Artificial Dietician System

Final Year Project

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Plagiarism Free Certificate

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Project Report

Artificial Dietician System

Change Record

Author(s)	Version	Date	Notes	Supervisor's Signature
	1.0			

APPROVAL

PROJECT SUPERVISOR

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_____

Name:_____

Date:_____ Signature:_____

PROJECT MANAGER

Comments: _____

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Date:_____ Signature:_____

HEAD OF THE DEPARTMENT

Comments: _____

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Date:_____ Signature:_____

Dedication

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents, I also dedicate this dissertation to my supervisor and teachers who have supported me throughout the process. I will always appreciate all they have done, especially Muhammad Ali Amir for helping me develop our project prototype, Aiza Fizza for making UML diagrams for idea generating for our project.

Acknowledgements

We would first like to express my gratitude to my project supervisor Sir Jameel for the useful comments, remarks and given constant encouragement throughout this entire process. We also take this opportunity to express a deep sense of gratitude to the Superior University offering an opportunity to carry out this project. We would also like to thank the experts and participants who were involved in providing required information for system implementation and evaluation. Without their passionate participation and input, We will not be able to do this job. I would also like to thank all group members who helped me in this work. Finally, we must express our deep gratitude to my parents for providing us with unfailing support and continuous encouragement throughout our project thesis. This achievement would not have been possible without them.

Executive Summary

An AI Dietician system helps people to evaluate user nutrition status and conditions and accordingly provides them with nutrition and diet advises. Moreover, it will help people to save their time as they will not need to visit the doctor to evaluate their nutrition conditions. The general idea of the nutrition expert system is asking users many questions related to age, weight, height, gender, and exercise time and type, and accordingly advise them. Knowledge acquisition in any domain including nutrition is not an easy process.

We may face the need to continuously update the knowledge base of the expert system. Nevertheless, in domains where knowledge is well established, the development of an expert system offers many benefits to people such as increased timeliness, increased productivity of experts, improved consistency in decisions, improved understanding, and improved management of uncertainty and formalization of knowledge. In nutrition support, the main benefits of expert system are substantial time savings for people and clinicians and an improved quality of care; an expert system's ease of use, robustness, integration, and the maintainability by the clinical experts are the main factors for its success. Also this kind of system is required particularly in view of large rural population with no access to medical help.

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Chapter 1

Introduction

Chapter 1: Introduction

The artificial dietician is a system with artificial intelligence for human diets. It acts as a food regimen representative much like an actual dietician. Dieticians are knowledgeable with nutrient value of foods. A dietician consults someone primarily based totally on his schedule, frame type, peak and weight. The machine too asks all this statistics from the person and techniques it. It asks approximately what number of hour the person works, his peak, weight, age etc. The machine shops and techniques this statistics after which calculates the nutrient fee had to replenish customer's needs. The machine then indicates the appropriate food plan to the customers and asks if person is adequate with it, else it indicates different trade diets to replenish customer's needs.

1.1. Background

In the present AI Diet Consultant gadget, you need to rent a dietitian on the way to get advice. Hiring a nutrients medical doctor will now no longer handiest waste some time and efforts for calling them, going to them and so forth however additionally fee you very excessive as their prices in line with month are very excessive.

The second can even arrive whilst they may now no longer to be had for you and you need to look for a few different dietitian urgently. In this gadget, a hard and fast term is described for the repetitive scanning of the documents with inside the gadget. After a certain period, the gadget calculates checksum for every and each document with inside the gadget, no matter whether or not it changed into accessed. Then the brand new checksum values are in comparison with the antique or reference checksum values so one can decide if the document with inside the gadget is changed or now no longer. For example, in the sooner dietitian has to accumulate consumer info for food plan. Approving the ones consumer info takes lot of time. Dietitian and consumer must seek advice from every different immediately if any statistics is needed. If any new consumer come for food plan agenda, dietitian and his body of workers has to go looking the consumer info and that they must discover the

dietitian agenda for that unique food plan. Here looking for eligible food plan takes masses of time. And from time to time a few users' info can be missed.

According to cutting-edge fitness survey in Pakistan there are greater than 70% of human beings be afflicted by one or the alternative disease. This is due to the fact they don't realize how a whole lot they ought to eat. People keep away from going to nutritionists or food plan planner due to their excessive fees.

1.2. Motivations and Challenges

This system is recommender system which suggest a proper diet to the person according to his/her schedule, body type, height and weight. The patients have to visit the doctor for their diet and they face many difficulties related time and other etc.

1.3. Goals and Objectives

The Objective of this application is to provide an expert system who can work as a dietician and recommend a diet plan according to the person's health. There is no need to pay high fees of dietician in order to get an advice.

1.4. Literature Review/Existing Solutions

In existing system people need to go to the human expert which is waste a much time and money. There is no full-time availability of Nutrition. Also, the human expert is not always accurate.

1.5. Gap Analysis

In old systems people have to visit the dietician for their suggestion. They have to pay high fees. And it was a time consuming process.

1.6. Proposed Solution

The proposed machine is completely programmed, which eliminates all of the downsides of present machine. Throughout this proposed machine of computing eating regimen consultant, the usage of the method of pc science, you may get entry to any or all the centers through this application that is actually furnished with the aid of using a person's dietitian. No want of consulting medical doctor for eating regimen plans. This machine affords complete information of the nutrient charter in frame and if required extra or now no longer alongside the plan with the aid of using simply answering to a few queries It additionally Saves cash and really powerful and provide correct consequences as it's miles coded with retaining eating regimen chart in mind. There are opportunity eating regimen chart furnished with the aid of using the machine if the consumer do not like any.

1.7. Project Plan

1.7.1. Work Breakdown Structure

2. Project Management

2.1. Work Breakdown Structure (WBS)

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3. Reports / Documentation

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3.6. Testing & Performance Evaluation

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4.1. Development Environment

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4.3. Business Logic Layer

4.4. Data Management Layer

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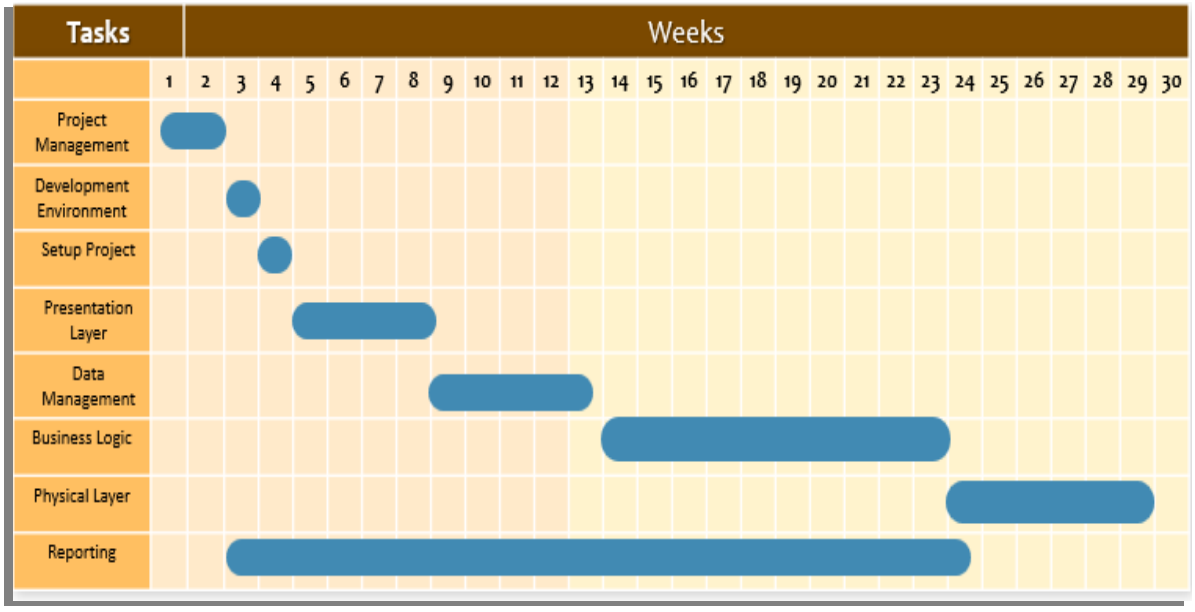
1.8 Roles & Responsibility Matrix

WBS #	WBS Deliverable	Activity #	Activity to Complete the Deliverable	Duration (# of Days)	Responsible Team Member(s) & Role(s)
1	Project Management	1	Analyze Requirements And divide work	14	All
2	Development Environment	2	Selecting Environment and Version	7	All
3	Setup Project	3	Setting Connection to Database and Setting Project	7	Muhammad Ali
4	Presentation layer	4	Designing Front –End	28	Muhammad Ali/Tayyaba Tahira
5	Data Management	5	Design Datasets	35	Aiza Fizza/Tayyaba Tahira
6	Business Logic	6	Code the project	70	All
7	Physics layer	7	Get Hosting and Domain	42	All
8	Reporting	8	Report about the project	154	Aiza Fizza/ Tayyaba Tahira

1.9 Gantt Chart



Chapter 2

Software Requirement Specifications

Chapter 2: Software Requirement Specifications

2.1 Introduction

2.1.1 Purpose

The reason is “Artificial Intelligence Dietician” permit the consumer to recognize approximately his/her real weight loss program statistics i.e. how a great deal consumer had energy of their frame in this foundation machine shows exercising and meals suggestions. This software program package deal is a robust sufficient to resist regressive facility for the Handicapped Peoples. This software program reduces the time span and fee for professional advices for weight loss program. This web page is rather treasured to wellness cares and dietician. This product diminishes the time compass and fee for grasp advices for ingesting routine.

2.1.2 Document Conventions

The font used in this Report is Calibri. The main heading is of 16pt. The subheading is of 14pt. The point inside the subheading will be written in round bullets. The Title of the chapter is Bold with the font size of 20pt. The Diagrams are drawn on Visio and Draw.io.

