registration of the users, the e-mail required for registration can only be used for one user, and if different users try to register with the same e-mail, they will be rejected. The information of the users will be kept in the MySql database and the process of sending the information to the database and calling it back to the interface will be performed in a .php file. Interface design will be done using html, css and js in .php extension files. After the user logs in, 3 options will be presented to the user who accesses the interface. These are User information, Calculate body mass index and Create Diet List options. In the chat with Chatbot and Create Diet List sections, we will use phyton language in files with .py extension. For the Create Diet list section, the data set previously introduced in my system is trained and 3 different classifications are made. Then, according to the classification made, it will be presented to the user who will create a diet list from the database.

5.1.5 Data

The database information in our project is as follows . Tables are linked to each other by their id numbers.
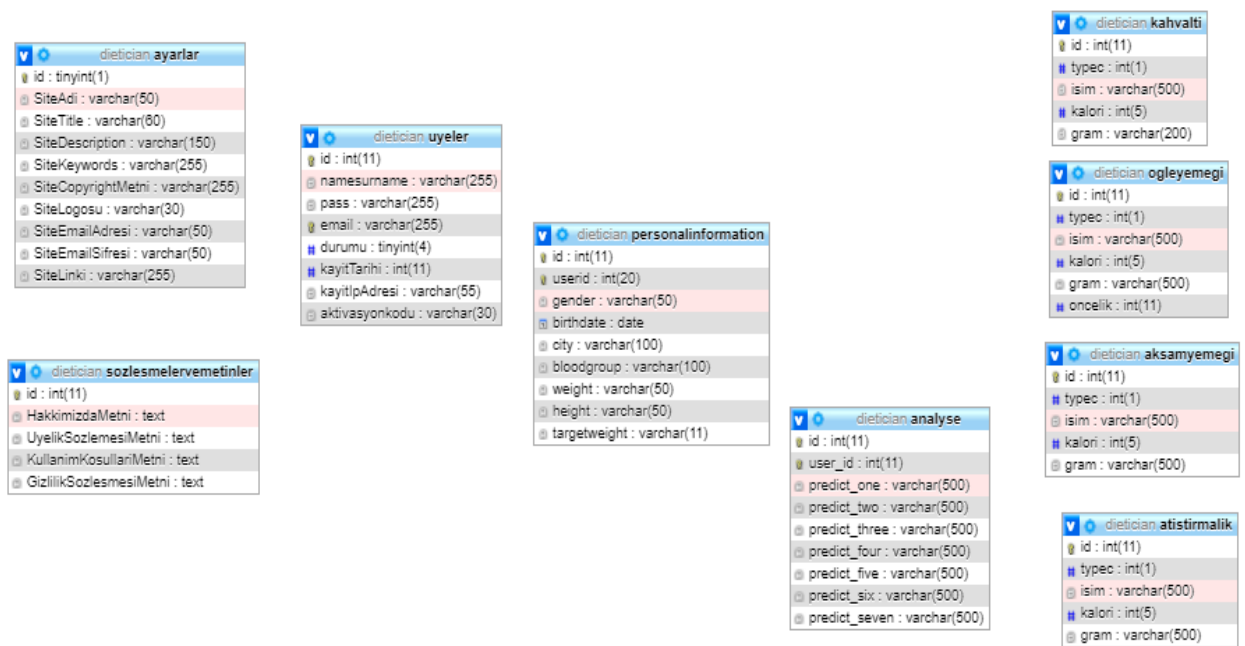

Figure 15 Logical Data Structure

6   ALGORITHMS AND FUNCTIONS USED

Our project actually consists of 2 main parts. The first of these is to create a diet list for the user and make the necessary calculations for a healthy life. The second is a chatbot designed for the user to use our website easily and chat as if he were talking to a dietitian. Different algorithms and functions are used for the two main structures.

6.1   CREATE DIET LIST

We have 2 different datasets that we use to create a diet list. Firstly, the data in this dataset were digitized with one_hot encoding and label encoding methods and transferred to new tables and the data was made ready for analysis. A few of the lines of code in which these operations are performed are shown as examples in Figure 16.

```
116    #şimdi ilk olarak cinsiyet grubunda label hot encoding yapıcaz yani 0,1 e çeviricez
117    le = preprocessing.LabelEncoder()
118    #cinsiyet dönüştürülmüş sutununa cinsiyeti sayısallaırıp atadık
119    verigrubu['cinsiyet_donusturulmus']= le.fit_transform(verigrubu['Cinsiyet'])
120    |
121    #şimdi one hot encoding işlemine geçiyoruz kan grubunu encode ediyoruz
122    verigrubu['Kan Grubu'] = pd.Categorical(verigrubu['Kan Grubu'])
123    kan_grubu = pd.get_dummies(verigrubu['Kan Grubu'], prefix = 'Grup')
124
125    #one hot encode u kan grubu ve bölge  için yapıcam
126    minveri['Kan Grubunuz']=pd.Categorical(minveri['Kan Grubunuz'])
127    kan_grubu_minveri = pd.get_dummies(minveri['Kan Grubunuz'], prefix = 'Grup')
128
129    minveri['Bölge olarak nerelisiniz']=pd.Categorical(minveri['Bölge olarak nerelisiniz'])
130    bolge_minveri = pd.get_dummies(minveri['Bölge olarak nerelisiniz'], prefix = '')
131
132    #min veri deki kan grubu ve bolge verilerini birleştiricez
133    bagimli_minveri = pd.concat([kan_grubu_minveri, bolge_minveri], axis=1)
134
135    #burada veri grubunda sayısal olan degerleri aldık
136    bagimli_veri_1=verigrubu.iloc[:,1:4]
137    bagimli_veri_2=verigrubu.iloc[:,6:7]
138
139    #şimdi ise concat ile kangrubu sutunları ile veri grubu birleştirilecek
140    bagimli_veri_3 = pd.concat([bagimli_veri_1, bagimli_veri_2], axis=1)
141    bagimli_veri_4 = pd.concat([bagimli_veri_3,kan_grubu],axis=1)
142    bagimli_veri_new=bagimli_veri_4.iloc[:,].values
143
144    #şimdi ise bagımsız verimizi ekliyoruz makarna/ pivav
145    bagimsiz_veri=maxveri.iloc[:,19:20].values.ravel()
```

Figure 16 Code Part

Using this data, we used machine learning to give people an accurate diet chart. Machine learning is divided into two main headings, supervised learning and unsupervised learning. In the unsupervised machine learning model, only one data is given to the machine and the machine is asked to extract something from this data. There is no information flow to the machine by the user. In supervised learning, the user gives certain information to the machine and asks the machine to guess the unknown information. In both processes, the machine generates a guess. The choice of the user of these methods is related to the data group you will analyze. In the dataset we use, based on the food habits of the old users, a supervised machine learning process was carried out by taking the similar aspects of the new users to the users in the dataset. For this analysis, we preferred to use classification, a sub-branch of supervised learning, and its 3 different algorithms.

