

# BSCS FINAL PROJECT

## Software Design Specification

### SugarSage – AI Companion For Diabetics



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# **Software Design Specification**

## **SDP Phase II**

**SugarSage – AI Companion For  
Diabetics**

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## **Revision History**

Name	Date	Reason For Changes	Version

## **Abstract**

This project introduces SugarSage, a mobile application powered by AI, specifically designed to address the complex dietary management needs of diabetic patients in Pakistan. The problem of diabetes is significant in Pakistan, with a staggering 31% of the population affected. SugarSage aims to fill the gap in available resources for diabetic individuals by offering personalized dietary recommendations that consider individual food preferences, sugar levels, energy requirements, and locally available food options.

The application utilizes machine learning techniques to analyze various factors influencing dietary choices and suggests optimal diet plans. Additionally, it allows users to record insulin intake, track walking and sleeping patterns, and maintain a calorie count, thus providing a comprehensive solution for diabetes management. The project's scope includes not only dietary recommendations but also the development of a user-friendly interface and functionalities that allow for effective monitoring of diabetes-related activities.

The outcomes of this project are expected to empower diabetic patients in Pakistan to take control of their diabetes management process, thereby improving their overall well-being and quality of life. The project also aims to provide valuable insights into the application of machine learning algorithms in a real-life healthcare scenario, along with experience in mobile application development and backend management.

# 1. Introduction

Managing the dietary needs of individuals with diabetes has always been a tricky and complex task, and it becomes even more challenging for diabetic patients in Pakistan who lack readily available resources to help them cope with their food-related issues. The food they consume plays a crucial role in maintaining their sugar levels and managing the severity of their diabetes, making it essential to have an effective dietary plan.

While doctors can recommend food options, their pre-made generic eating plans may not consider individual preferences and health-related information nor take into account all the possible effective and appealing diets for each individual. Moreover, doctors may not always be available to monitor and track patients' diabetes-related activities, leaving patients with limited support and guidance. With Pakistan having the world's highest diabetes ratio of 31%, it makes a dire need to develop a system that can manage the dietary requirements of diabetics, including keeping track of their everyday routines such as walking, sleeping, and insulin intake.

SugarSage is an AI-based mobile application that uses machine learning techniques to suggest optimal diet plans for people with diabetes while considering their food preferences, sugar levels, and energy requirements. The app takes a systematic approach to process all the possibilities and gives the most effective option for individual users.

In addition to providing personalized diet plans, SugarSage also allows users to record their insulin intake, track their walking and sleeping, and keep a calorie track. These features enable users to monitor their diabetes-related activities and make informed decisions about their health. The app's user-friendly interface and functionalities make managing dietary needs cost-efficient and convenient for diabetic patients in Pakistan.

SugarSage empowers diabetic patients in Pakistan to take control of their diabetes management process and overcome the challenges associated with managing their dietary needs. The app's comprehensive features and functionalities provide users with a personalized and effective solution to manage their diabetes, improving their overall well-being and quality of life.

## 1.1 Product

In Pakistan, 31% of the population is affected by diabetes, a chronic condition with severe repercussions when poorly managed. Poorly managed diabetes can lead to vision loss and limb amputations, according to the World Health Organization. Diet is one of the key factors in effective diabetes management. A well-balanced diet can significantly control blood sugar levels, reduce dependency on medication, and mitigate the risk of complications. However, medications remain the more commonly utilized approach to manage the condition. These medications can introduce additional health issues, such as hormonal imbalances and gastrointestinal disturbances.

Unfortunately, the currently available diet plans for diabetics lack personalization. Also it is impossible for a doctor to provide 24/7 monitoring. To fill this gap, we introduce SugarSage, an AI-driven mobile application that provides personalized dietary management solutions to diabetics in Pakistan. With SugarSage, users can access around-the-clock monitoring and receive locally relevant dietary advice tailored to their individual preferences and health requirements. The app integrates state-of-the-art machine learning algorithms to analyze dietary choices and suggest suitable meal plans. It also allows users to track their physical activities and insulin levels and maintain a healthy lifestyle. SugarSage is a complete diabetic care system that offers a user-friendly interface, making it a valuable resource for managing diabetes effectively and conveniently.

## **1.2 Background**

Pakistan has the highest ratio of diabetics in the world. Despite being the most in need of awareness and facilities to help people manage diabetes efficiently, there is a lack of both. Living with diabetes requires managing it through a combination of medication and diet. While medication is important, it's equally important to keep an eye on what a diabetic person eats. Their diet can either contribute to the development of diabetes or help reduce it. In some cases, a balanced diet can even control diabetes more efficiently than medication because medications can cause complications such as stomach problems, kidney issues, hormonal imbalances, and more.

Although diabetes dietitians can provide diet plans for diabetics, they often lack enough customization based on the patient's taste preferences. While if asked, they may make some adjustments to a rigid plan, it may not be as effective as needed. However, if a system could access a large database of foods, consider the complexities of what is good and what is not for a particular diabetic person, and consider the patient's preferences, it could offer a tailored diet plan. Such a system would be a step forward in helping patients manage their diabetes with ease.

## **1.3 Objective(s)/Aim(s)/Target(s)**

- The main objective is to provide a better solution to Pakistani diabetes patients for managing their diet.
- Patients can easily manage diabetes with an all-in-one app for tracking sugar levels, calories, and activities.
- Providing patients with 24/7 accessibility for easy management of diabetes.

## **1.4 Scope**

The main scope of this project lies in dietary recommendations for diabetics based on these factors:

1. Their sugar levels
2. Their food preferences
3. Their insulin intake
4. Their energy requirements
5. Locally available food options

The secondary scope lies in that the app will be able to track sugar (user input dependent), detect and count daily steps, detect, and measure sleep time. The app will provide users with access to blogs and news about diabetes and diet. The

This system does not aim to cure but control diabetes through diet. The system cannot assist people with severe diabetes complications that can no longer be controlled merely through diet. The system does not provide an alternative to a real-life diabetes doctor who can provide professional medical consultation.

It must be noted that any misuse of the system or failure to use it as intended falls outside the scope of this project. The system is not responsible for forcing users to comply or recover from misuse, as these are not part of the project's objectives.

## 1.5 Business Goals

The proposed system will be able to provide round-the-clock services to its users for diabetes management. One of the business goals include introducing a subscription model for premium features, including personalized support, and advanced tracking capabilities. That being said, implementing sustainable monetization strategies while ensuring accessibility for all income groups. Another business goal is establishing SugarSage as a sole and leading diabetes management app in Pakistan. We aim to continuously grow the user base by providing exceptional services and user experience. We also aim to prioritize user satisfaction through continuous improvement based on feedback and evolving needs.

## 1.6 Document Conventions

### 1. Section Numbering:

The document uses a hierarchical numbering system for sections, sub-sections, and sub-sub-sections (e.g., 1., 1.1, 1.1.1).

### 2. Font Styles:

- **Italics:** Italics are used for emphasis, titles of books, and when introducing new terms or concepts for the first time.
- **Bold:** Bold text is used for headings, subheadings, and to highlight important points.

### 3. Lists:

- **Bullet Points:** Bullet points are used for listing items within a section.
- **Numbered Lists:** Numbered lists are used when presenting a sequence of steps or items.

### 4. Tables:

Tables are employed for organizing and presenting structured data, such as use case descriptions and functional requirements.

### 5. Quotes:

Block quotes are used for excerpts from external sources, such as references, to clearly distinguish them from the main text.

### 6. Hyperlinks:

Hyperlinks are used for references, citations, and external resources to provide easy access to additional information.

### 7. Acronyms and Abbreviations:

Acronyms and abbreviations are spelled out upon first use, followed by the abbreviation in parentheses. The abbreviation is then used consistently throughout the document.