2.1.3 Intended Audience and Reading Suggestions

Our intended Audience include all the persons who have health issues and have no proper diet schedule. Food calorie and nutrition dimension system could be very useful for dietitians and sufferers to degree and manipulate the everyday meals intake.

2.1.4 Product Scope

The proposed machine is absolutely computerized, which gets rid of all of the drawbacks of current machine. In this proposed machine of synthetic intelligence eating regimen consultant, the use of the approach of synthetic intelligence, you'll get get admission to to all of the centers thru this utility that is in reality furnished with the aid of using a human dietitian. The predominant gain of the use of this standalone internet utility is that the time required with the aid of using the humans to journey to the dietitian could be decreased and additionally it reduces the fee of hiring dietitians for a few specific purpose. Also, this

internet utility gives multiple healthy diet weight-reduction plan additionally, for a few specific form of functionalities of human bodies.

2.1.5 References

"[1] Raman spectroscopy for determining nutritional facts By Moustakas, C. Dept. of Electr. & Comput.Eng., Univ. of Cyprus, Nicosia, Cyprus Pitris, C. and E-ISBN: 978-1-4244-5379-5; Print ISBN: 978-1- 4244-5379-5; INSPEC Accession Number: 11102584."

"[2] Jul 10, 2014 - Measuring Calorie and Nutrition from Food Image by Parisa Pouladzadeh,Shervin Shirmohammadi And Rana Almaghrabi and ISSN: 00189456; INSPEC Accession Number: 14432032."

2.2 Overall Description

2.2.1 Product Perspective

The important gain of the usage of this standalone internet software is that the time required through the humans to tour to the dietitian may be decreased and additionally it reduces the price of hiring dietitians for a few unique purpose. Also, this internet software gives multiple weight loss plan additionally, for a few unique form of functionalities of human bodies.

2.2.2 Product Functions

The following are the functions:

1. It calculates your BMI and tells you about your status.
2. Keep your record and update it on weekly or daily basis.
3. Analyze your health and give a diet plan according to your BMI
4. It has a chat bot which will answer the queries of the user using Artificial Intelligence and NLP

2.2.3 User Classes and Characteristics

Following is the list of classes we will be using in our Project:

- Users: All the Users will be first register and saved in database.
- BMI Record: BMI Record will be saved of user.
- Diet Chart: Diet Chart will be saved of individual users.

2.2.4 Operating Environment

The Web Browser that are supported are Chrome, Mozilla Firefox, Microsoft Edge and Safari.

The Server for Deployment should have Microsoft Windows 10, IIS Manager minimum 16GB of RAM and Minimum 1TB of Hard disk. It should also Microsoft SQL Server for Database management.

2.2.5 Design and Implementation Constraints

The Design should be in be HTML. The Technology is ASP.NET Core. The Server OS should be Microsoft Windows Server 2019 and Database should be Microsoft SQL Server 2014.

2.2.6 User Documentation

The User documentation or user guide will be given at the completion of all the deliverables. It will include all the training needed for the usage of the project. An IT Professional will also be there at the time of deployment for training. Any query at any time will be entertained after delivering project.

2.2.7 Assumptions and Dependencies

For the best Performance Good Internet Connection is needed. The Server bought either by client or company will charge according to the package you select. The Response time is also depending on the speed of your server and the device or system client is using. Browser support is also needed.

2.3 External Interface Requirements

2.3.1 User Interfaces

Its User Interface is as simple as it can be. Each Form has a submit and back button at the end for submitting any data a user wants to store. The UI includes drop down lists, JsGrids etc. Many information is shown in tabular form so it can readable. Dashboard will contain all the information user needed for its first sight.

2.3.2 Hardware Interfaces

On Computers or laptops all you will need a keyboard and a mouse. Mouse for selecting a specific column and keyboard to write anything. Keyboard can also be used to focus on field by pressing tab.

On mobile devices you can touch on screens to select and use its keyboard to write anything.

2.3.3 Software Interfaces

You will just need a browser which can be Google Chrome, FireFox, Opera etc.

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2.3.4 Communications Interfaces

All you need is just a web browser that supports Javascript and Jquery etc. On the server side you will be needed Sql server, Sql management tool, IIS server Manager.

2.4 System Features

Following are the Primary features of the product. These features should be implemented. Without implementation of these feature our system would be useless

2.4.1 Login with Credentials

The User Should be able to Login in his account with the credentials which he/she has set already.

2.4.1.1 Description and Priority

This is the first step and the most crucial part. Without Login the user will not be able to use application. So, it is on the highest priority to have ha proper login system

2.4.1.2 Stimulus/Response Sequences

The User will open the application or website by searching it on google or any preferred search engine. On opening application, the user will be redirected to login Page where he has to put his credentials. In case of successful login, the user will be redirected to his dashboard.

2.4.1.3 Functional Requirements

The Login System should be Secure and there should be no vulnerability to exploit.

2.4.2 Registration

Registration is also a fundamental part of this application. User has to register himself in order to use the services provided by the application.

2.4.2.1 Description and Priority

User will Register himself as a member to avail services. All users will be registered as a member and given rights of only members. The admin will only have the authority to make users with the roles of admin.

2.4.2.2 Stimulus/Response Sequences

The Login Page will have an option of new user. The New user will click on that link. That link will redirect him to the Register page where he will be registered as a member.

2.4.2.3 Functional Requirements

The Role given at the time of registration will only be of member. Only admin should have the authority to make another user with the roles of admin.

2.4.3 Chat Bot

The Application will have a chat bot to reply the queries of the user.

2.4.3.1 Description and Priority

The chat bot will be the significant feature of our product. The user can chat with the bot. which will answer the queries.

2.4.3.2 Stimulus/Response Sequences

The Chat bot will be aligned at a side. And the user can chat with the dietician in English to get the results.

2.4.3.3 Functional Requirements

The Chat bot should be efficient enough to solve queries of the users.

2.4.4 Diet Planner

The Application will analyze User diet and make sufficient diet plan for the user.

2.4.4.1 Description and Priority

In this feature, the user will update his information about is weight, blood pressure etc. And According to these attributes BMI and diet plan will be made.

2.4.4.2 Stimulus/Response Sequences

The User will select the update information option. After that he will give the information needed to calculate BMI and Diet. Then after that he will get the diet plan.

2.4.4.3 Functional Requirements

The Diet Plan should be accurate and efficient.

2.5 Other Nonfunctional Requirements

2.5.1 Performance Requirements

The performance should be very efficient. The Chat Bot and diet analysis should be very efficient. There should not be any lag between the processes otherwise it will be useless.

2.5.2 Safety Requirements

The Data should be backed up on monthly bases so there should not be any loss of data.

2.5.3 Security Requirements

Security is the major concern because any security breach can cause very fatal loss for company. The Company will collect some personal information so any breach can cause company a Law Suit.

2.5.4 Software Quality Attributes

The software should maintainable, portable and reliable. There should not be any flaw in the flow of the program. And it should be able to get updates in future.

2.5.5 Business Rules

Admin will have the full access on every feature. He can perform any CRUD operation. The Users will be able to update their information. They can also see their diet plan etc.

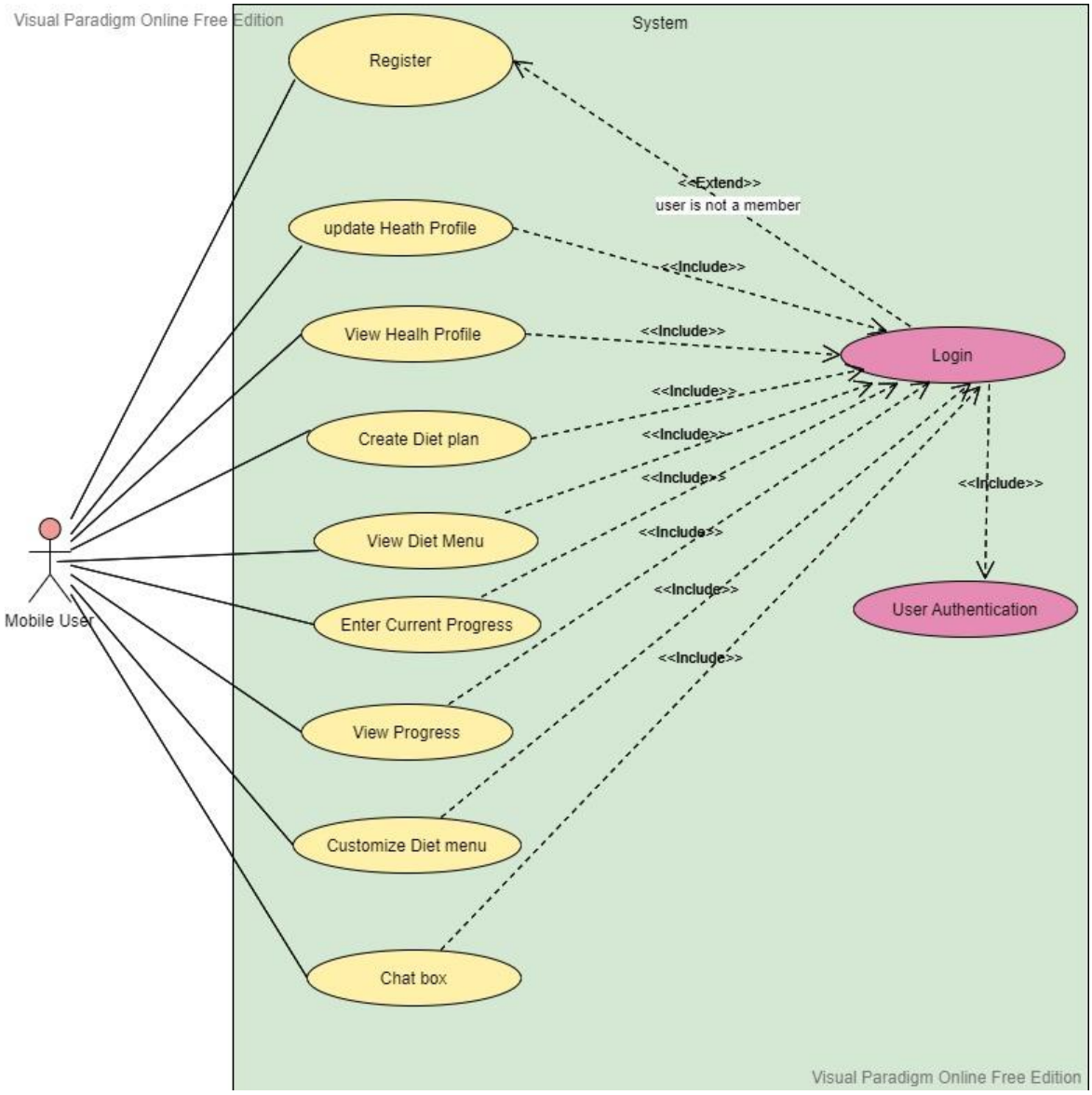
Chapter 3

Use Case Analysis

Chapter 3: System Analysis

In this chapter, we will discuss about use case scenarios according to our functional and nonfunctional requirements. We will register the users and then they can perform functionality.