6.1.1 Classification

Classification is the categorization of what the machine has observed and learned from certain types of data into classes according to new data. Data sets can be either bi-class or multi-class. The feature that distinguishes the classification from the prediction is that it classifies according to one of the data sets given to it in the classification, and does not produce a new value. Therefore, classification is one of the methods used for estimating verbal data as opposed to numerical data in general. In our application, we made our predictions by using linear regression, Naïve bayes, decision tree, random forest and support vector machine algorithms from classification algorithms, and we selected the algorithms that reached the highest accuracy value according to the data and used them in practice. Below is a sample code snippet of one of the functions written in figure 17 and figure 18, and a code snippet from which the functions used are called.

```
53
54    #Random Forest Algoritmasını kullanarak yazıgımız fonksiyon
55 ∨ def tahmin_RandomForest(bagimliveri,bagimsizveri ,tahminadi):
56        x_train, x_test, y_train, y_test = train_test_split(bagimliveri, bagimsizveri, test_size=0.50, random_state=0)
57        sc = StandardScaler()
58        X_train = sc.fit_transform(x_train)
59        X_test = sc.transform(x_test)
60        rfc = RandomForestClassifier(n_estimators=10, criterion='entropy')
61        rfc.fit(X_train, y_train)
62        y_pred = rfc.predict(X_test)
63
64
65        le.fit(y_test)
66        list(le.classes_)
67        y_test_new = le.transform(y_test)
68
69        le.fit(y_pred)
70        list(le.classes_)
71        y_pred_new = le.transform(y_pred)
72
73        # Şimdi ise dogruluk oranı puanı hesaplama işlemlerine geçicez
74        dogrulukOranı = metrics.accuracy_score(y_test_new, y_pred_new)
75        print(tahminadi, "Dogru Tahmin Oranı :", dogrulukOranı)
76
```

Figure 17   Classification with Random Forest Algorithm

```
249    tahmin(bagimli_veri_new,bagimsiz_veri,'logistic Makarna - Pilav')
250    tahmin_KNN(bagimli_veri_new,bagimsiz_veri,'KNN Makarna - Pilav')
251    tahmin_RandomForest(bagimli_veri_new,bagimsiz_veri,'Random Forest Makarna - Pilav')
252    tahmin_SVM(bagimli_veri_new,bagimsiz_veri,'Support Machine  Makarna - Pilav')
253    tahmin_NBA(bagimli_veri_new,bagimsiz_veri,'Naive Bayes Makarna - Pilav')
254    tahmin_DTree(bagimli_veri_new,bagimsiz_veri,'Decision Tree Makarna - Pilav')
255    print('*******************************************************************************************************')
256
```

Figure 18   Piece of code in which classification functions are called

With the output of the codes seen above, we looked at which of the algorithms used gave the best accuracy rate and based on these accuracy rates, we used those algorithms in our project. You can see the accuracy rates from figure 19 to 21.

```
PS C:\xampp\htdocs\odev-deneme> & C:/Users/Casper/AppData/Local/Programs/Python/Python39/python.exe c:/xampp/htdocs/odev-deneme/Classification_
logistic Makarna - Pilav Dogru Tahmin Oranı : 0.4928571428571429
KNN Makarna - Pilav Dogru Tahmin Oranı : 0.46919431279620855
Random Forest Makarna - Pilav Dogru Tahmin Oranı : 0.5308056872037915
Support Machine  Makarna - Pilav Dogru Tahmin Oranı : 0.14218009478672985
Naive Bayes Makarna - Pilav Dogru Tahmin Oranı : 0.13270142180094788
Decision Tree Makarna - Pilav Dogru Tahmin Oranı : 0.5165876777251185
********************************************************************************
Logistic Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.5785714285714286
KNN Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.5308056872037915
Random Forest Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.6113744075829384
Support Machine Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.5545023696682464
Naive Bayes Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.21800947867298578
Decision Tree Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.5260663507109005
********************************************************************************
Logistic Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.21428571428571427
KNN Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.47393364928909953
Random  Forest Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.5118483412322274
Support Machine Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.4834123222748815
Naive Bayes Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.47393364928909953
Decision Tree Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.4834123222748815
********************************************************************************
Logistic Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.19285714285714287
KNN Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.24170616113744076
Random Forest Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.5971563981042654
Support Machine Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.22274881516587677
Naive Bayes Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.45023696682464454
Decision Tree Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.2037914691943128
```

Figure 19 Accuracy rate

```
Aşagıdaki veri grubu yukarıda ki bagımlı verilere kan grubu verilerini dahil etmeden sınıflandırma yapılan kısımdır
-- Makarna - Pilav Dogru Tahmin Oranı : 0.5142857142857142
-- * Beyaz - Kepekli Ekmek Dogru Tahmin Oranı : 0.5
-- Hangisinden Vazgeçemessiniz Dogru Tahmin Oranı : 0.22142857142857142
-- Yaş Meyve -Kuru Meyve Dogru Tahmin Oranı : 0.16428571428571428

 Logistic Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.532258064516129
 KNN Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.12903225806451613
 Random Forest Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.043010752688172046
 Support Machine Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.043010752688172046
 Naive Bayes Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.22580645161290322
 Decision Tree Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.053763440860215055
********************************************************************************
 Logistic Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6451612903225806
 KNN Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946
 Random Forest Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.5806451612903226
 Support Machine Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946
 Naive Bayes Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.17204301075268819
 Decisison Tree Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.5913978494623656
********************************************************************************
 Logistic Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.6774193548387096
 KNN Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7311827956989247
 Random Forest Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.6881720430107527
 Support Machine Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7419354838709677
 Naive Bayes Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.27956989247311825
 Decision Tree Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7204301075268817
********************************************************************************
```

Figure 20 Accuracy rate 2

```
Sadece kan grubu verileri dahil edilmiş bu veriler en düşük dogruluk oranı veren verilerdir
** Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.03225806451612903
**  Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6290322580645161
** Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.6935483870967742

Sadece yaşadığı bölge  verileri dahil edilmiş
&& Hangisini Tercih Edersiniz Dogru Tahmin Oranı : 0.03225806451612903
Bu veri her iki grubunda oldugu veri grubuyla daha iyi tahnin edlebiliyor o sebeple onun algoritmalar ile denemeyecegim

Logistic Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6451612903225806
KNN Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946
Random Forest Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946
Support Vector Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946
Naive Bayes Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.17204301075268819
Decision Tree Hangisi Sizi Rahatsız Ediyor Dogru Tahmin Oranı : 0.6236559139784946

 Logistic Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7580645161290323
 KNN Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7526881720430108
 Random Forest Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7204301075268817
 Support Vector Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7204301075268817
 Naive Bayes Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7096774193548387
 Decision Tree Hangi salatayı tercih edersiniz Dogru Tahmin Oranı : 0.7204301075268817
```

Figure 21 Accuracy rate 3

We used Logistic Regsression , Random Forest , Naïve Bayes and K-Nearest Neighbor algorithms based on the accuracy rates in figures 19,20,21 above.