## 2. Overall Description

### 2.1 Product Features

The "SugarSage - AI Companion for Diabetics" project aims to address the challenges of diabetes management in Pakistan considering user's local food preferences. It offers the following key features:

- 1. Personalized Diet Planning:** The system includes an AI algorithm capable of generating personalized diet plans for diabetics, taking into account individual health metrics, medication regimens, and activity levels.
- 2. Local Food Database:** The system integrates a comprehensive food database that considers local Pakistani dietary data, ensuring that dietary recommendations align with cultural norms, making it more feasible for users to follow.
- 3. Mobile Application:** The end product is a user-friendly mobile application that serves as a digital dietitian for diabetics. Users can access and adhere to their personalized dietary recommendations through this intuitive platform.
- 4. User Experience:** The project focuses on designing a user-friendly interface that caters to a diverse user base, from tech-savvy individuals to those less familiar with mobile applications, ensuring ease of use and accessibility.
- 5. Activity Tracking:** Integration of manual entry of physical activity can help users monitor their exercise routines (Daily steps, sleep schedule). The app can adjust meal plans based on activity levels to help maintain blood sugar levels.
- 6. Health Reports:** Users can generate health reports summarizing their progress and adherence to the dietary recommendations. These reports can be shared with healthcare providers for better-informed care.

## 2.2 Functional Description

### 2.1 Patient Use Cases

#### 2.1.1 Name of Use-Case 1: Signup

<b>Identifier</b>	UC-1	
<b>Purpose</b>	User will be able to create an account.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. User should not have an account in the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	<b>Minimal guarantees:</b> 1. Registration failed due to invalid input. 2. User already exists.  <b>Success guarantees:</b> 1. User successfully registered.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on the “Sign up” option on the startup screen of the application.	The system will redirect to the signup form.
<b>2</b>	The user enters email, password, name, and medical information (BMI, blood sugar levels etc.) on the registration form and clicks the Signup button.	The system will authenticate the user credentials and redirect to the home screen of the application.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user enters email, password, medical information, etc., and clicks the Signup button.	The system detects that the user credentials are invalid and displays an error message. <b>Example:</b> <ul style="list-style-type: none"> <li>1. “Your Password doesn’t contain any special characters.”</li> <li>2. “Your BMI input is invalid.”</li> <li>3. “Email doesn’t match the</li> </ul>

		format."
<b>2</b>	User enters email, password, medical information etc. and clicks on the Signup button.	System detects that the user already exists in the system and displays the error message " <b>User already exists.</b> "

**Table 1: UC-1****2.1.2 Name of Use-Case 2: Login**

<b>Identifier</b>	UC-2	
<b>Purpose</b>	User will be able to access their account.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. User should be registered in the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	<b>Minimal guarantees:</b> 1. The user account does not exist in the system. <b>Success guarantee:</b> 1. The user successfully logged in.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	User clicks on "Login" option on the startup screen of the application.	The system will redirect you to the login form.
<b>2</b>	The user enters the email and password on the login form and clicks the Login button.	The system will verify user credentials and redirect to the home screen of the application.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user enters the email and password on the login form and clicks the Login button.	The system detects that the user doesn't exist in the database and displays the error message " <b>User doesn't exist.</b> "

**Table 2: UC-2**

### 2.1.3 Name of Use-Case 3: Get Meal Plan

<b>Identifier</b>	UC-3	
<b>Purpose</b>	To generate personalized meal plans, delete meal plans, and share meal plans.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. User should be logged in on the system 2. User medical information should be known. 3. Internet connectivity required.	
<b>Post-conditions</b>	System will generate a meal plan according to user preferences	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the "Get Meal Plan" button on the Meal Plan icon.	The system will redirect to the meal form.
<b>2</b>	User will enter their blood sugar levels, food preferences, food recommended by their doctor, and duration of meal plan on the meal form.	The system will use the user's food preferences and medical information to create a personalized meal plan.
<b>3</b>	User clicks on the "Edit Meal Plan" button and choose the particular item they want to substitute with a different one.	The system updates and displays a customized meal plan based on previous inputs and new modifications.
<b>4</b>	The user clicks on the "Delete Meal Plan" button.	The system deletes the previous meal plan and redirects to the Meal Plan tab.
<b>5</b>	The user clicks on the "Share Meal Plan" button.	The system displays a list of applications that can be used to share the meal plan image.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

Table 3: UC-3

### 2.1.4 Name of Use-Case 4: User Profile

<b>Identifier</b>	UC-4	
<b>Purpose</b>	Allow users to view and edit their personal information, as well as check their achievements and give feedback.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	1. User should be logged in on the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	User profile is successfully viewed and edited.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on the “User Profile” icon on the application.	The system will display personal information and a few achievements of the user and the option to log out.
<b>2</b>		The system also shows options to edit personal information and view more achievements.
<b>3</b>	The user clicks on the edit icon on the Personal Information.	The system will allow the user to edit their personal information.
<b>4</b>	The user edits their personal information and saves it.	The system will verify and update the edited information on the database.
		The system now displays the newly updated personal information.
<b>5</b>	The user clicks on “View More Achievements”.	The system will redirect to another page and display the user’s achievement in detail.
<b>6</b>	The user clicks on the “Give Feedback” option	The system will redirect to the feedback form page.
<b>7</b>	The user writes the feedback and click the submit button.	The system will store the feedback in the database and redirect to the User Profile tab.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user edits their personal information and saves it.	The system detects that the edited information is incorrect and displays an error message.

Table 4: UC-4

### 2.1.5 Name of Use-Case 5: Health Profile

<b>Identifier</b>	UC-5	
<b>Purpose</b>	Users can update their health status.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	1. User should be logged in on the system 2. Internet connectivity required. 3. User gives permissions to access device sensors and locations etc.	
<b>Post-conditions</b>	<b>Minimal guarantees:</b> 1. Invalid input values for Insulin levels, HbA1c score, and blood sugar levels. <b>Success guarantee:</b> 1. Successfully updated Insulin levels, HbA1c score, and blood sugar levels. 2. Successfully viewed health information.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on "Health Profile" icon on the application.	The system will display health information like sleep tracking, physical activity (steps), HbA1c score, blood sugar, and insulin levels.
<b>2</b>		The system shows option view sleep patterns, physical activity track, blood sugar, and insulins levels in detail.
<b>3</b>		The system also shows the option to update HbA1c score, blood sugar, and insulin levels.
<b>4</b>	The user clicks on update icon and enters updates values for their HbA1c score, blood sugar, or insulin levels.	The system verifies the values and updates them in the database.
<b>5</b>		The system now displays the newly updated information.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on update icon and enters updates values for their HbA1c score, blood sugar, or insulin levels.	The system detects the incorrect values for HbA1c score, blood sugar, or insulins levels and displays an error message.

Table 5: UC-5

### 2.1.6 Name of Use-Case 6: Logout

<b>Identifier</b>	UC-6	
<b>Purpose</b>	Users can log out of the system	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	1. User should be logged in on the system 2. Internet connectivity required.	
<b>Post-conditions</b>	User has successfully logged out.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on “User Profile” icon on the application.	The system will display other information along with the option to logout.
<b>2</b>	The user clicks on the logout option.	The system displays the dialogue box with message “Are you sure you want to log out from SugarSage?”
<b>3</b>	The user clicks on “Yes” button.	The system ends the session and redirects to the startup screen.
		Go to UC-1 or UC-2
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

Table 6: UC-6

## 2.2 Admin Use Cases

### 2.2.1 Name of Use-Case 7: Admin Login

<b>Identifier</b>	UC-7	
<b>Purpose</b>	Admin will be able to access their account.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. Admin should exist in the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	<b>Minimal guarantees:</b> The admin account does not exist in the system. <b>Success guarantee:</b> The admin successfully logged in.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin enters the email and password on the login form and clicks the “Continue” button.	The system will check whether the user exists in the system and upon successful authentication, redirect to the Dashboard Page.
<b>2</b>	The admin can reset their password if they forget by clicking the “Forgot your password” button.	The system will redirect user to the authentication page, asking them to enter the OTP code sent to their contact number.
<b>3</b>	The admin enters the OTP code on the authentication page.	The system verifies the code and upon success, displays a form allowing the user to reset their password.
<b>4</b>	The admin enters their new password and clicks the “Confirm” button.	The system will redirect the user to the login form.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin enters the email and password on the login form and clicks the Login button.	The system detects that the admin does not exist in the database and displays the error message <b>“Admin doesn’t exist.”</b>
<b>2</b>	The admin enters the OTP code on the authentication page.	The system verifies the code and if the input is incorrect, it will display <b>“Incorrect OTP entered”</b> .