3.1. Use Case Model



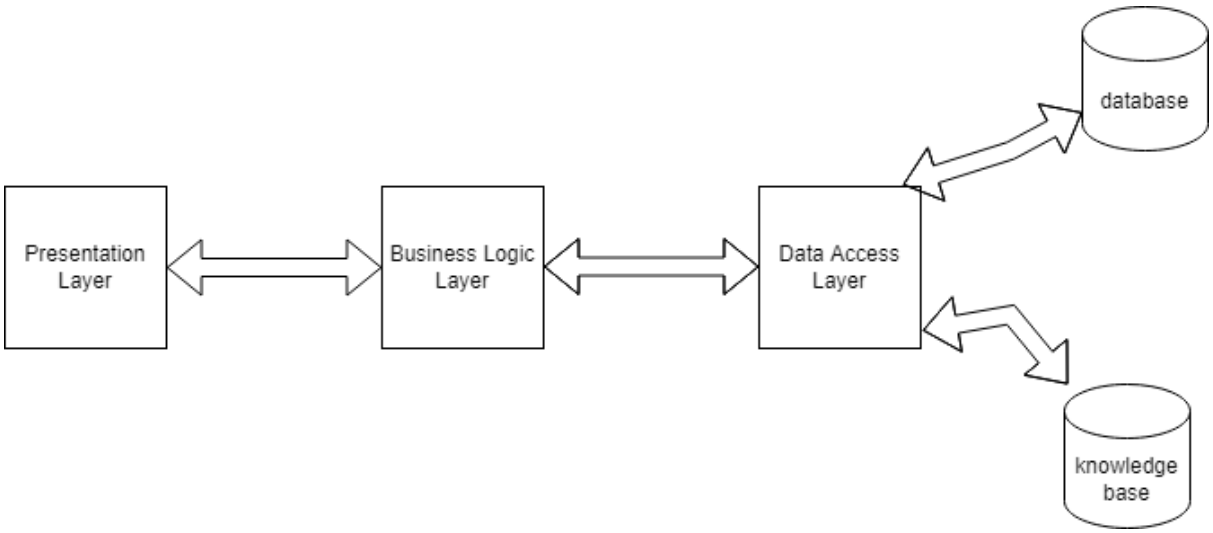
Chapter 4

System Design

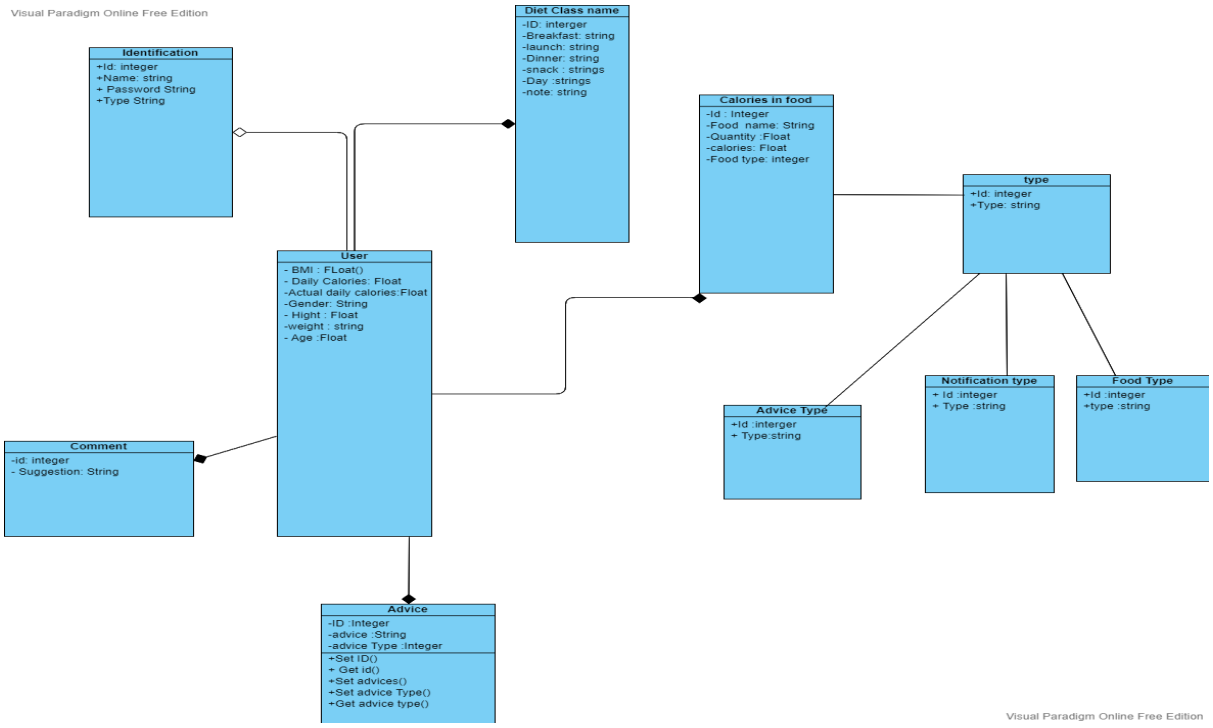
Chapter 4: System Design

In this chapter we will discuss System design with the help of different UML diagram