6.1.1.1 Logistic Regression

Logistic regression is a classification algorithm that analyzes data using independent variables, generally using a system of 2. The mathematical formula of logistic regression is as follows.

$$\theta_i = \frac{1}{1 + \exp\left[-\left(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ij}\right)\right]}$$

Figure 22 Formula of Logistic Regression

6.1.1.2 Random Forest

The random forest algorithm creates the model using the collective learning method by creating more than one decision tree. It divides the dataset into multiple parts and estimates each one with a different decision tree. Therefore, it generates different values each time.
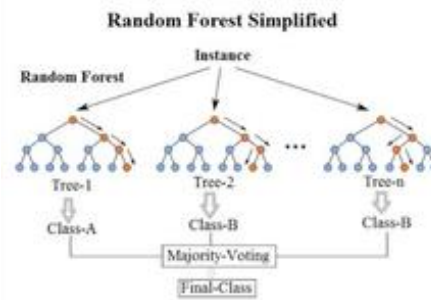

Figure 23 Random Forest

6.1.1.3   Naïve Bayes

Naïve Bayes algorithm is a probability-based classification algorithm. When the data set is given, it checks the data and calculates which class it is most likely to be in according to the argument given by the user. With this method, it predicts which class the new data received from the user belongs to.

Figure 24 Naïve Bayes Formula

6.1.1.4   K-Nearest Neighbor

The K-Nearest Neighbor algorithm makes classification by calculating the distance between the new data and the existing data in the data group. The data closest to the data is calculated and the class of the new data is determined as the class with the closest one. Euclidian, minkowski and Manhattan methods are used to calculate the distance.

Figure 25 Distance Formula
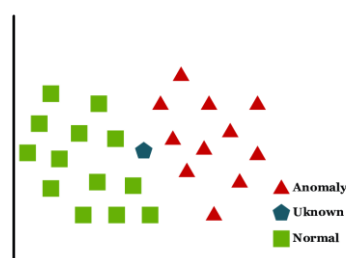
Figure 26 K Nearest Neighbor

6.2   CHATBOT

We used phyton language and libraries to make chatbot in our project. . The operations we do for the chatbot in its simplest form; Using the NLTK library in Python, we split sentences into words with the tokenize function, and root words with the stemmer function. We then specified a function and indexed the tokenized and requested sentences.

6.2.1 Stemming Algorithm

There are certain algorithms to best detect natural language. Stemming algorithms are one of them. Setmming algorithm is used to reduce words to root. For example, in all three, wait reduces the words wait and wait to root wait. There are different types of Stemming algorithm.

6.2.1.1   Porter Stemmer

The Porter Stemmer algorithm is a natural language detection algorithm based on the oldest in history. This algorithm takes words to their roots to understand natural language. There is no Turkish language support in the porter stemmer algorithm. The working principle of the Porter Stemmer algorithm consists of 5 steps. You can see these steps in Figure 27.
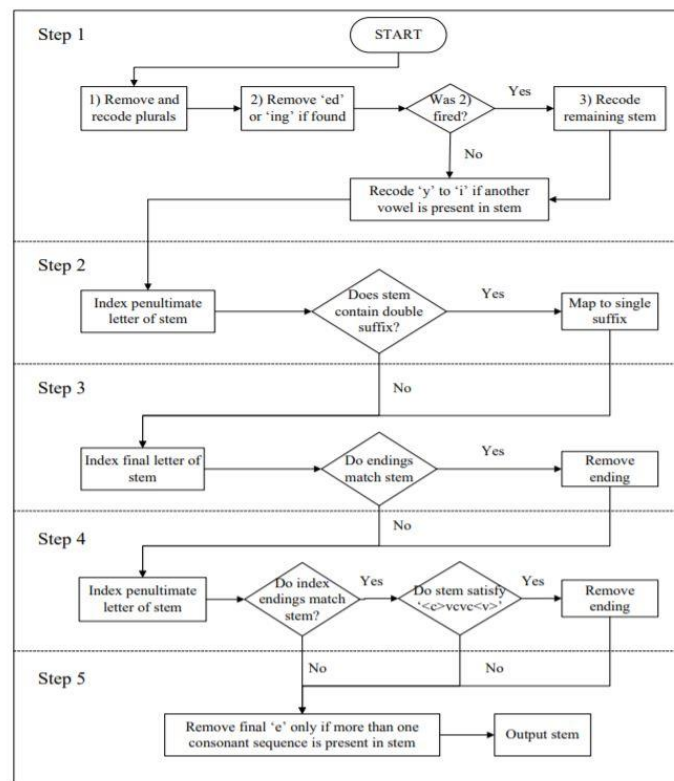
Figure 27 Porter Stemmer Algorithm Phase

6.2.2 Tokenizer Algorithm

Tokenizer Algorithm is a very helpful algorithm in processing and understanding natural language. It is very difficult to process sentences or paragraphs received from the user as sentences. We can split a

paragraph or sentence word for word, recognize and select punctuation, so we can access the word in a sentence and find its root. In this sense, it is an algorithm that can be preferred. We use word_tokenize while using the tokenizer algorithm. This function separates each word in sentences one by one. The sent_tokenize function is used to separate the given sentences.

6.2.3 Artifical Neural Network

It is a technique developed based on the human brain. It works by imitating the working logic of the human brain. Artificial neural networks perform mathematical operations in many processing units and combine them in some way to produce a result. Artificial neural networks are machine learning. The working logic of artificial neural networks is shown in the figure below.
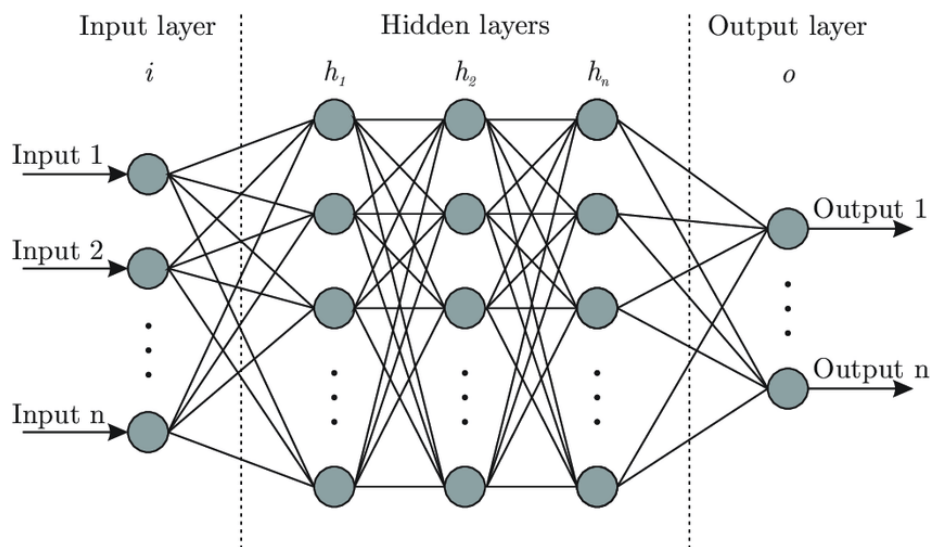
Figure 28 Artificial Neural Network

If we explain the working logic of artificial neural networks; It is a structure with certain layers. It has 3 layers. First, it starts with the Input layer. We transfer the information coming from outside to other layers starting from this layer. No calculation is made in this layer, it just transmits the incoming information to the hidden layer. There can be more than one hidden layer. This varies according to the project. Calculations can be made here and it transmits the information from the input layer to the output layer. The output layer, on the other hand, re-exports the calculations made of the incoming information. The important point here is that there can be one input layer and one output layer.,

The specific questions to ask the chatbot and the answers to be received are kept in a json file. You can see it in Figure 29.