Table 7: UC-7

## 2.2.2 Name of Use-Case 8: Admin Dashboard

<b>Identifier</b>	UC-8	
<b>Purpose</b>	Admin will be able to view analytics related to the application.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	Display analytical graphs and charts according to the application usage.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on “Dashboard” on the sidebar.	The system will redirect to the dashboard page and display analytics regarding user traffic, type of diabetic patients etc.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

Table 8: UC-8

## 2.2.3 Name of Use-Case 9: User Account Management

<b>Identifier</b>	UC-9	
<b>Purpose</b>	Admin will be able to view, update, and delete user's accounts.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	1. User deleted successfully. 2. User details updated successfully. 3. Updated list displayed successfully.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on “Users” button on the sidebar.	The system will redirect to a page displaying all the user's profile details along with the option to update and delete users.
<b>2</b>	The admin clicks on the update icon under the “Action” column.	The system will display a form containing all the data of a user

		and allows the permission to change them except the email address.
<b>3</b>	The admin updates the user account details and clicks on the "Update" button.	The system will verify the changes and update the corresponding fields in the database.
<b>4</b>	The admin clicks on the delete icon under the "Action" column.	The system will display a dialogue box with the message "Are you sure you want to delete this user?"
<b>5</b>	The admin clicks on "Delete" button on the popup box.	The system will delete the user from the database and display an updated list of users.
<b>6</b>	The admin clicks on "Cancel" button on the popup box.	The system will redirect to the user's account page.
<b>7</b>	The admin clicks on the "Health Profile" button on the "Users" page.	The system will redirect to a page displaying all the user's health details along with the option to update them.
<b>8</b>	The admin clicks on the edit icon on the Health Profile page.	The system will display a form containing all the health details of a user and allows the permission to change them except the email address.
<b>9</b>	The admin updates the user health details and clicks on the "Update" button.	The system will verify the changes and update the corresponding fields in the database.

**Alternate Course of Action**

<b>S#</b>	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin updates the user account details and clicks on the "Update" button.	The system detects that the updated user account details are invalid and displays an error message.
<b>2</b>	The admin updates the user health details and clicks on the "Update" button.	The system detects that the updated user health details are invalid and displays an error message.

**Table 9: UC-9**

## 2.2.4 Name of Use-Case 10: Food Item Management

<b>Identifier</b>	UC-10	
<b>Purpose</b>	Admin will be able to view, add, update, or delete food items.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. Admin should be logged in the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	<b>Minimal guarantees:</b> 1. Invalid food input values. <b>Success guarantee:</b> 1. Food Item displayed successfully. 2. Food Item updated successfully. 3. Food Item added successfully. 4. Food Item deleted successfully.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on “Foods” button on the sidebar.	The system will redirect to the food page displaying all the foods along with the option to add, update, delete foods.
<b>2</b>	The admin clicks on “Add Food” button.	The system will display a form containing all the input fields required for a food.
<b>3</b>	The admin fills all the fields (protein, carbs, glycemic index etc.) on the “Add Food” form and clicks the Add button.	The system will verify the input field values and add the food to the database and display the updated food list.
<b>4</b>	The admin clicks on the update icon under the Action column.	The system will display a form containing all the fields of the food which can be edited.
<b>5</b>	The admin updates the input fields of the food and clicks the Update button.	The system will verify the field values and update the fields in the database and display the updated food list.
<b>6</b>	The admin clicks on the delete icon under the Action column.	The system will ask the user “Are you sure you want to delete this Food Item?”.
<b>7</b>	The admins click the “Delete” button on the popup screen.	The system will delete the Food Item from the database and display the updated food list.
<b>8</b>	The admins click the “Cancel” button on the popup screen.	The system will redirect to the food list page.
<b>Alternate Course of Action</b>		

S#	Actor Action	System Response
1	The admin fills all the input fields on the “Add Food” form and clicks the Add button.	<p>The system detects that the provided food’s fields are invalid and display an error message  Example:</p> <ol style="list-style-type: none"> <li>1. “Invalid Food macro-nutrients.”</li> <li>2. Invalid Food glycemic index.</li> </ol>
2	The admin updates the fields of the food and clicks the Update button.	The system detects that the edited input fields are invalid and displays an error message.

**Table 10: UC-10****2.2.5 Name of Use-Case 11: Dish Management**

<b>Identifier</b>	UC-11	
<b>Purpose</b>	Admin will be able to view, add, update, or delete dishes.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	<ol style="list-style-type: none"> <li>1. Admin should be logged in the system.</li> <li>2. Internet connectivity required.</li> </ol>	
<b>Post-conditions</b>	<p><b>Minimal guarantees:</b></p> <ol style="list-style-type: none"> <li>1. Invalid dish input values.</li> </ol> <p><b>Success guarantee:</b></p> <ol style="list-style-type: none"> <li>1. Dishes displayed successfully.</li> <li>2. Dishes updated successfully.</li> <li>3. Dishes added successfully.</li> <li>4. Dishes deleted successfully.</li> </ol>	
<b>Typical Course of Action</b>		
S#	Actor Action	System Response
1	The admin clicks on “Dishes” icon.	The system will redirect to a page containing list of dishes along with the option to add, update, delete dishes.
2	The admin clicks on “Add Dish” button.	The system will redirect to a form containing all the input fields required for a dish.
3	The admin fills all the fields (ingredients, total calories etc.) on the “Add Dish” form and clicks the Add button.	The system will verify the field values and add the dish to the database and display an updated table of dishes.

<b>4</b>	The admin clicks on the update icon under the Action column.	The system will redirect to a form containing all the input fields of the dish which can now be edited.
<b>5</b>	The admin updates the fields of the dish and clicks the Update button.	The system will verify the field values and update the fields in the database and display an updated table of dishes.
<b>6</b>	The admin clicks on the delete icon under the Action column.	The system will display a dialogue box with the message "Are you sure you want to delete this Dish?".
<b>7</b>	The admin clicks the "Delete" button on the popup box.	The system will delete the Dish Item from the database and close the popup box and display an updated table of dishes.
<b>8</b>	The admin clicks the "Cancel" button on the popup box.	The system will not delete the item and close the popup box.

**Alternate Course of Action**

<b>S#</b>	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin fills all the fields on the "Add Dish" form and clicks the save button.	The system detects that the provided Dishes input fields are invalid and display an error message Example: 1. "Invalid value for Glycemic Load." 2. "Invalid Total Calories value."
<b>2</b>	The admin updates the fields of the dish and clicks the save button.	The system detects that the edited dish input fields are invalid and displays an error message.