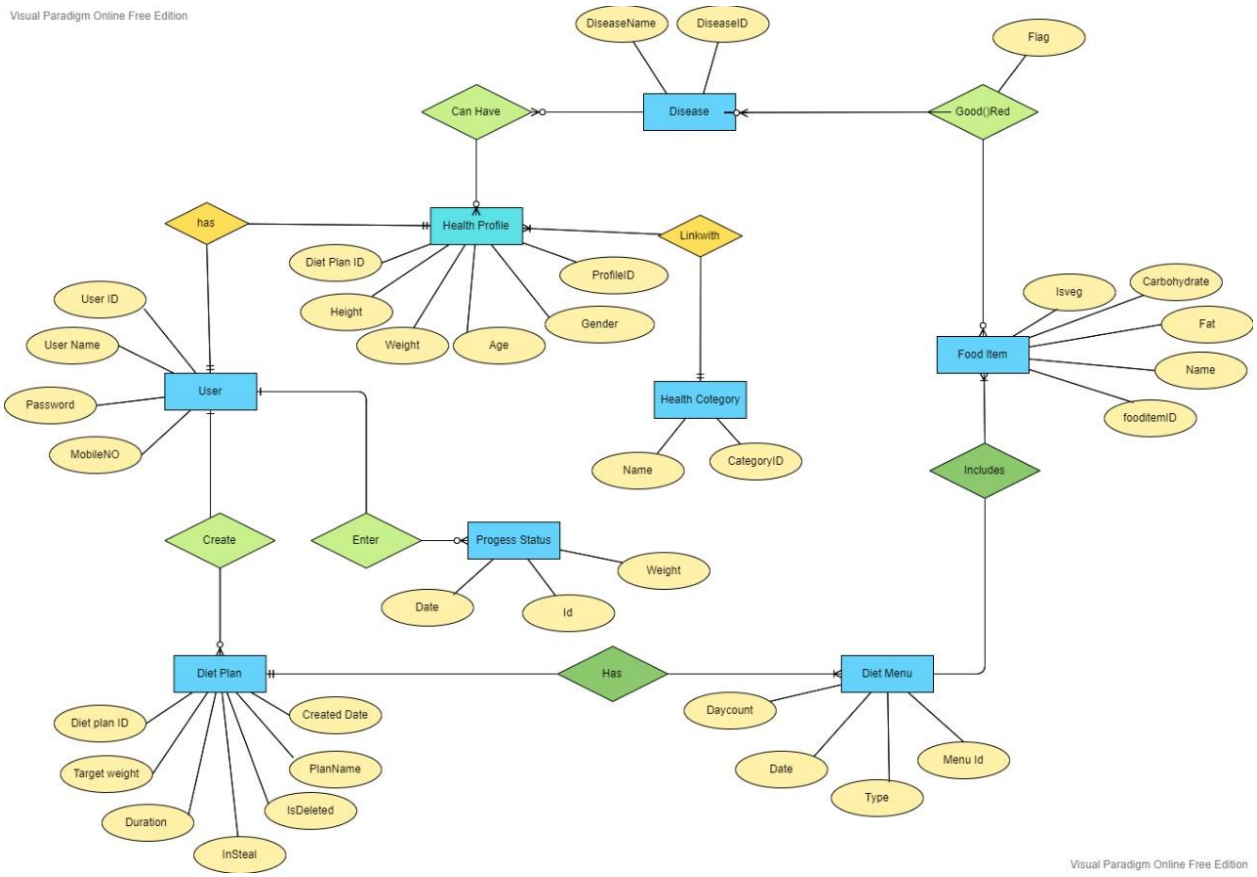
4.1. Architecture Diagram



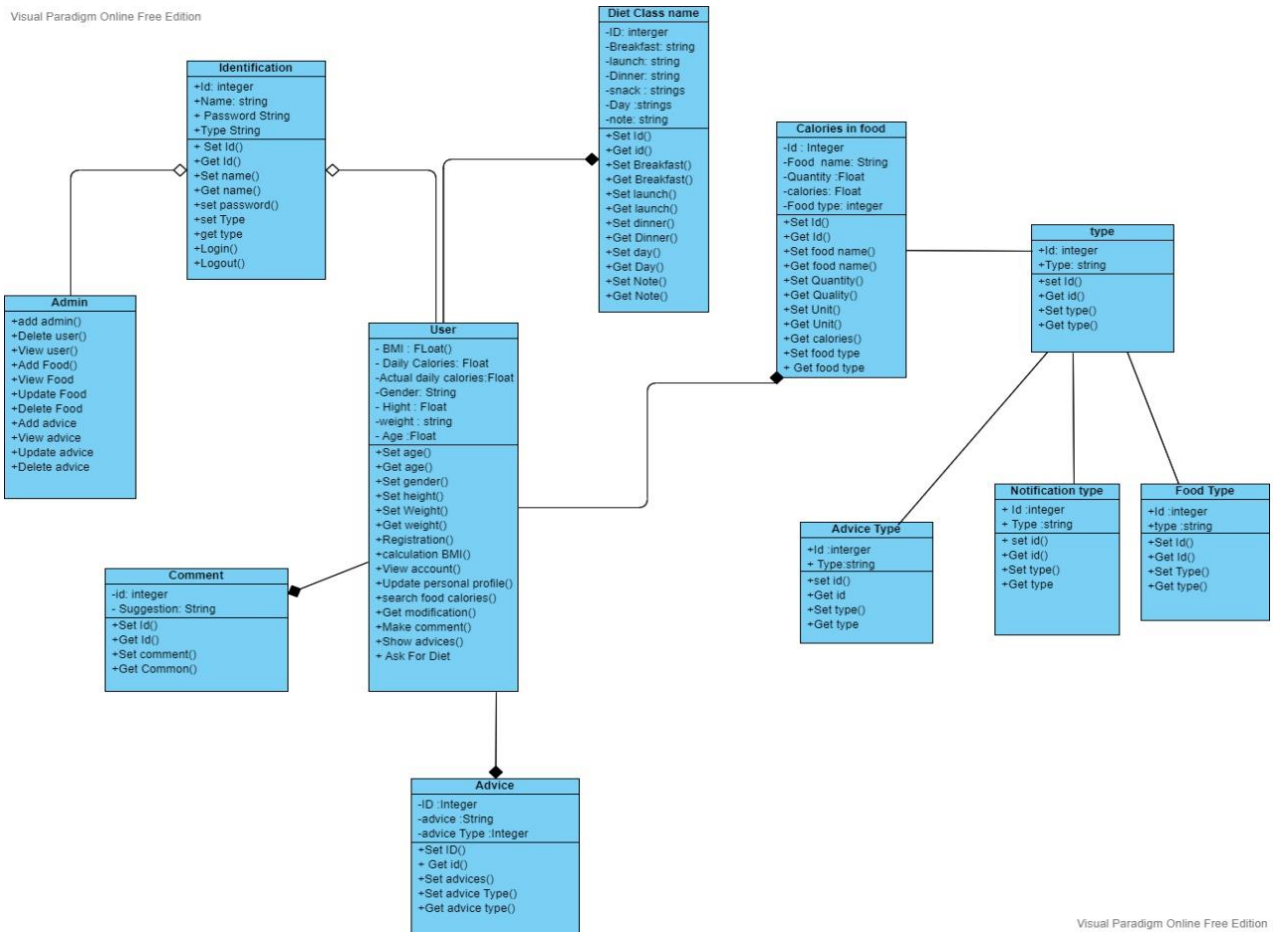
4.2. Domain Model



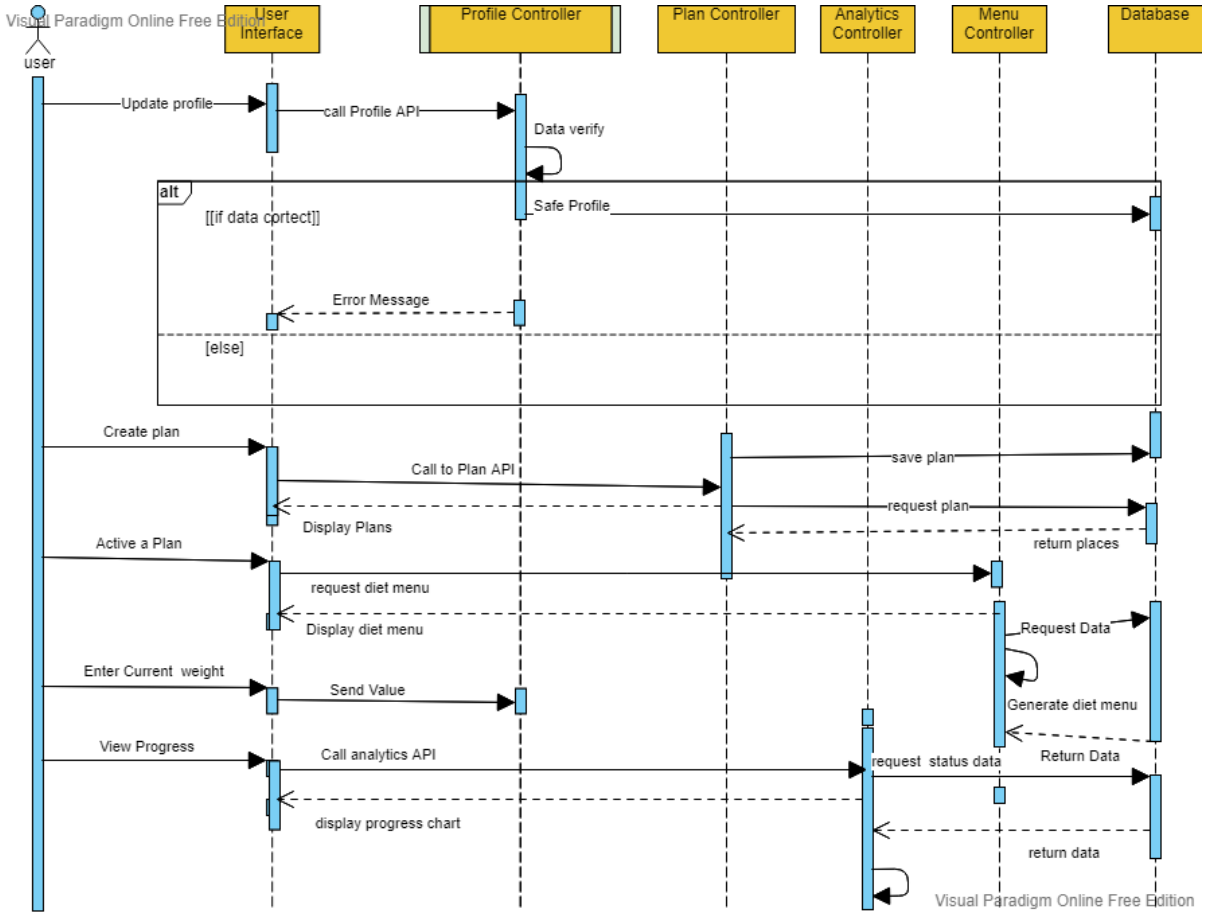
4.3. Entity Relationship Diagram with data dictionary