Figure 29 Json File

Below is a code snippet of how to split and index words in figure 30.

Figure 30 Chatbot code part

You can see that we are using the Pytorch library in the following lines of code. The reason why we use the pytorch library is that it is similar to python in writing style and can be used in the backend for its functional features such as cpu and gpu. At the same time, we preferred pytorch because it can easily create the neural network model that we will use in our chatbot.

In the code line below, we processed the sentence we received with the input and .php file extension on the server side. And we returned an answer. One of the difficulties we had while doing these operations was sending data from a .php file to the .py extension. Only the first word of the data entered as a sentence could be sent to the .py file. We have developed the solution between lines 36-48 below to resolve this issue.

```python
import random #Rastgele atayacağımız şeyler için kütüphaneyi import ediyoruz.
import json # sözlük olarak oluşturduğumuz dosyanın uzantısını import ediyoruz.
import torch #Kullanacağımız pyTorch kütüphanesini import ediyoruz.
from model import NeuralNet #model.py dosyasından NeuralNet fonksiyonunu import ediyoruz.
from nltk_utils import bag_of_words, tokenize #ntlk_utils.py klasöründen kullanacağımız fonksiyonları import ediyoruz.
import sys #argümanlar için kullanacağımız sys modülünü import ediyoruz.


#GPU için kontrol gerçekleştiriyoruz.
device = torch.device('cuda' if torch.cuda.is_available() else 'cpu')

with open('intents.json','r') as f: #json file içinde yazmış olduğumuz tagları ,cümleleri ve cevapları bu kodu kullanarak dosyayı açıyoruz ve oku
    intents = json.load(f)  #intents içinde bulunan herşeyi yüklüyoruz. Bu kısmı çalıştırdığımızda terminalde cevapları görebiliyoruz.

FILE = "data.pth"
data = torch.load(FILE) #Nesneleri diske kaydeder.

#data klasörünün içinden bunları çekiyoruz.
input_size = data ["input_size"]
hidden_size = data ["hidden_size"]
output_size = data["output_size"]
all_words = data["all_words"]
tags = data["tags"]
model_state = data["model_state"]

model = NeuralNet(input_size, hidden_size, output_size).to(device)
model.load_state_dict(model_state)
model.eval() #Kendisine verilen karakter dizisini değerlendirir ve bir sonuç verir.


#print("Let's chat! type 'quit! to exit ")

#print("uzunluk  argv : " ,len(sys.argv))
```

```python
#print("Let's chat! type 'quit! to exit ")

#print("uzunluk  argv : " ,len(sys.argv))

uzunluk = len(sys.argv)

gelensentence = " "
if uzunluk > 0 :
    j=1
for i in range(1,uzunluk):

    x = sys.argv[i]
    #print ("Arguman ayrimi : " , x)
    gelensentence=gelensentence+x
    gelensentence=gelensentence+" "
#print(gelensentence)
newsentence = gelensentence



sentence = newsentence
#print("while dan sonraki sentence " , sentence)
if sentence == 'quit':
    print("aaa")

sentence = tokenize(sentence)
X = bag_of_words(sentence, all_words)
X = X.reshape(1,X.shape[0])
X = torch.from_numpy(X).to(device)

output = model(X)
_, predicted = torch.max(output, dim=1)
tag = tags[predicted.item()]
```

Figure 31 Chatbot Code Part 2

When the user asks his question through the interface, the shell_exec command will run, which enables the .py file to run from within the php file. In the py extension file, the sentence will be divided into words and a decavp will be returned and this answer will be printed in a txt file. After these processes are finished, the commands in the php file will continue to work and will read the response sent from the txt file and transfer it to the interface.

7   SCEERENSHOTS

At this stage of the report, there will be pictures and explanations describing how the project works step by step.
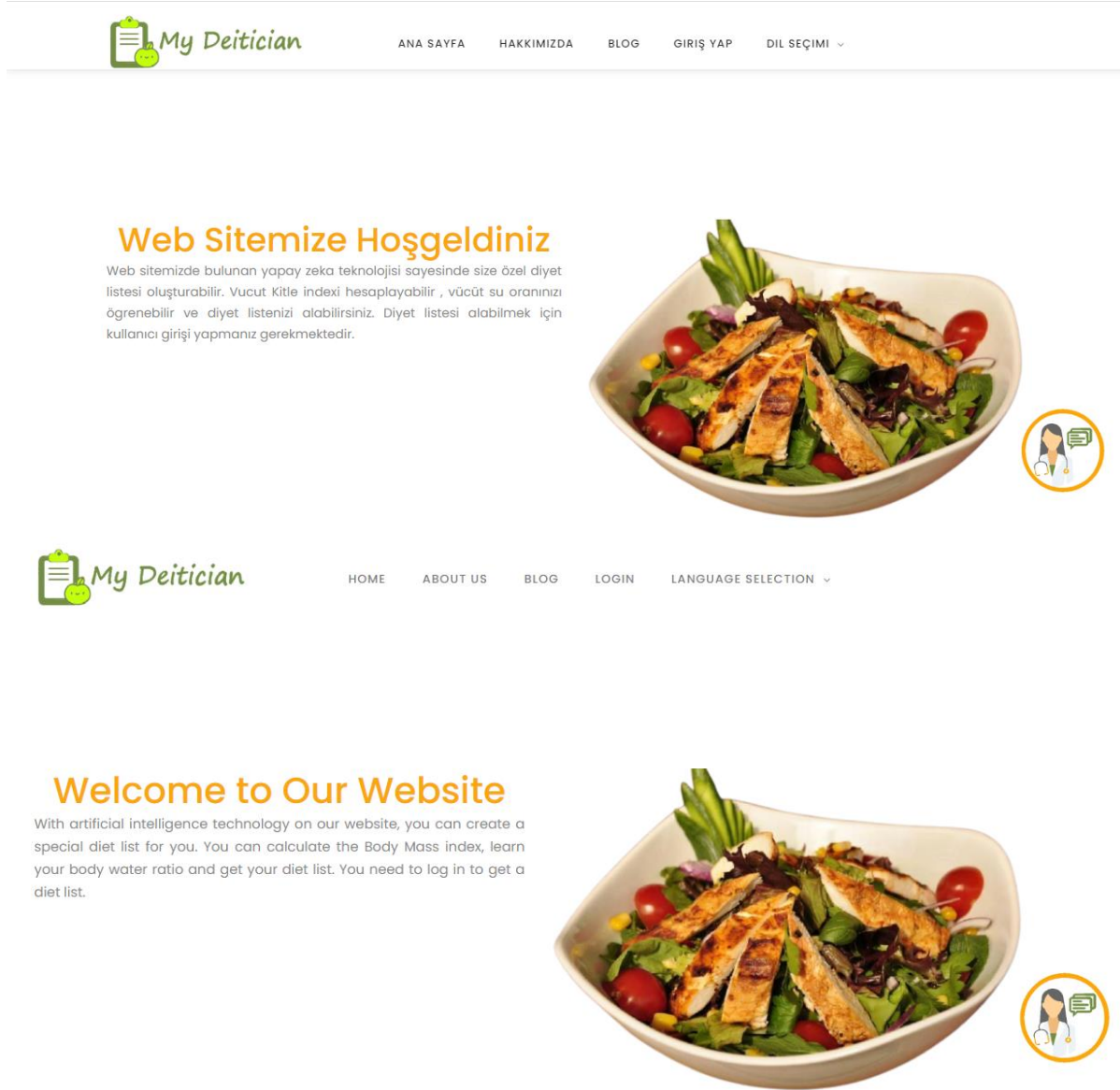