**Table 11: UC-11**

## 2.2.6 Name of Use-Case 12: Feedback Management

<b>Identifier</b>	UC-12	
<b>Purpose</b>	Admin will be able to view and delete the feedbacks.	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 3. Internet connectivity required.	
<b>Post-conditions</b>	1. Feedbacks displayed successfully. 2. Feedbacks deleted successfully. 3. Access to the full view of the Feedback.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on “Feedback” button on the sidebar.	The system will redirect to a page displaying a table of feedbacks.
<b>2</b>	The admin clicks on delete icon under the action column.	The system will display a popup box containing the message “Are you sure you want to delete this feedback?”
<b>3</b>	The admin clicks the “Delete” button on the popup box.	The system will delete the corresponding feedback from the database and display the updated table of feedbacks.
<b>4</b>	The admin clicks the “Cancel” button on the popup box.	The system will redirect to the page displaying a table of feedbacks.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

Table 12: UC-12

### 2.2.7 Name of Use-Case 13: User Activity Logs

<b>Identifier</b>	UC-13	
<b>Purpose</b>	Admin will be able to view the activities of the users in the application.	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	Displays all the activities of the users.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on the "Activity Log" button on the sidebar.	The system will redirect to a page displaying a table of all the activities performed by users.
<b>2</b>	The admin clicks on the view icon under the Action column.	The system will redirect to a page displaying all the activity logs of the corresponding user.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

Table 13: UC-13

### 2.2.8 Name of Use-Case 14: Blogs

<b>Identifier</b>	UC-14	
<b>Purpose</b>	Admin will be able to view, add, update, and delete blogs on the application.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 2. Internet connectivity required.	
<b>Post-conditions</b>	<ul style="list-style-type: none"> <li>• Blogs displayed successfully.</li> <li>• Blog updated successfully.</li> <li>• Blog added successfully.</li> <li>• Blog deleted successfully.</li> </ul>	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks on the "Blogs" button on the sidebar.	The system will redirect to a page displaying a table of all the blogs with the option to add, update and delete blogs.

<b>2</b>	The admin clicks on “Add Blog” button.	The system will redirect to a form containing all the input fields required for the blog post.
<b>3</b>	The admin fills all the input fields on the “Add Blog” form and clicks the Upload button.	The system will add the blog on the database and also upload it on the user application.
<b>4</b>	The admin clicks on the update icon under the Action column.	The system will redirect to a form containing all the input fields of the Blog which can now be edited.
<b>5</b>	The admin updates the input fields of the blog and clicks the Update button.	The system will update the values on the database and display the updated blog.
<b>6</b>	The admin clicks on the delete icon under the Action column.	The system will display a dialogue box with the message “Are you sure you want to delete this Blog?”.
<b>7</b>	The admin clicks the “Delete” button on the popup box.	The system will delete the Blog from the database and display an updated table of blogs.
<b>8</b>	The admin clicks the “Cancel” button on the popup box.	The system will not delete the blog and close the popup box.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

Table 14: UC-14

### 2.2.9 Name of Use-Case 15: Admin Profile Management

<b>Identifier</b>	UC-15	
<b>Purpose</b>	Admin will be able to view and update their personal information	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	1. Admin should be logged into the system. 3. Internet connectivity required.	
<b>Post-conditions</b>	Displays and updates admin's information.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks the “Setting” button on the sidebar.	The system will redirect to a page displaying a form to update admin account details and a toggle button to switch between light and dark themes. Also, it shows an option for the admin to delete their account

<b>2</b>	The admin applies updates their picture, personal information and clicks the "Save" button.	The system will update the admin account details on the database and display updated values.
<b>3</b>	The admin flips the toggle switch.	The system will invert the theme of the application (dark to light or light to dark)
<b>4</b>	The admin clicks the "Delete Account" button.	The system will display a popup box containing the message "Are you sure you want to delete your account?".
<b>5</b>	The admin clicks the "Delete" button on the popup box.	The system will delete the admin from the database and redirect to the login screen.
<b>6</b>	The admin clicks the "Cancel" button on the popup box.	The system will not delete the admin and close the popup box.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

Table 15: UC-15

### 3.2.10 Name of Use-Case 16: Logout

<b>Identifier</b>	UC-16
<b>Purpose</b>	Admin will be able to log out of the system.
<b>Priority</b>	Low
<b>Pre-conditions</b>	1. Admin should be logged into the system. 2. Internet connectivity required.
<b>Post-conditions</b>	Admin will be logged out of the system.

#### Typical Course of Action

S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The admin clicks the "Logout" button on the sidebar.	The user will be redirected to a page asking for confirmation if they want to log out or not.
<b>2</b>	The admin clicks the "Logout" button.	The system will end the session and redirect to the login screen.
<b>3</b>	The admin clicks the "Cancel" button.	The system will redirect user to the dashboard page.

#### Alternate Course of Action

S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

Table 16: UC-16

## 2.3 Patient Web Application Use Cases

### 2.3.1 Name of Use-Case 17: Signup

<b>Identifier</b>	UC-17	
<b>Purpose</b>	User will be able to create an account.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should not have an account in the system.</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	<p><b>Minimal guarantees:</b></p> <ul style="list-style-type: none"> <li>Registration failed due to invalid input.</li> <li>User already exists.</li> </ul> <p><b>Success guarantees:</b></p> <ul style="list-style-type: none"> <li>User successfully registered.</li> </ul>	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user opens the sign page of the application.	The system will display a form asking the user to enter email address and password and redirect to a page containing the form to enter personal and health details.
<b>2</b>	The user clicks on the "Already have an account?" button.	The system will redirect the user to login screen.
<b>2</b>	The user enters email and password on the signup form and click "Next" button.	The system will verify the input values and redirect to the registration form.
<b>3</b>	The user enters name, age, gender, and medical information (BMI, blood sugar levels etc.) on the registration form and clicks the "Continue" button.	The system will authenticate the user credentials and display the "Get Started" screens and redirect to the dashboard of the application.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>2</b>	The user enters email and password on the signup form and click "Next" button.	<p>The system will detect that the input values are incorrect and displays an error message.</p> <p><b>Example:</b></p> <ul style="list-style-type: none"> <li>"Your Password doesn't contain any special characters."</li> <li>"Email doesn't match the format."</li> </ul>
<b>1</b>	The user enters name, age, gender, medical information,	The system detects that the user credentials are invalid and

	etc., and clicks the Signup button.	displays an error message. <b>Example:</b> <ul style="list-style-type: none"><li>• “Invalid Age value.”</li><li>• “Invalid BMI value.”</li></ul>
<b>2</b>	User enters email, password, medical information etc. and clicks on the Signup button.	System detects that the user already exists in the system and displays the error message <b>“User already exists.”</b>

Table 27: UC-17

### 2.3.2 Name of Use-Case 18: Login

<b>Identifier</b>	UC-18
<b>Purpose</b>	User will be able to access their account.
<b>Priority</b>	High
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>• User should be registered in the system.</li> <li>• Internet connectivity required.</li> </ul>
<b>Post-conditions</b>	<p><b>Minimal guarantees:</b></p> <ul style="list-style-type: none"> <li>• The user account does not exist in the system.</li> </ul> <p><b>Success guarantee:</b></p> <ul style="list-style-type: none"> <li>• The user successfully logged in.</li> </ul>

#### Typical Course of Action

S#	Actor Action	System Response
<b>1</b>	The user opens the login page of the application.	The system will display a form asking the user to enter email and password.
<b>2</b>	The user enters the email and password on the login form and clicks the “Continue” button.	The system verifies user credentials and redirect to the dashboard of the application.
<b>3</b>	The user clicks on the “Don’t have an account?” button.	The system will redirect the user to the signup screen.
<b>4</b>	The user clicks on “Forgot Password?” button.	The system will redirect to a page asking the user to enter email address.
<b>5</b>	The user enters the email address on the “Forgot Password?” screen and clicks the “Sent Reset Link” button.	The system will redirect the user to a “Verification” screen asking the user to enter 4-digit code sent on their corresponding email.
<b>6</b>	The user enters the OTP code on the “Verification” screen and clicks the “Verify” button.	The system verifies the given code and upon success, redirect to a screen asking the user to enter new password.
<b>7</b>	The user enters new password	The system will check whether

	and clicks the "Confirm" button.	the password is in correct format and upon success, redirect the user to Login Screen.
<b>Alternate Course of Action</b>		
S#	Actor Action	System Response
<b>1</b>	The user enters the email and password on the login form and clicks the Login button.	The system detects that the user doesn't exist in the database and displays the error message " <b>User doesn't exist.</b> "
<b>2</b>	The user enters the OTP code on the "Verification" screen and clicks the "Verify" button.	The system detects that the given code is incorrect and displays an error message "Invalid Code".
<b>3</b>	The user enters new password and clicks the "Confirm" button.	The system detects that the given password is in wrong format and displays an error message "Wrong Password Format".