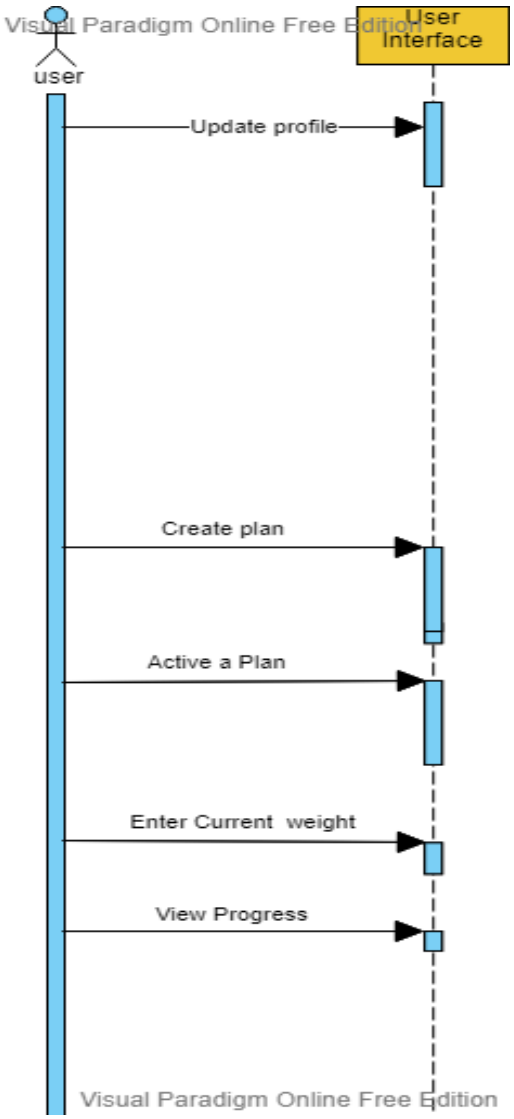
4.4. Class Diagram



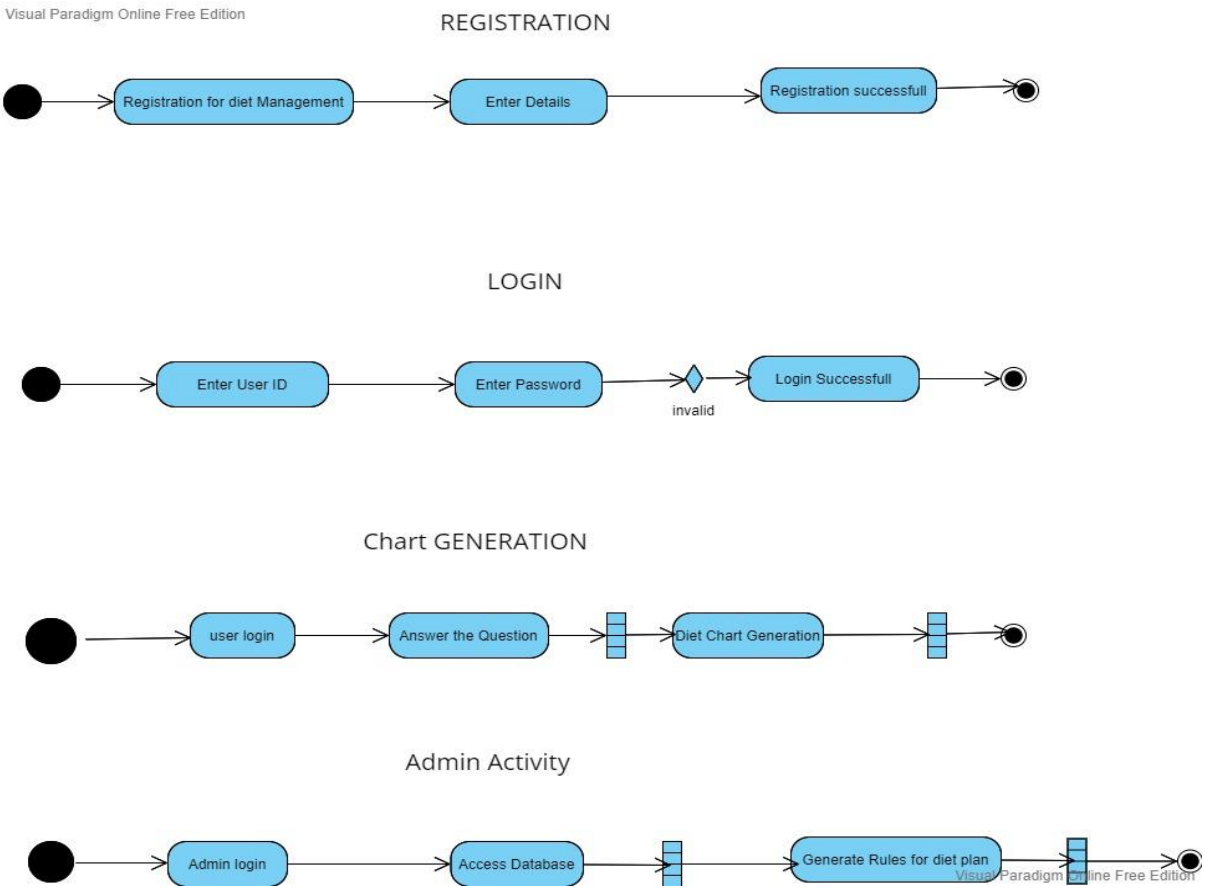
4.5. Sequence / Collaboration Diagram



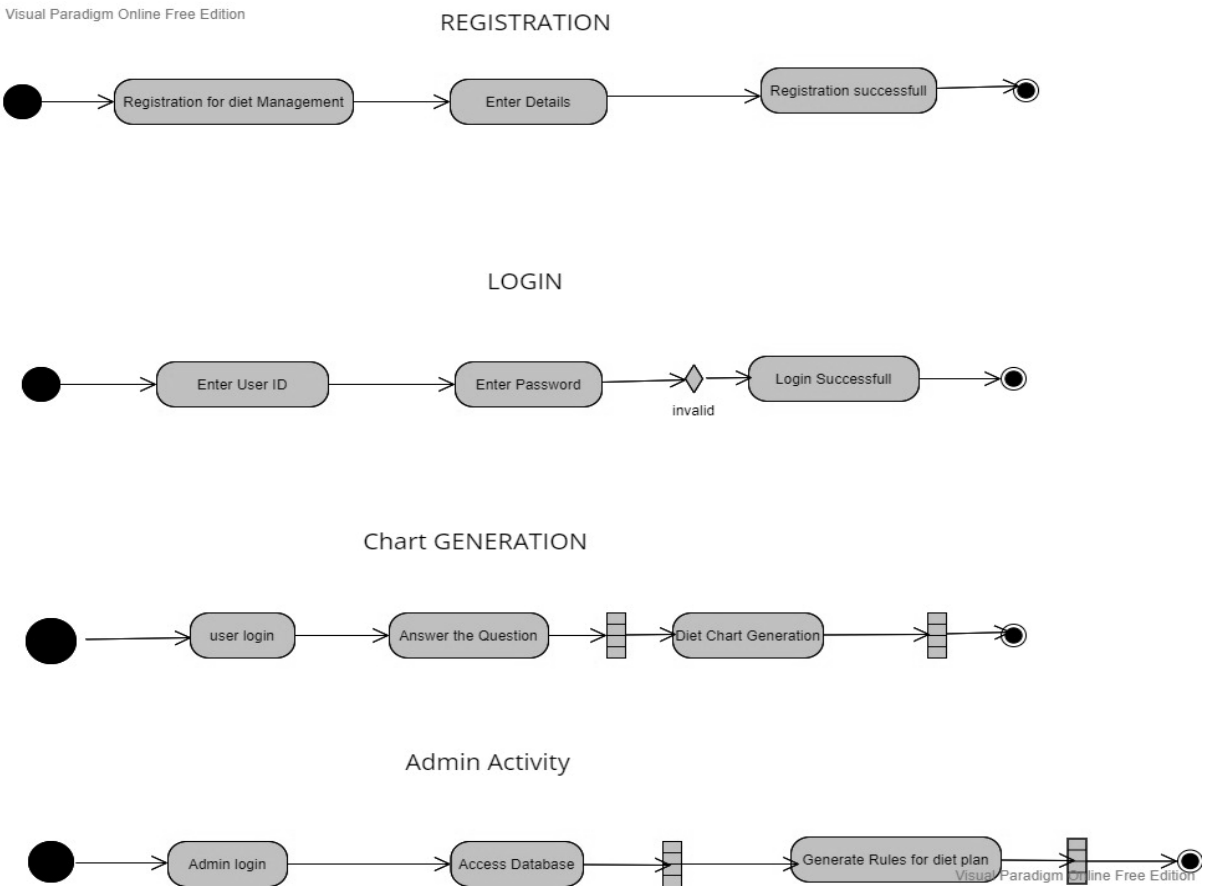
4.6. Operation contracts



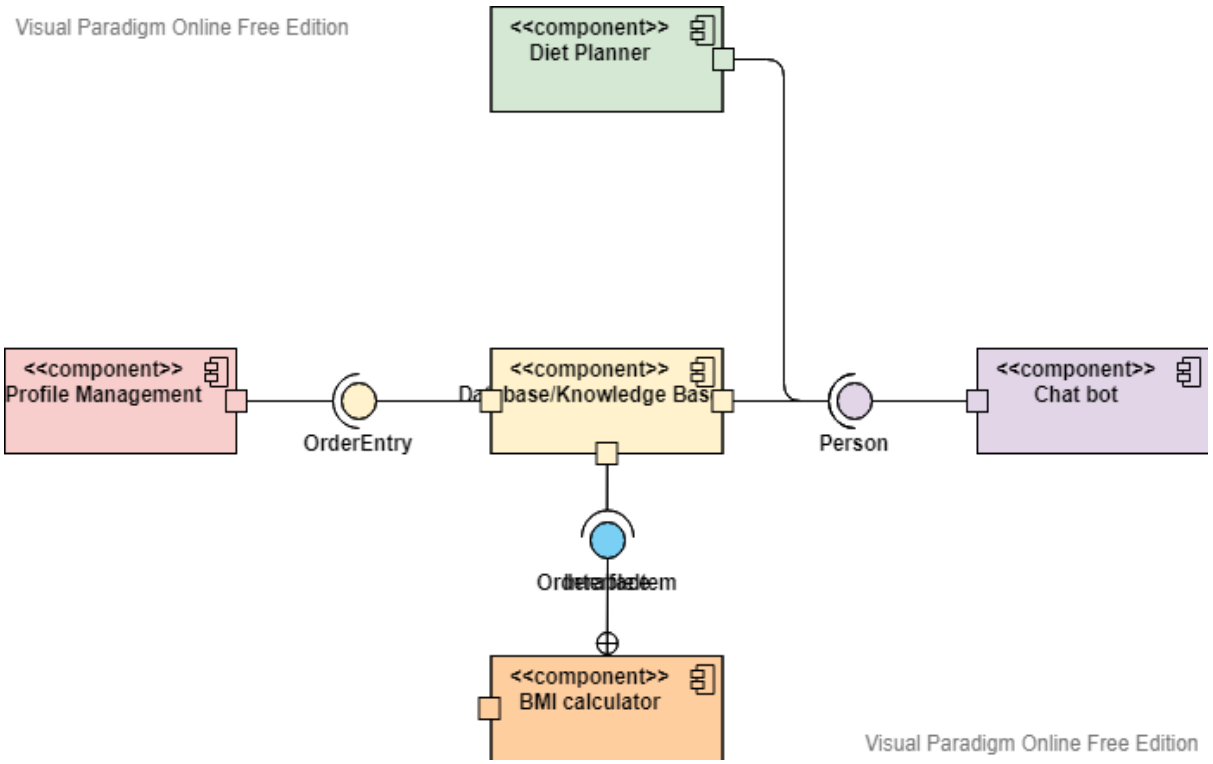
4.7. Activity Diagram



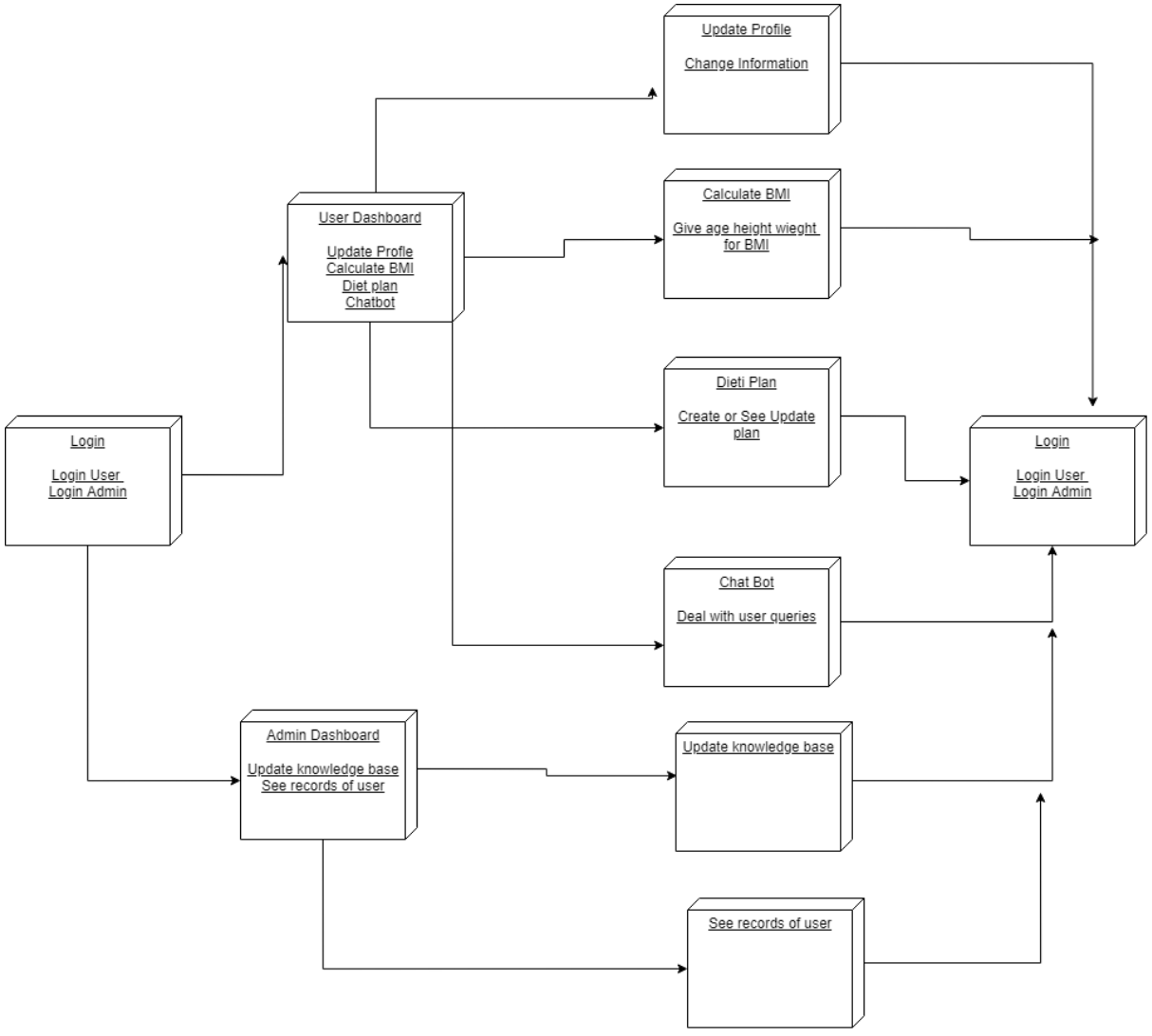
4.8. State Transition Diagram



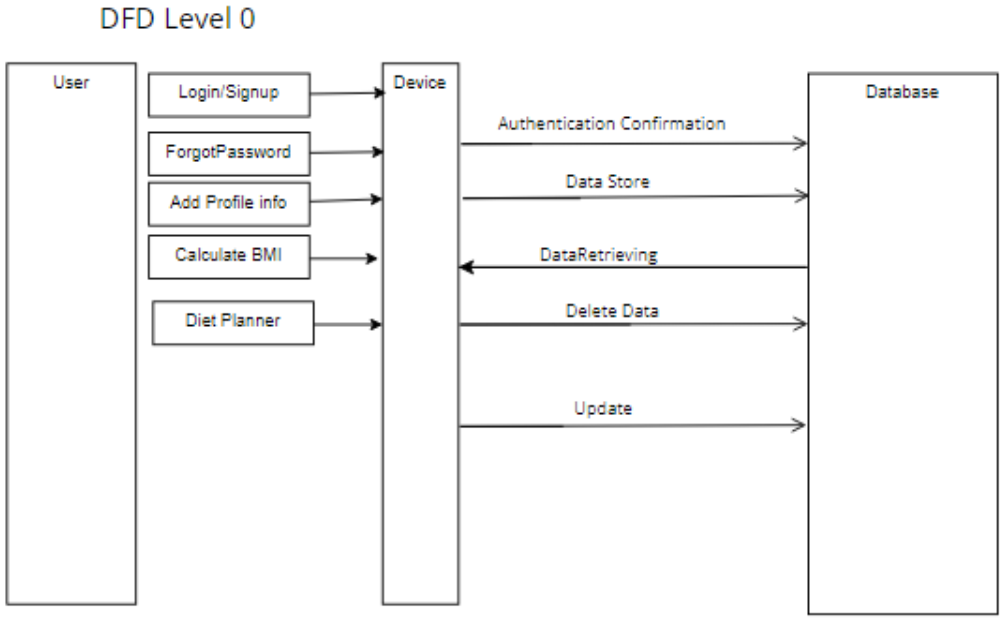
4.9. Component Diagram



4.10. Deployment Diagram



4.11. Data Flow diagram



Chapter 5

Implementation

Chapter 5: Implementation

In this chapter we will discuss about the important points about implementation of the product. The technology we are using is ASP.NET Core and the database is Microsoft SQL Server 2014.Further details are discussed below.

5.1. Components, Libraries, Web Services and stubs

The Components and devices involved in this system are discussed below:

- **Server:** Server we will the place where the system is installed. Database will also be present here.
- **Android/PC Devices:** These devices will be used to run application on them.
- **Internet Browser:** Internet Browser will be the place where the application will be run

5.2. Deployment Environment

The Application will be installed on Server of Microsoft Windows Server. The Database will be Microsoft SQL Server 2014.Database can be managed by Database Manager in the environment of in the Microsoft SQL Server Database Manager.

5.3. Tools and Techniques

The Framework in ASP.NET Core is entity framework. The IDE used is Microsoft Visual Studio Community 2019.For Database management, Microsoft SQL Server Manager is used. The technique used is Model View Controller which is based on Object Oriented Programming.

Languages:

Following are the languages involved in production:

- C#
- JavaScript
- Jquery
- Bootstrap
- HTML
- CSS

5.4. Best Practices / Coding Standards

The Method Used in Dot Net Core is Model View Controller method. All the Classes are in Model. The Controller contains on all the functionality on server side. And the View is the Display or UI that the user can see.

5.5. Version Control

The Version of Dot Net Core is dot net core sdk 3.1. The Microsoft SQL Server is 2014 version.

Chapter 6

Testing and Evaluation

Chapter 6: Testing and Evaluation

Our evaluation studies judges the approach to have considerable potential to improve the daily routine of hospital dietitians as well as to improve the average quality of the dietary advice given to patients within the limited available time for dietary consultations. Our approach opens up a new avenue towards building highly specialised WEB application in a more cost-effective way. Hence, our approach promises to allow a significantly more widespread development and practical deployment in a large variety of application domains including many medical applications.

6.1. Use Case Testing

In our web application we have 2 use cases first one is Super Admin -Control user management and role management + All Functionality and second one is Customer user - Control its profile ,diet plan.