Figure 32 Home Page

The login screen of our website is as above. The website has Turkish and English language support. You can change the language of the website with the language selection button. The pages that you can access without creating a membership on the website are the Homepage, About Us, Blog and Chatbot pages.
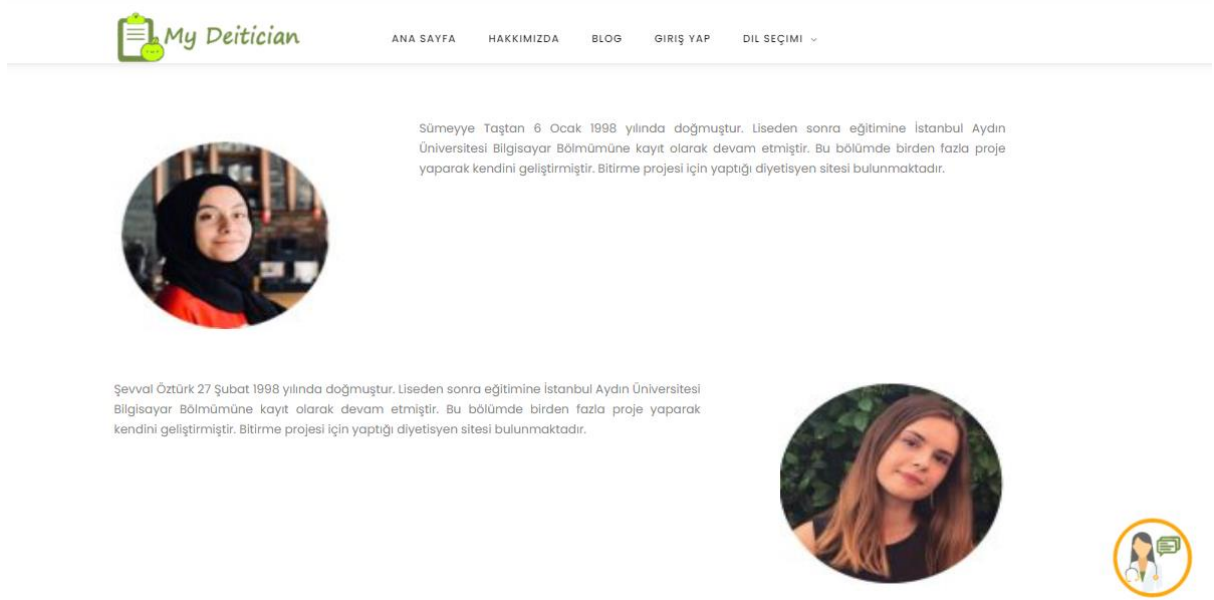
Figure 33 About Page

The about us page on the website contains brief summary information about the website's designers and developers.
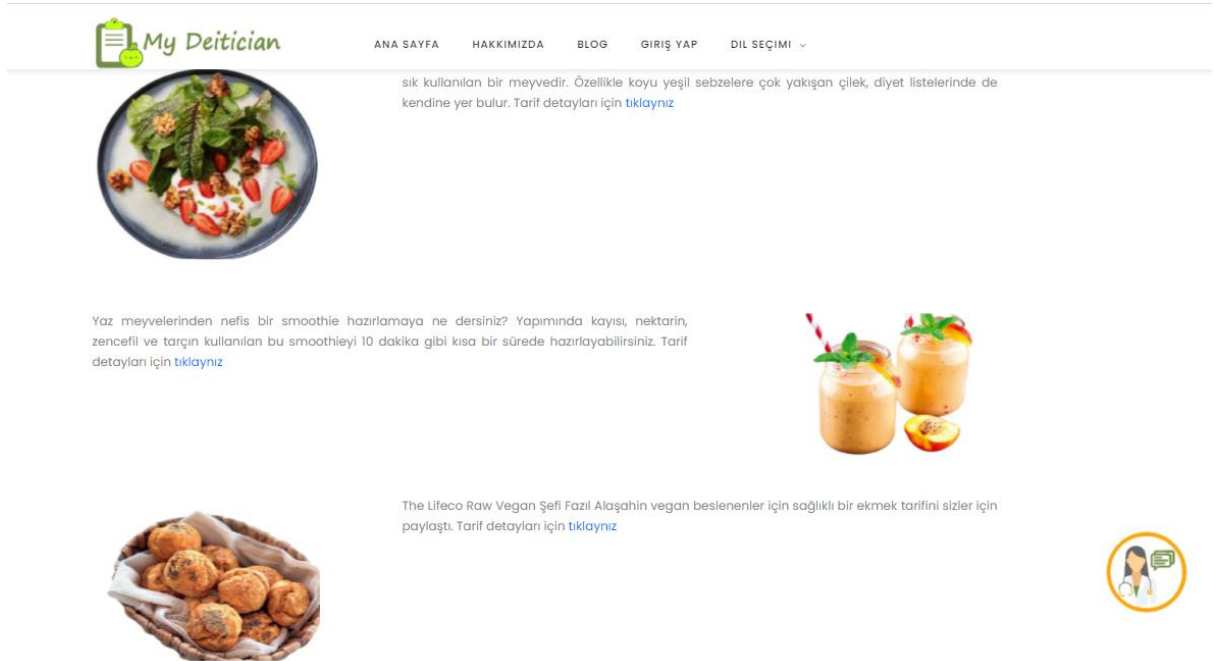

Figure 34 Blog Page

There are quick, practical and healthy recipes that you can add to your diet list on the blog page on the website.

Figure 35 Chatbot Button
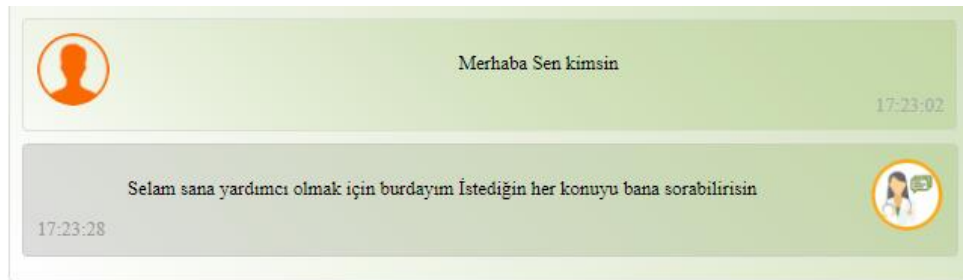
Figure 36   Chatbot Page

Figure 37 Chatbot Page

Chatbot also supports English and Turkish languages as on the website. The above example shows the response asked and received to the chatbot. The same answer cannot be given to the same question twice. You can see this in the example below.