**Table 18: UC-18**

### 2.3.3 Name of Use-Case 19: Overview

<b>Identifier</b>	UC-19	
<b>Purpose</b>	To summarize the analytics regarding the user.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	System will display analytics on the user health status and activities.	
<b>Typical Course of Action</b>		
S#	Actor Action	System Response
<b>1</b>	The user clicks the "Overview" button on the sidebar.	The system will redirect to a page containing different details such as recent blogs, health and activity analytics.
<b>Alternate Course of Action</b>		
S#	Actor Action	System Response
-	-	-

**Table 19: UC-19**

### 2.3.4 Name of Use-Case 20: Get Meal Plan

<b>Identifier</b>	UC-20	
<b>Purpose</b>	To generate personalized meal plans, delete meal plans, and share meal plans.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	1. User should be logged in on the system 2. User medical information should be known. 4. Internet connectivity required.	
<b>Post-conditions</b>	System will generate a meal plan according to user preferences	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the "Get Meal Plan" button on the Meal Plan icon.	The system will redirect to a page displaying buttons such as Generate Meal Plan, View Meal Plans, Edit Meal Plans etc.
<b>2</b>	User clicks the "Generate Meal Plan" button.	The system will redirect to a page display a form asking the user to enter their meal preferences and health details.
<b>3</b>	User will enter their blood sugar levels, food preferences, food recommended by their doctor, and duration of meal plan on the meal form.	The system will use the user's food preferences and medical information to create a personalized meal plan.
<b>4</b>	User clicks on the "Edit Meal Plan" button and choose the particular item they want to substitute with a different one.	The system updates and displays a customized meal plan based on previous inputs and new modifications.
<b>5</b>	The user clicks on the "Delete Meal Plan" button.	The system deletes the previous meal plan and redirects to the Meal Plan tab.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	User will enter their blood sugar levels, food preferences, food recommended by their doctor, and duration of meal plan on the meal form.	The system detects that the provided inputs are incorrect and displays an error message.

Table 20: UC-20

### 2.3.5 Name of Use-Case 21: Health Tracking

<b>Identifier</b>	UC-21	
<b>Purpose</b>	Allow users to view statistics and edit their health status.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system.</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	<p><b>Minimal Guarantee:</b></p> <ul style="list-style-type: none"> <li>Invalid input values for weight, height, etc.</li> </ul> <p><b>Success Guarantee:</b></p> <ul style="list-style-type: none"> <li>User health details updated and displayed successfully.</li> </ul>	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the “Health Track” button on the sidebar.	The system will redirect to a page showing the analytics of user health status and a form to edit update their health status.
<b>2</b>	The user enters values on the Health status form and clicks the “Update” button.	The system verifies the entered values, update them on the database and display updated values.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user enters values on the Health status form and clicks the “Update” button.	The system detects that the entered input values are incorrect and displays an error message.

Table 21: UC-21

### 2.3.6 Name of Use-Case 22: Activity Tracking

<b>Identifier</b>	UC-22	
<b>Purpose</b>	Allow users to view statistics on their activities and set goals.	
<b>Priority</b>	Medium	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>• User should be logged in on the system.</li> <li>• Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	Goal added successfully.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the “Activity Track” button on the sidebar.	The system will redirect to a page showing the analytics of user activity and a section to add goals.
<b>2</b>	The user enter goal name, current status, goal status and clicks on the “Set goal” button.	The system will add the goal on the database and display the updated list of goals.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

Table 22: UC-22

### 2.3.7 Name of Use-Case 23: Give Feedback

<b>Identifier</b>	UC-23	
<b>Purpose</b>	Allows the user to upload their feedback.	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system.</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	Admin will be able to view the user feedback.	
<b>Typical Course of Action</b>		
<b>S#</b>	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the “Give Feedback” button on the sidebar.	The system will redirect to a page displaying a form asking the user to enter subject, type, description of the feedback.
<b>2</b>	The user enters the feedback details and clicks the “Update” button.	The system will add the feedback on the database and display a success message.
<b>Alternate Course of Action</b>		
<b>S#</b>	<b>Actor Action</b>	<b>System Response</b>
-	-	-

**Table 23: UC-23**

### 2.3.8 Name of Use-Case 24: Blogs

<b>Identifier</b>	UC-24	
<b>Purpose</b>	Allows the user to view blog posts.	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system.</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	User will be able to read the blogs and checkout their sources.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the “Blogs” button on the sidebar.	The system will redirect to a page displaying different blog posts uploaded by the Admin.
<b>2</b>	The user clicks on the “Copy” icon.	The system will add the source link of the original blog on the user’s clipboard.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

**Table 24: UC-24**

### 2.3.9 Name of Use-Case 25: Profile

<b>Identifier</b>	UC-25	
<b>Purpose</b>	Allows the user to update their personal information and health details.	
<b>Priority</b>	High	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system.</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	User's personal information and health details updated successfully.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the "Profile" button on the sidebar.	The system will redirect to a page displaying user profile and health profile and allow the user to update them.
<b>2</b>	The user edits the personal information and click the "Update" button.	The system will verify and update input values and show a success message.
<b>3</b>	The user edits the health details and click the "Update" button.	The system will verify and update input values and show a success message.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user edits the personal information and click the "Update" button.	The system detects that the input values are incorrect and displays an error message.
<b>2</b>	The user edits the health details and click the "Update" button.	The system detects that the input values are incorrect and displays an error message.

Table 25: UC-25

### 2.3.10 Name of Use-Case 26: Terms and Policy

<b>Identifier</b>	UC-26	
<b>Purpose</b>	Allows the user to read the terms of service of the application.	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>• User should be logged in on the system.</li> <li>• Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	-	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks the “Terms and Policy” button on the sidebar.	The system will redirect to a page displaying the terms of service of the application.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
-	-	-

Table 26: UC-26

### 3.3.11 Name of Use-Case 27: Logout

<b>Identifier</b>	UC-27	
<b>Purpose</b>	Users can log out of the system	
<b>Priority</b>	Low	
<b>Pre-conditions</b>	<ul style="list-style-type: none"> <li>User should be logged in on the system</li> <li>Internet connectivity required.</li> </ul>	
<b>Post-conditions</b>	User has successfully logged out.	
<b>Typical Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	The user clicks on “Logout” button on the sidebar.	The system will display a popup box with the message “Are you sure you want to logout?”.
<b>2</b>	The user clicks the “Logout” button.	The system will end the user’s session and redirect to the Login Screen.
<b>3</b>	The user clicks the “Cancel” button.	The system will close the popup box.
<b>Alternate Course of Action</b>		
S#	<b>Actor Action</b>	<b>System Response</b>
<b>1</b>	N/A	N/A