6.2. Equivalence partitioning

AI is beginning to play a growing role in transformative changes now underway in both health and health care, in and out of the clinical setting. At present the extent of the opportunities and limitations is just being explored. However, there are significant challenges in this field that include: the acceptance of AI applications in clinical practice, initially to support diagnostics; ability to leverage the confluence of personal networked devices and AI tools; availability of quality training data from which to build and maintain AI applications in health; large-scale data collection to include missing data streams; building on the success in other domains, creating relevant AI competitions; executing and understanding the limitations of AI methods in health and health care applications.

6.3. Boundary value analysis

In this webweb page the primary touchdown web page carries administrations, offices, approximately us, get in contact, and so on. This serves to purchaser; purchaser can get facts of after that purchaser can especially login to webweb page. On the off risk that purchaser has formally enrolled usually purchaser wishes to make a file using Registration Form and include following important requirements:

1) ChatBot: it will only take input in the form of text.

2) BMI: if it comes in the range of 14 to 30 then it is valid.

3) Diet Plan: Diet plan should take valid age weight height for precise result

6.4. Data flow testing

First the registered use must sign in with the role given to him then BMI calculator calculates BMI and result will be seen on the dashboard and the Diet plan with the list having all the history and latest info on dashboard is assigned. Also the chat bot sending and receiving messages facilitate the user for proper guidance.

6.5. Unit testing

- **User Management** is tested by creating user and giving them roles
- **Chat bot** is testing with different phrases
- **BMI Calculator** : calculation are checked with different cases
- **Diet Plan** : testing with different test cases

6.6. Integration testing

All modules developed independendtly with their own controllers models and views and integrated after completion some conflicts of javascript and css occured but solved afterwards.

6.7. Performance testing

In this system, patient was assessed by BMI and the flow chart of the sequence of Collection and processing the data through the different stages after Integration performance is tested according to time and accuracy.

6.8. Stress Testing

Main pressure throughout growing undertaking is software program checking out that verifies stability & reliability of software program application. The aim of Stress checking out is measuring software program on its robustness and mistakes managing competencies below extraordinarily heavy load situations and making sure that software program doesn't crash below crunch situations. It even exams past regular running factors and evaluates how software program works below intense situations.