Figure 38 Chatbot Page

No membership registration is required to access all the pages mentioned and shown above. Now I will show the changed menu and the page that comes up after the member registration.
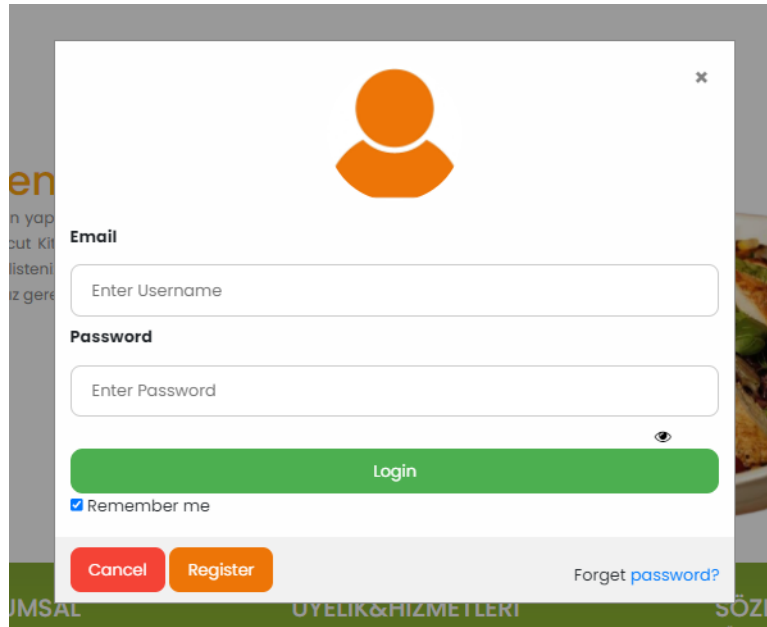
Figure 39 Login Page

In order to be a member, you must first become a member by clicking the register button.

Figure 40 Register Page

The registration screen is as above. There are some drums that we check while registering in the project. For example, if you do not approve the membership agreement, your registration will not be made and you will be greeted with an error screen. The other checked situation is whether a membership has been made with this e-mail address before. Another check is if the password is long enough and it matches the password entered for the second time. In the following screen condition, you can see the screen that will appear in front of a user who is stuck in one of the controls and cannot become a member.

HATA !

Bu mail adresi kullanılarak bir üyelik bulunmaktadır veya beklenmedik bir hata meydana gelmiştir

Anasayfa Dönmek İçin

TIKLAYINIZ

Figure 41 Register Error

Now, you can see the screenshot that will appear on the screen after the registration process, which proceeds without getting stuck on any control screen while making the subscription process.

TEBRİKLER !

Üye Kaydınız Başarılı bir şekilde gerçekleştirildi.Mail Adresinize aktivasyon için gerekli link gönderilmiştir lütfen aktivasyon işlemini gerçekleştiriniz

Anasayfa Dönmek İçin

TIKLAYINIZ

Figure 42 Register Succes

In order to complete your membership registration, an e-mail is sent to the e-mail address you entered while registering. You can complete your registration by completing your activation process via this e-mail. In the database information below, the status of the last registered member is defined as "0", that is, he has not completed the activation process yet.

id	namesurname	pass	email	durumu	kayitTarihi	kayitIpAdresi	aktivasyonkodu
Sil 39	pain gain	$2y$08$ryDQTVItjrcF4yulxynEquBDS0gPx97hMDE9GrLjbvP...	paingainsoftware@gmail.com	1	1621883443	::1	99999-26315-53018
Sil 40	Şevval Öztürk	$2y$08$b7pwqpTbF4.1dr1phJkJuOpGvTtemUGuCdAwbNYk5yO...	sevvalozturkc@gmail.com	1	1622575273	::1	99999-85827-24171
Sil 43	Sümeyye Taştan	$2y$08$Qrksr1cLSiMXdi0LmyicrurtCxFhC7NNNgbjP4SauzH...	sumeyyetastanc@gmail.com	0	1623083768	::1	99999-90607-70678

Figure 43 User Database Before Activation
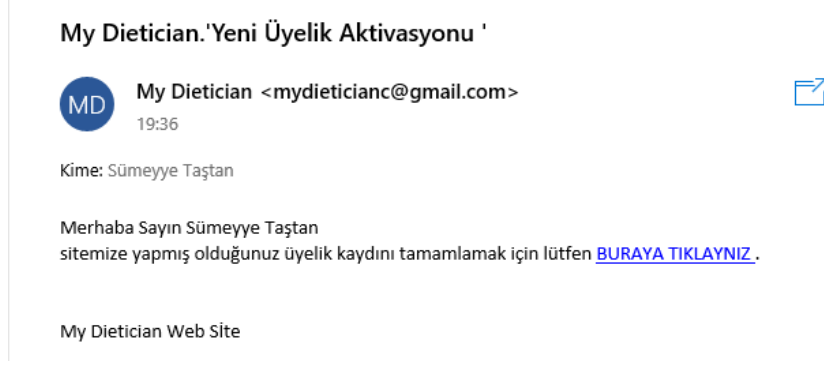
Figure 44 Activation Mail

Figure 45 Activation Page

When you click on the link in the e-mail, it will direct you to this address and perform the activation process. Below you can see the activation process in the database.