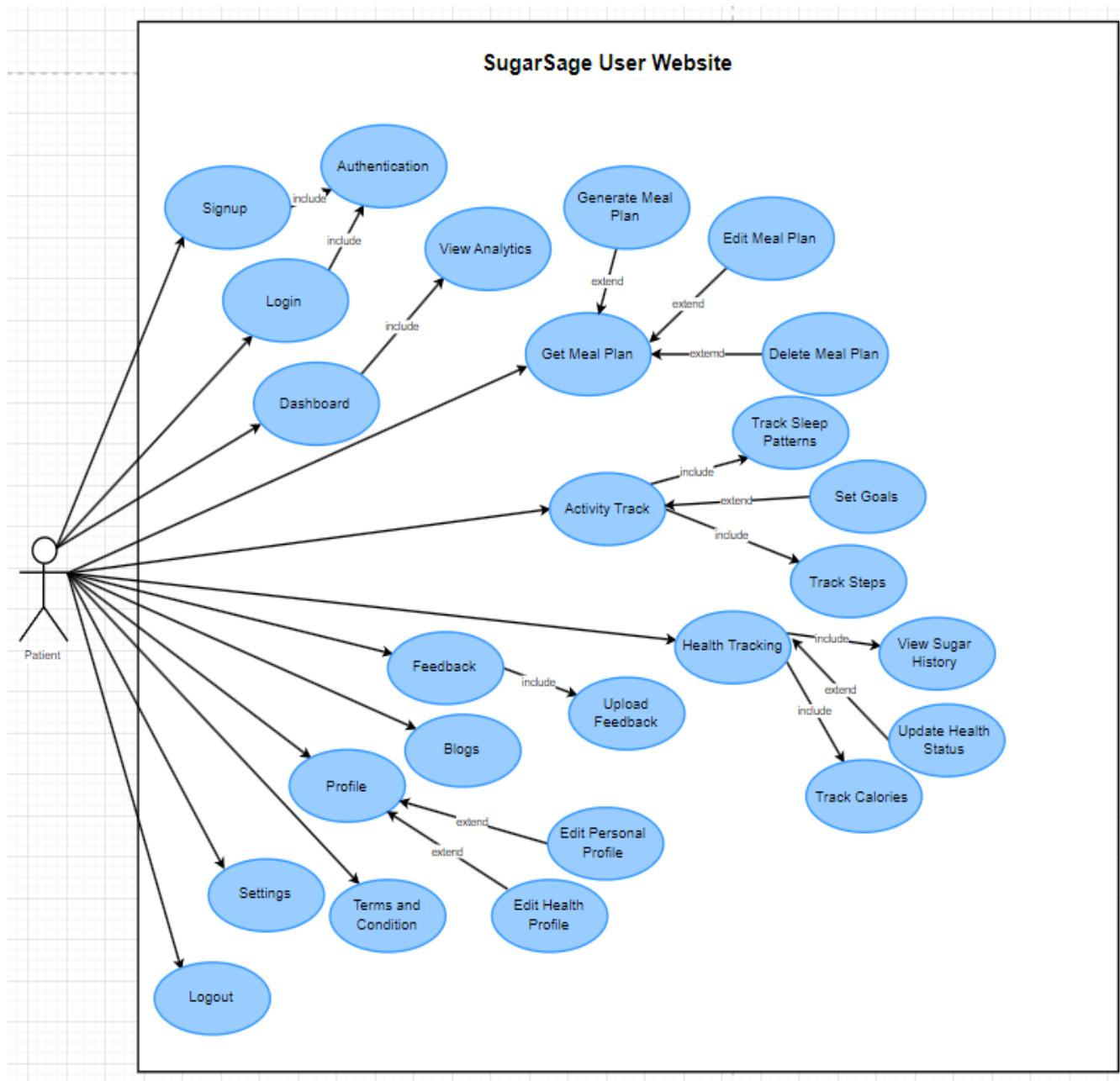
Table 27: UC-27

## 2.4 Use Case Diagrams

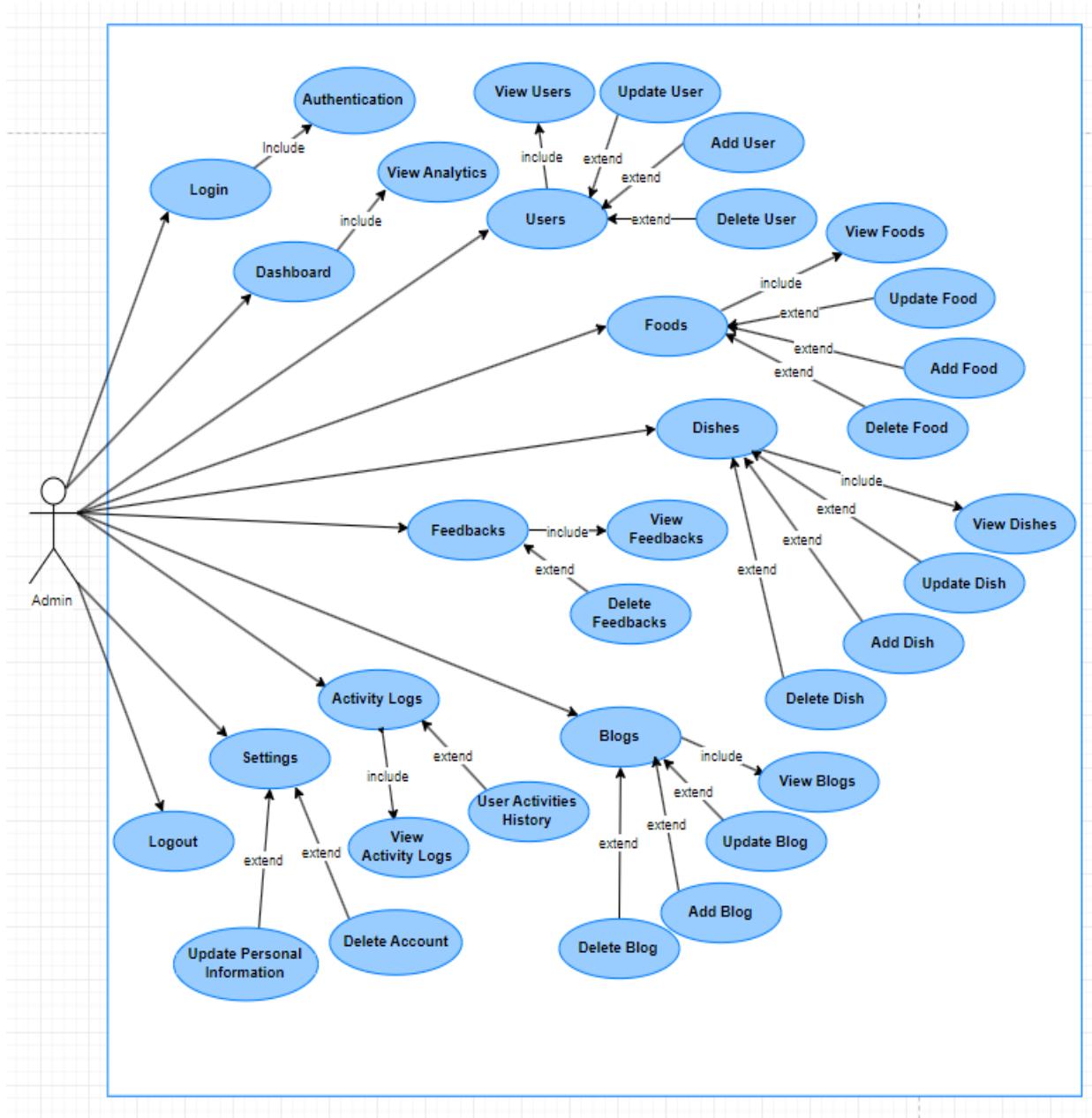
### 2.4.1 User Mobile App Use Case Diagram



### 2.4.2 User Website Use Case Diagram



### 2.4.3 Admin Use Case Diagram



## 2.5 User Classes and Characteristics

- 1. Diabetic Individuals:** Diabetic individuals are the primary users of the product. They vary in terms of age, gender, and cultural backgrounds. They may have different levels of technical expertise, ranging from tech-savvy individuals to those less familiar with mobile applications.