Chapter 7

Summary, Conclusion and Future Enhancements

Chapter 7: Summary, Conclusion & Future Enhancements

7.1. Project Summary

As humans throughout the globe are getting extra inquisitive about looking their weight, consuming extra wholesome meals and averting junk meals, a device which could degree energy and vitamins in each day food may be very beneficial for keeping our health. Food calorie and vitamins size device could be very useful for dietitians and sufferers to degree and manipulate the day by day meals intake. The proposed device is a responsive internet site which includes the understanding and facts concerning the health of a person. Nevertheless, in domain names wherein understanding is nicely established, the improvement of an professional device gives many blessings to humans consisting of expanded timeliness, expanded productiveness of specialists, stepped forward consistency in decisions, stepped forward understanding, and stepped forward control of uncertainty and formalization of understanding. In dietician support, the primary blessings of professional device are great time financial savings for humans and clinicians and an stepped forward excellent of care; an professional device's ease of use, robustness, integration, and the maintainability with the aid of using the medical specialists are the primary elements for its Also this sort of device is needed mainly in view of big rural populace without a get entry to scientific help.

7.2. Achievements and Improvements

- NLP and Extraction achieved by using azure services.
- Combine machine learning automation & human evaluation with our data.
- Marry the data research efforts with project management best practices.
- Develop a flexible development methodology.
- Centralize our AI and ML data.

7.3. Critical Review

The on line synthetic dietician is a bout with synthetic intelligence approximately human diets. It acts as a weight-reduction plan representative much like an actual dietician. Dieticians are knowledgeable with nutrient fee of foods. A dietician consults someone primarily based totally on his schedule, frame type, top and weight. The gadget too asks all this records from the consumer and techniques it. It asks approximately what number of hour the consumer works, his top, weight, age etc. The gadget shops and techniques this records after which calculates the nutrient fee had to replenish customer's needs. The gadget then indicates the ideal weight-reduction plan to the customers and asks if consumer is good enough with it, else it indicates different trade diets to replenish customer's needs.

7.4. Lessons Learnt

1. Making Dietician Plan complicated.
2. Different health problems should have different plans

7.5. Future Enhancements/Recommendations

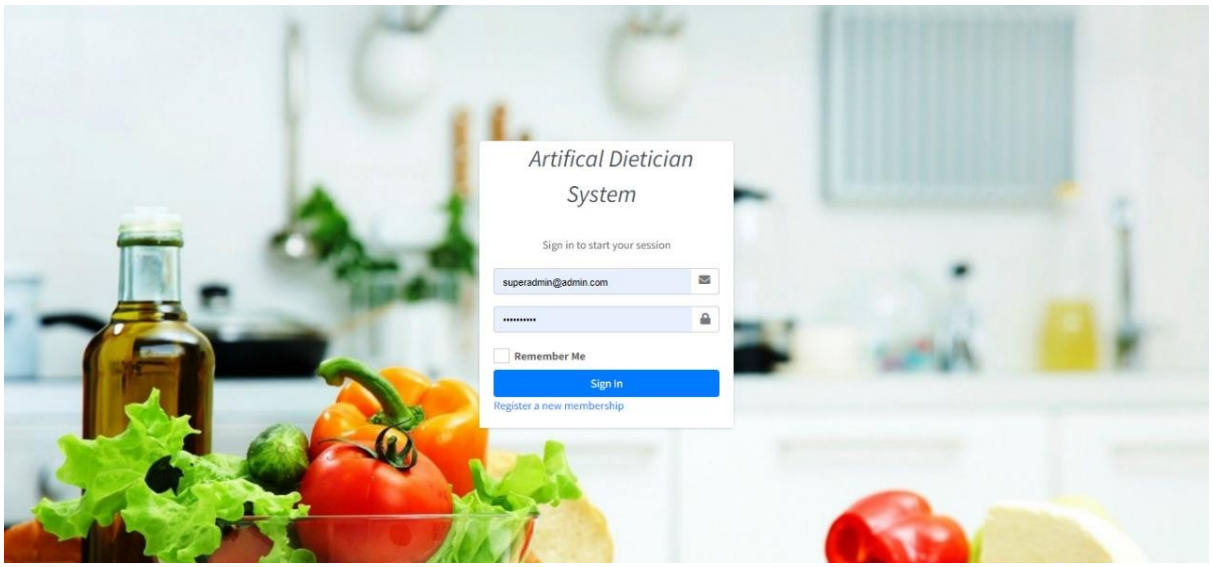
Support the development of AI applications that can enhance the performance of new web apps.

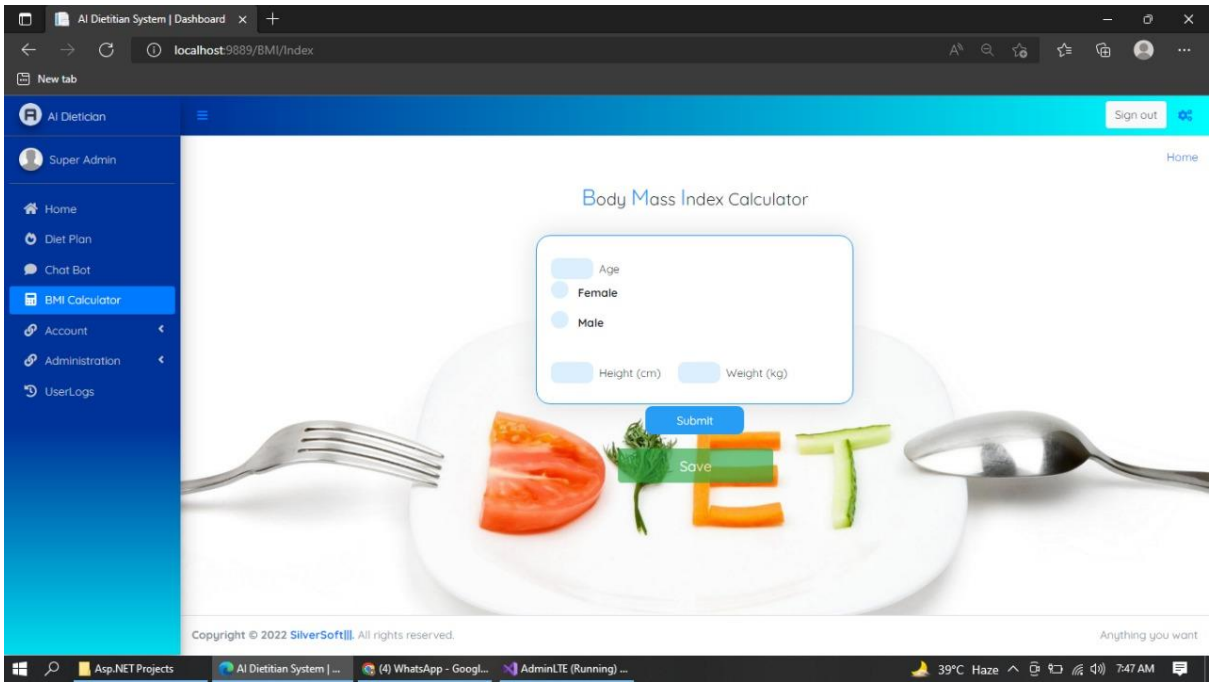
● Develop data infrastructure to capture and integrate data generated from smart devices to support AI applications.

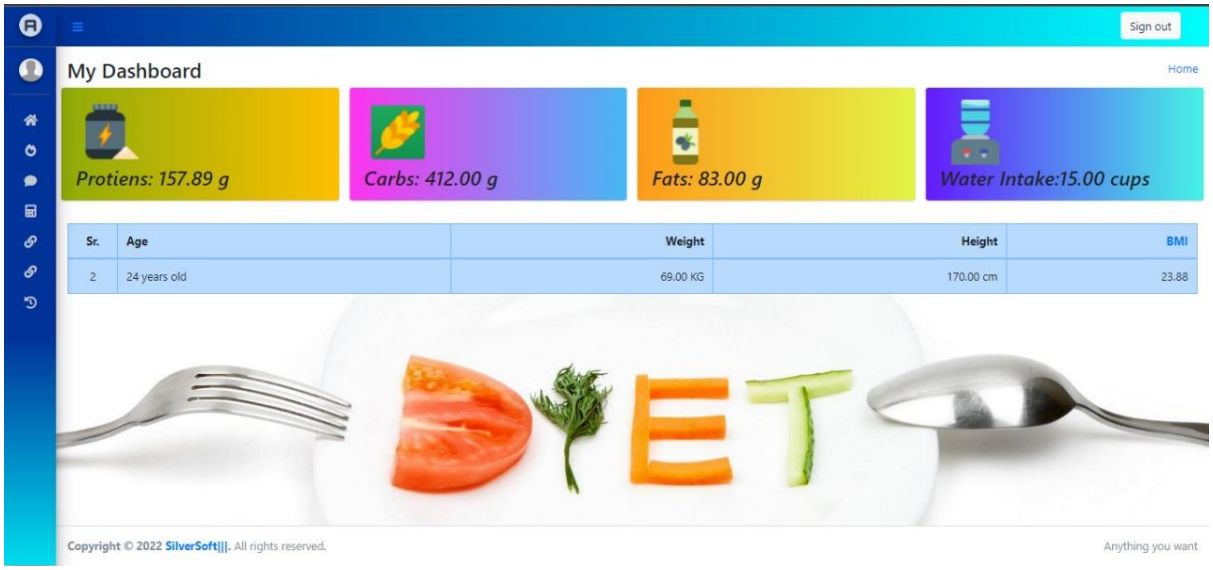
● Require that development include approaches to insure privacy and transparency of data use.

● Track developments in foreign health care systems, looking for useful technologies and also technology failures.