Figure 46 User Database After Activation

After completing the membership process, the My Account page will appear on the screen. At the same time, the menu bar will change and the "My Account" and "Log Out" button will appear on the menu.
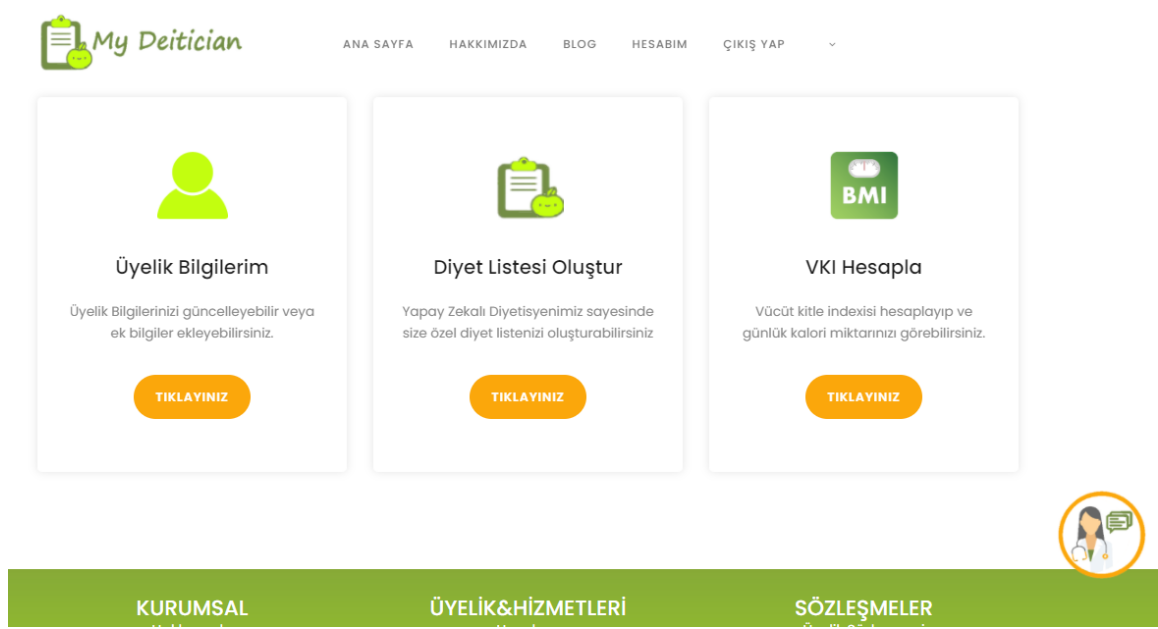
Figure 47 Accaount Page

You can perform 3 different operations on this page. You can view your membership information, create a diet list or calculate a body mass index.

Figure 48 Take Diet List Page 1

2/3

Lütfen Doğum tarihini giriniz ?

Doğum günü (tarih ve saat): 06.01.1998 20:33 📅

‹   ›

1/3

Lütfen Yaşadığınız Yeri Seçiniz

Şehirler :   Doğu Anadolu ⌄

‹   ›

1/3

Lütfen Kan Grubunuzu Seçiniz

Kan Grubu: 0 Rh- ⌄

‹   ›

Lütfen Kilo ve Boyunuzu Giriniz

Kilo(kg):   52

Boy(cm):   165

Figure 49 Take Diet List Page 2

Figure 50 Take Diet List Page 3

When you first enter the Create diet list page, you will be asked for additional information with the screenshots above, and when you enter this information, a diet list will be given to you thanks to the machine learning on the back. Once you have entered this information, click this button and you will be given your diet list directly.

Figure 51 Diet List 1

Akşam Yemeği			
	Çorba	150	1 kase
	Balık Buğulama	204	1 tabak (4 köfte büyüklüğünde)
Ara Öğünler ve Atıştırmalıklar			
	Yeşillikli salata	60	1 tabak (200 gr)
	Sütlü Tatlı	120	100 gr (küçük kase)
	Kepekli Ekmek	54	1 ince dilim
	Badem , Ceviz veya Fındık	80	8 adet

Diyet Listeniz Toplamda : 1475 kaloridir .   **Diyet Listeniz haricinde ek: 162.251 kalori hakkınız bulunmakatdır .**

Figure 52 Diet List 1

In the classification, the meat-based diet of this user was found to be correct and a diet list was given based on this. In addition, this diet list was given in accordance with the prediction of which salty the user would like to eat, which type of bread he would prefer and which would be preferred as a snack. Each time the user presses the create diet list button, a different diet list will be given to the user.

My Deitician   ANA SAYFA   HAKKIMIZDA   BLOG   HESABIM   ÇIKIŞ YAP

BMI

Vucut Kitle İndexi

NORMAL

KURUMSAL   ÜYELİK&HİZMETLERİ   SÖZLEŞMELER

Figure 53 BMI Page

When you click on the calculate body mass index button, your weight is calculated and shown to you whether it is normal or not.

The website is simple to use as in the screenshots above.

Cinsiyet	Yaş	Kilo	boy	Kan Grubu	Memleket	Soru1	Soru2	Soru3	Soru4
Kadın	22	48	160	0 + Rh	İstanbul	Evet	Dana Eti, Balık, Tavuk	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Kadın	22	51	165	0 - Rh	Erzurum	Evet	Dana Eti, Tavuk	Patlıcan, Karnabahar, Man	Nohut, Fasülye, Mercimek,
Kadın	22	55	163	A + Rh	Trabzon	Evet	Balık, Tavuk	Taze Fasülye, Patlıcan, En	Fasülye, Mercimek, Bezel)
Kadın	18	48	168	0 + Rh	istanbul	Hayır	Dana Eti, Tavuk	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	18	61	180	0 + Rh	Trabzon	Hayır	Koyun Eti	Taze Fasülye, Karnabaha	Nohut, Fasülye, Mercimek,
Erkek	22	114	175	B + Rh	Sinop	Evet	Dana Eti, Balık, Tavuk	Karnabahar, Mantar, Brok	Nohut, Mısır
Erkek	18	65	176	0 + Rh	Makedonya	Hayır	Dana Eti, Kuzu Eti, Tavuk	Taze Fasülye, Patlıcan, Pa	Nohut, Fasülye, Mercimek,
Kadın	16	45	162	0 - Rh	Erzurum	Evet	Tavuk	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	18	82	185	0 + Rh	Bursa	Evet	Dana Eti	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Kadın	23	52	163	0 + Rh	Malatya	Hayır	Kuzu Eti	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	16	95	180	B + Rh	Erzurum	Evet	Koyun Eti, Dana Eti,	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	18	70	183	B + Rh	Bitlis	Hayır	Koyun Eti, Dana Eti, Kuzu	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Kadın	30	59	160	0 + Rh	Erzurum	Hayır	Koyun Eti, Dana Eti, Kuzu	DereOtu / Maydanoz / Kıvı	Fasülye, Mercimek, Barbu
Kadın	19	65	161	0 + Rh	İstanbul	Evet	Balık, Tavuk	DereOtu / Maydanoz / Kıvı	Mercimek
Kadın	43	95	165	0 - Rh	istanbul	Evet	Dana Eti, Balık, Tavuk	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek
Kadın	19	65	161	0 + Rh	İstanbul	Evet	Balık, Tavuk	DereOtu / Maydanoz / Kıvı	Mercimek
Erkek	17	98	186	AB - Rh	Makedonya	Evet	Koyun Eti, Dana Eti, Kuzu	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Kadın	17	51	160	0 + Rh	Diyarbakır	Evet	Koyun Eti, Dana Eti, Balık,	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	22	83	180	AB - Rh	Bitlis	Hayır	Koyun Eti, Dana Eti, Kuzu	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	19	71	170	A + Rh	Samsun	Evet	Dana Eti, Kuzu Eti, Balık, 1	DereOtu / Maydanoz / Kıvı	Nohut, Fasülye, Mercimek,
Erkek	22	63	178	A + Rh	Samsun	Hayır	Koyun Eti, Dana Eti, Balık,	Taze Fasülye, Patlıcan, Isı	Fasülye, Mercimek, Mısır