Usage:

- Diabetic individuals use the mobile application to access personalized diet plans and manage their diabetes diet.
- They input their health metrics, medication information, and activity levels.
- They follow the recommended meal plans, track their progress, and receive guidance and feedback.
- They may log their meals, monitor their physical activity, and record blood glucose levels using the app.

- 2. Technical Support Team:**

Technical support specialists with expertise in the product.

Usage:

- Users who encounter technical issues may contact the technical support team for assistance.
- The support team helps troubleshoot and resolve technical problems.

## 2.6 Design and Implementation Constraints

- **Hardware Limitations:**

Mobile devices may have limited processing power, memory, and storage capacity. The application must be designed to operate efficiently within these constraints to ensure optimal performance.

- **Compatibility with Mobile Operating Systems:**

The app must be compatible with various versions of Android and iOS. Ensuring compatibility and optimizing performance across different devices and OS versions can be a constraint.

- **Local Food Database Integration:**

Incorporating local dietary data may be challenging due to the availability and accuracy of such data. Efforts to obtain and maintain this data can be a constraint.

- **AI and ML Model Development:**

Developing and fine-tuning AI and ML algorithms to generate personalized diet plans may require access to large and diverse datasets, which could be a constraint if such data is limited or hard to acquire.

## 2.7 Assumptions and Dependencies

### Assumptions:

2. **Data Availability:** It is assumed that relevant dietary and nutritional data, including local food databases, will be available or obtainable for integration into the application.
3. **User Adoption:** The project assumes that diabetic individuals in Pakistan will adopt and use the mobile application effectively for managing their condition.

### Dependencies:

1. **Mobile Operating Systems:** The application is dependent on the stability and compatibility of Android and iOS operating systems, as updates or changes can impact the app's performance.
2. **AI and ML Models:** The development of AI and ML algorithms for personalized diet planning depends on access to suitable datasets and resources for model training and fine-tuning.
3. **User Acceptance:** The project's success is dependent on user acceptance and engagement. Ensuring that the app aligns with user needs and preferences is critical.

## 3. Technical Architecture

### 3.1 Application and Data Architecture

The SugarSage system is a personalized diabetes management and monitoring application that will be custom-built for users. It will consist of several application components, including the User Profile, Health Tracker, Meal Planner, Feedback, and Blog Reading modules. The application will primarily collect and manage data related to user health metrics, dietary intake, user feedback, and educational content. The critical data components will be User Data, Health Metrics, Meal Plans, Feedback, and Blogs.

The application will be developed using a layered architecture, utilizing a client/server model. The client will be a mobile application or web interface, while the server will provide API endpoints for data processing and storage. We will use programming languages suitable for mobile and web development, such as Kotlin or Swift for mobile and JavaScript (Node.js or React) for the web client, with a server backend possibly in Python or Java.

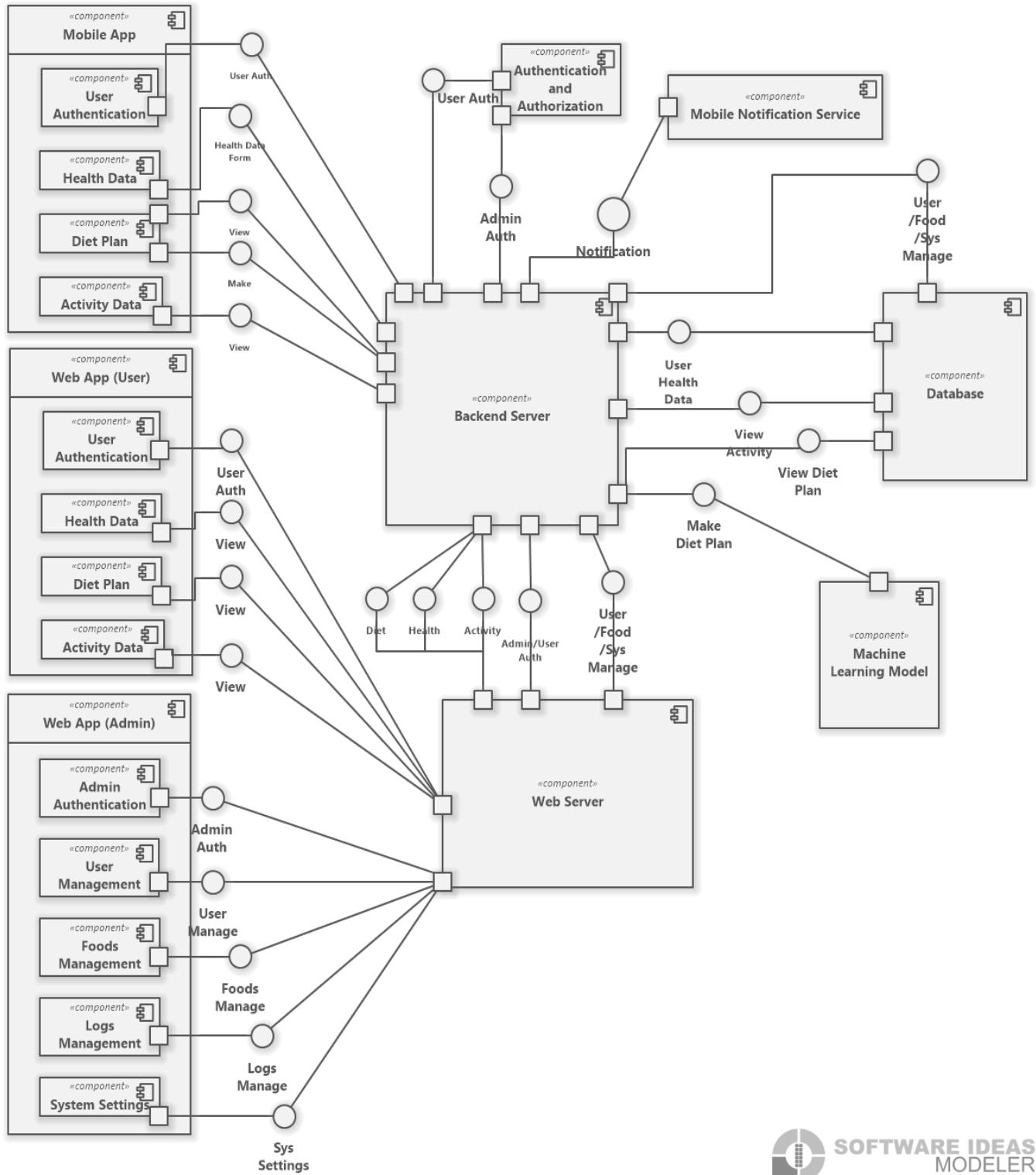
The hardware platform will not be device-specific, as the system is designed to be compatible with various smartphones and personal computers. Our backend infrastructure will be cloud-based, allowing for scalability and reliability. Depending on the data needs, we will use a relational database management system (RDBMS) like PostgreSQL or MySQL or a NoSQL database like MongoDB.

Our system will have a user-friendly interface accessible via mobile devices and web browsers. It is designed to be accessible online, ensuring users can manage their diabetes care anytime, anywhere.

The system will be hosted on a cloud platform (e.g., AWS, Azure) that provides the necessary computing resources, storage, and networking capabilities to support the application and data architecture.