Screen Shots OF Project:






Sign out
My Dashboard
Home
Protiens: 157.89 g
Carbs: 412.00 g
Fats: 83.00 g
Water Intake:15.00 cups
Sr.
Age
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24 years old
69.00 KG
170.00 cm
23.88
DIET
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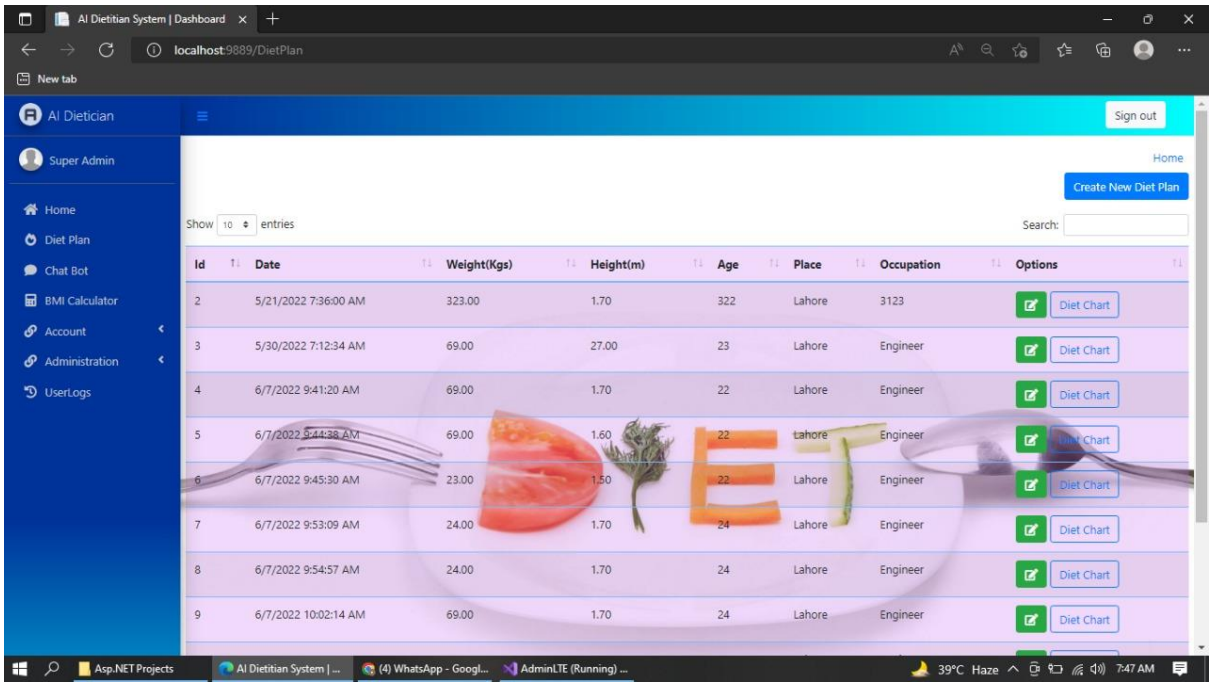
Anything you want


AI Dietitian System | Dashboard
localhost:9889/DietPlan
New tab
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Home
Diet Plan
Chat Bot
BMI Calculator
Account
Administration
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Id
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Weight(Kgs)
Height(m)
Age
Place
Occupation
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2 5/21/2022 7:36:00 AM 323.00 1.70 322 Lahore 3123 Diet Chart
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Asp.NET Projects
AI Dietitian System | ...
(4) WhatsApp - Googl...
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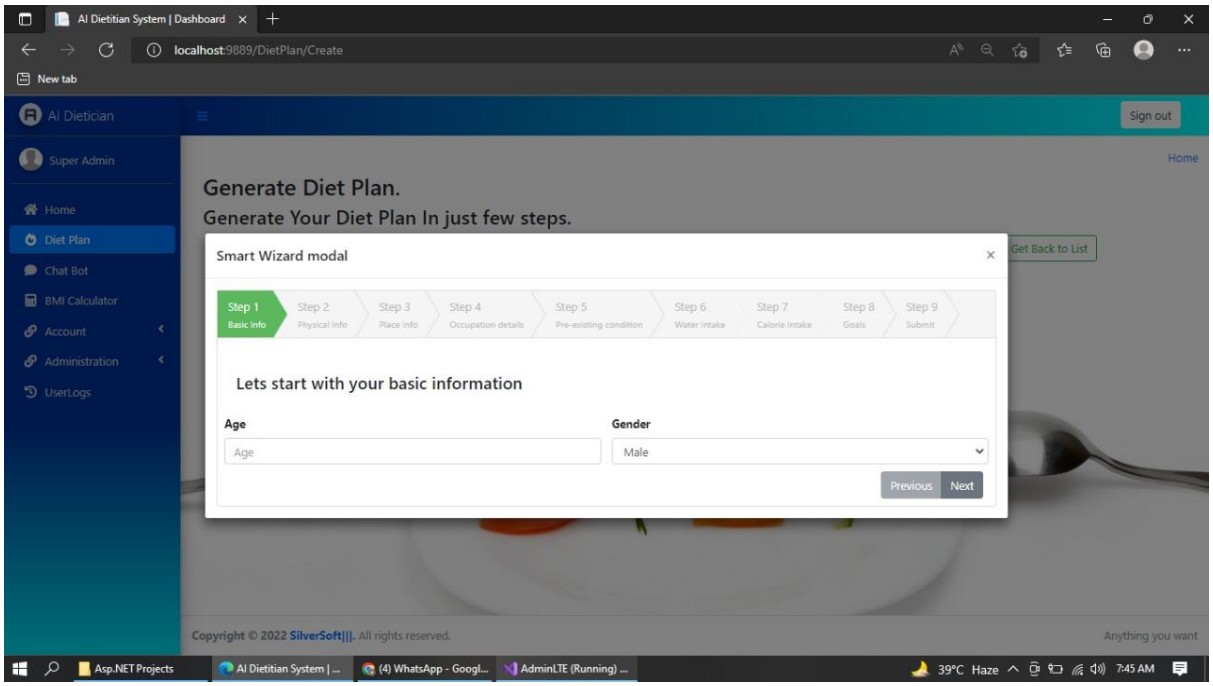
AI Dietitian System | Dashboard
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AI Dietician
Sign out
Super Admin
Home
Diet Plan
Chat Bot
BMI Calculator
Account
Administration
UserLogs
Generate Diet Plan.
Generate Your Diet Plan In just few steps.
Get Back to List
Smart Wizard modal
Step 1 Basic Info
Step 2 Physical Info
Step 3 Place Info
Step 4 Occupation details
Step 5 Pre-existing condition
Step 6 Water Intake
Step 7 Calorie Intake
Step 8 Goals
Step 9 Submit
Lets start with your basic information
Age
Gender
Male
Previous
Next
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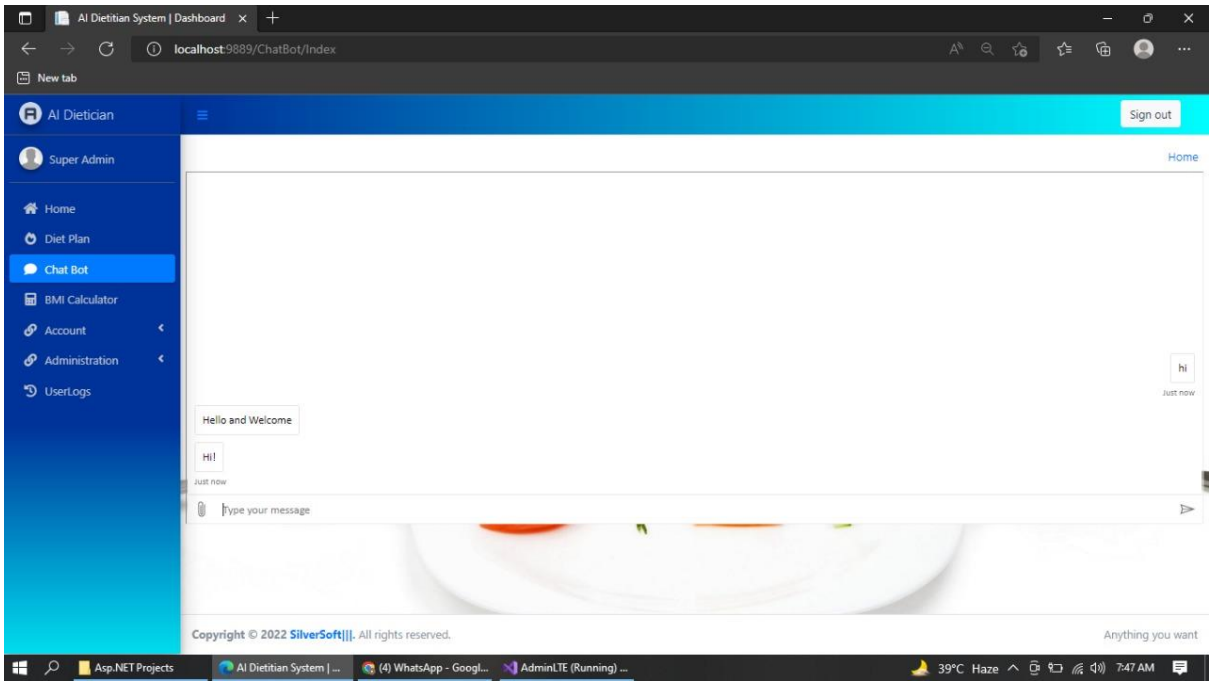
Anything you want


AI Dietitian System | Dashboard
localhost:9889/ChatBot/Index
AI Dietician
Sign out
Super Admin
Home
Diet Plan
Chat Bot
BMI Calculator
Account
Administration
UserLogs
hi
Just now
Hello and Welcome
Hi!
Just now
Type your message
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Anything you want

Reference and Bibliography

Reference and Bibliography

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[2] Artificial intelligence dietician. (2017). *International Journal Of Recent Trends In Engineering And Research*, *3*(2), 176-178. doi: 10.23883/ijrter.2017.3021.a9hn8

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