Soru6	Soru7	Soru8	Soru9	Soru10	Soru11	Soru12	Soru13	Soru14
Haftada 2-3 Gün	Kahvaltı Tercih Etmiyorum	10:00-12:00	Öğlen yemeği yemiyorum	17:00 - 19:00	Pilav	Beyaz Ekmek	Tatlı yemek	Kuru Yemiş
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Pilav	Beyaz Ekmek	Tatlı yemek	Kuru Yemiş
Ayda 1	Peynir/ Zeytin ve Klasik k	12:00-14:00	13:00-15:00	19:00 - 21:00	Makarna	Kepekli Ekmek	Tatlı yemek	Kuru Yemiş
Haftada 1 gün	Peynir/ Zeytin ve Klasik k	08:00-10:00	13:00-15:00	17:00 - 19:00	Makarna	Beyaz Ekmek	Ekmek	Yaş Meyve
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	13:00-15:00	19:00 - 21:00	Makarna	Beyaz Ekmek	Çaya veya Kahveye Şeke	Kuru Yemiş
Hergün	Kahvaltı Tercih Etmiyorum	Kahvaltı yapmıyorum	13:00-15:00	19:00 - 21:00	Pilav	Beyaz Ekmek	Hiçbiri	Yaş Meyve
Haftada 2-3 Gün	Sıcak kahvaltılık Ürünler (1	08:00-10:00	13:00-15:00	19:00 - 21:00	Pilav	Beyaz Ekmek	Çaya veya Kahveye Şeke	Kuru Yemiş
Haftada 2-3 Gün	Sıcak kahvaltılık Ürünler (1	12:00-14:00	Öğlen yemeği yemiyorum	17:00 - 19:00	Makarna	Ekmek Kullanmıyorum	Tatlı yemek	Kuru Yemiş
Hergün	Yulaf - Mısır Gevreği	10:00-12:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Hiçbiri	Kepekli Ekmek	Hiçbiri	Kuru Yemiş
Haftada 1 gün	Sıcak kahvaltılık Ürünler (1	08:00-10:00	13:00-15:00	Akşam yemeği yemiyorum	Makarna	Kepekli Ekmek	Tatlı yemek	Yaş Meyve
Hergün	Peynir/ Zeytin ve Klasik k	08:00-10:00	13:00-15:00	17:00 - 19:00	Pilav	Kepekli Ekmek	Hiçbiri	Kuru Yemiş
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	13:00-15:00	19:00 - 21:00	Makarna	Beyaz Ekmek	Hiçbiri	Kuru Yemiş
Hergün	Peynir/ Zeytin ve Klasik k	10:00-12:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Makarna	Beyaz Ekmek	Tatlı yemek	Yaş Meyve
Ayda 1	Sıcak kahvaltılık Ürünler (1	08:00-10:00	13:00-15:00	17:00 - 19:00	Pilav	Ekmek Kullanmıyorum	Hiçbiri	Kuru Yemiş
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	08:00-10:00	13:00-15:00	19:00 - 21:00	Makarna	Beyaz Ekmek	Tatlı yemek	Kuru Yemiş
Ayda 1	Sıcak kahvaltılık Ürünler (1	08:00-10:00	13:00-15:00	17:00 - 19:00	Pilav	Ekmek Kullanmıyorum	Hiçbiri	Kuru Yemiş
Hergün	Peynir/ Zeytin ve Klasik k	10:00-12:00	13:00-15:00	19:00 - 21:00	Makarna	Beyaz Ekmek	Tatlı yemek	Kuru Yemiş
Haftada 1 gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Hiçbiri	Kepekli Ekmek	Hiçbiri	Kuru Yemiş
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	Öğlen yemeği yemiyorum	17:00 - 19:00	Pilav	Beyaz Ekmek	Tatlı yemek	Yaş Meyve
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	13:00-15:00	19:00 - 21:00	Pilav	Ekmek Kullanmıyorum	Tatlı yemek	Kuru Yemiş
Hergün	Peynir/ Zeytin ve Klasik k	08:00-10:00	13:00-15:00	19:00 - 21:00	Makarna	Beyaz Ekmek	Tatlı yemek	Kuru Yemiş
Haftada 2-3 Gün	Peynir/ Zeytin ve Klasik k	10:00-12:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Makarna	Beyaz Ekmek	Çaya veya Kahveye Şeke	Kuru Yemiş
Ayda 1	Peynir/ Zeytin ve Klasik k	08:00-10:00	Öğlen yemeği yemiyorum	19:00 - 21:00	Pilav	Ekmek Kullanmıyorum	Hiçbiri	Yaş Meyve

Figure 54 Dataset 1

Kan Grubunuz	Bölge olarak nerelisiniz	Hangisini Yemeyi Tercih E	Hangi ürün diğerlerine gör	Hangi çeşit salatayı yemeği tercih edersiniz
0 - Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
B + Rh	Güney Doğu Anadolu Böl	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
B + Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
0 - Rh	Doğu Anadolu Bölgesi	Sebze	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
0 - Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
0 + Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
0 + Rh	Karadeniz Bölgesi	Et	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
A + Rh	Marmara Bölgesi	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
A + Rh	Karadeniz Bölgesi	Et	Sebze Yemekleri	Yeşillikli Salatalar
A + Rh	Doğu Anadolu Bölgesi	Sebze	Baklagiller (Kuru fasulye	Yogurtlu salatalar
A + Rh	Doğu Anadolu Bölgesi	Baklagil	Et	Yeşillikli Salatalar
A + Rh	Karadeniz Bölgesi	Et	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
0 + Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
0 + Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
0 + Rh	Marmara Bölgesi	Et	Sebze Yemekleri	Yogurtlu salatalar
AB - Rh	Doğu Anadolu Bölgesi	Sebze	Baklagiller (Kuru fasulye	Yeşillikli Salatalar
B + Rh	Ege Bölgesi	Sebze	Baklagiller (Kuru fasulye	Yogurtlu salatalar
AB + Rh	Marmara Bölgesi	Et	Et	Yeşillikli Salatalar
A + Rh	İç Anadolu Bölgesi	Et	Et	Yeşillikli Salatalar
B - Rh	Doğu Anadolu Bölgesi	Sebze	Sebze Yemekleri	Yeşillikli Salatalar
B + Rh	Doğu Anadolu Bölgesi	Et	Sebze Yemekleri	Yogurtlu salatalar
A - Rh	Doğu Anadolu Bölgesi	Et	Et	Yeşillikli Salatalar
B + Rh	Doğu Anadolu Bölgesi	Et	Baklagiller (Kuru fasulye	Yogurtlu salatalar
0 + Rh	Marmara Bölgesi	Baklagil	Sebze Yemekleri	Yogurtlu salatalar

Figure 55   Dataset 2

In addition, there are datasets that we use for machine learning and classify above.

8   CONCLUSION

As a result, our website has been designed and made available to help those who stay at home and lose weight during the pandemic period. Users of our website can chat with the chatbot as if they are talking to a dietitian and can create a special diet list for themselves. We used machine learning and natural language processing techniques to enable our website to perform these operations. Based on the blood types and hometowns of the users, we estimated whether the users could be fed mainly meat, vegetables and legumes. We reached an accuracy rate of more than 60 percent. In order to create a diet list, we created a personalized diet list by estimating the other eating habits of the users.

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