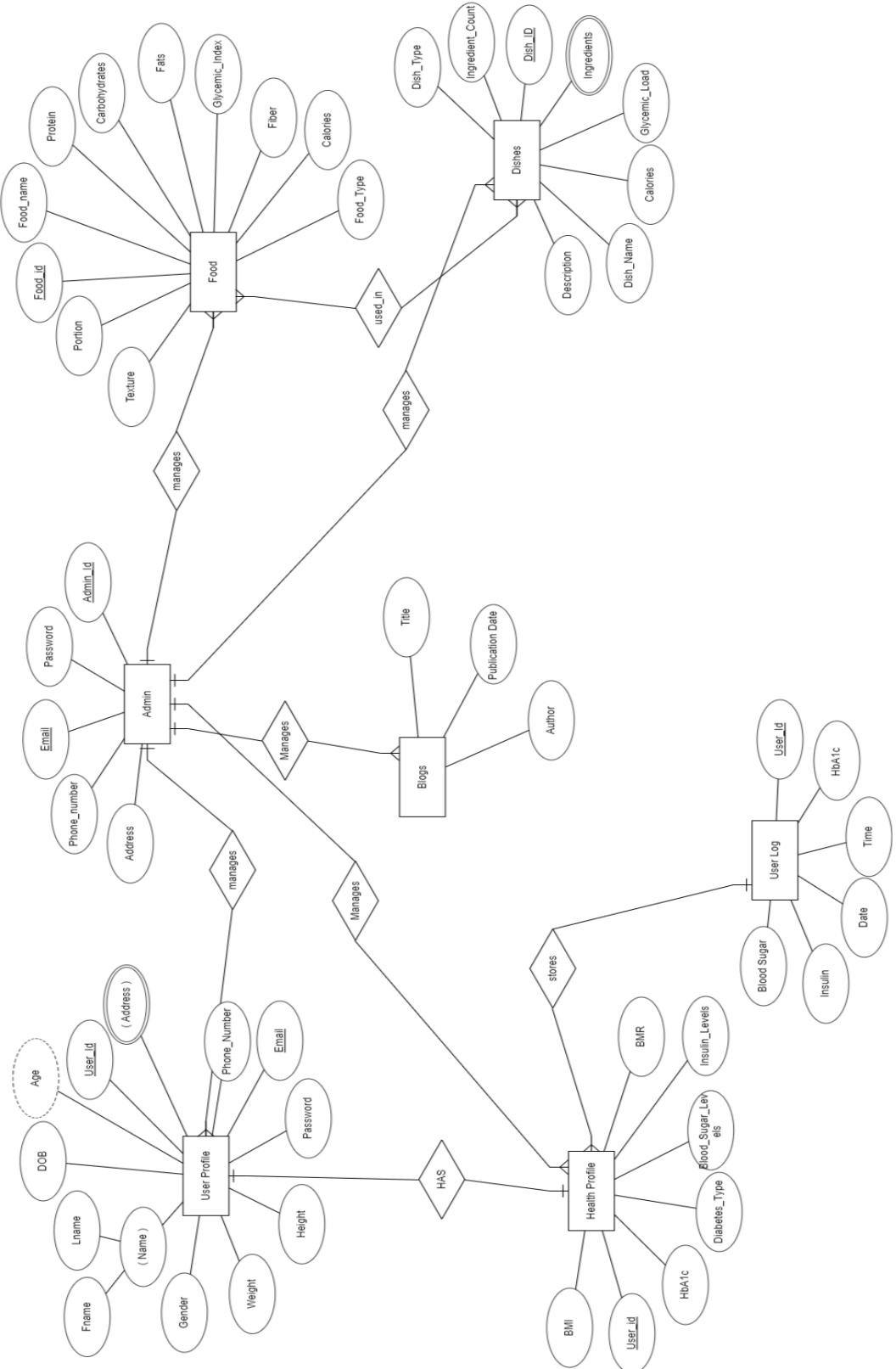
#### Diagrams and Descriptions:

## 1. Component Diagram



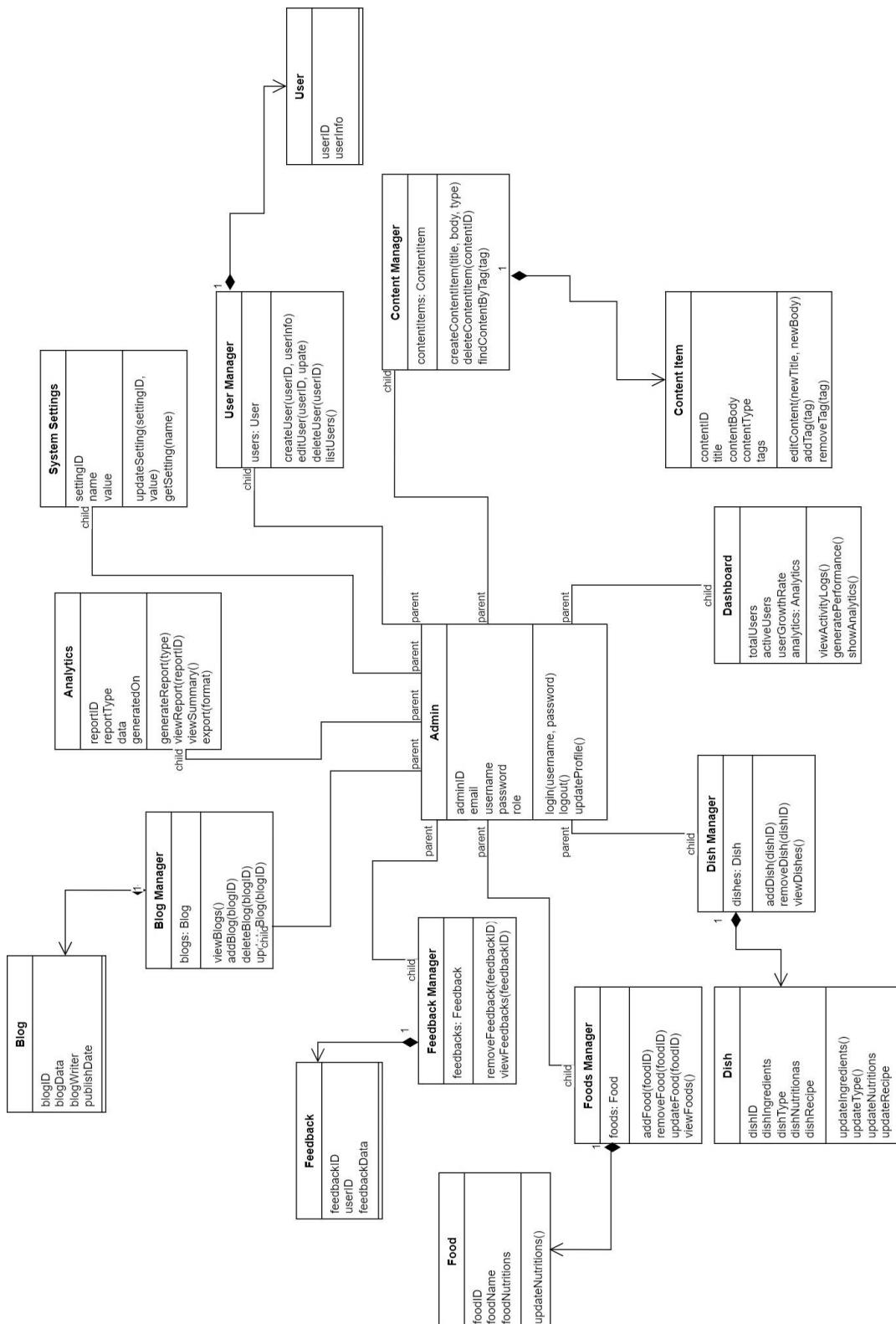
The Component Diagram illustrates the high-level architecture of the SugarSage system, showing the main components like the mobile app (for both users and admins), backend server, database, and machine learning model. It highlights the interaction between these components and subsystems, such as authentication, health data, diet plan, activity data, and notification service.

## 2. ER Diagram



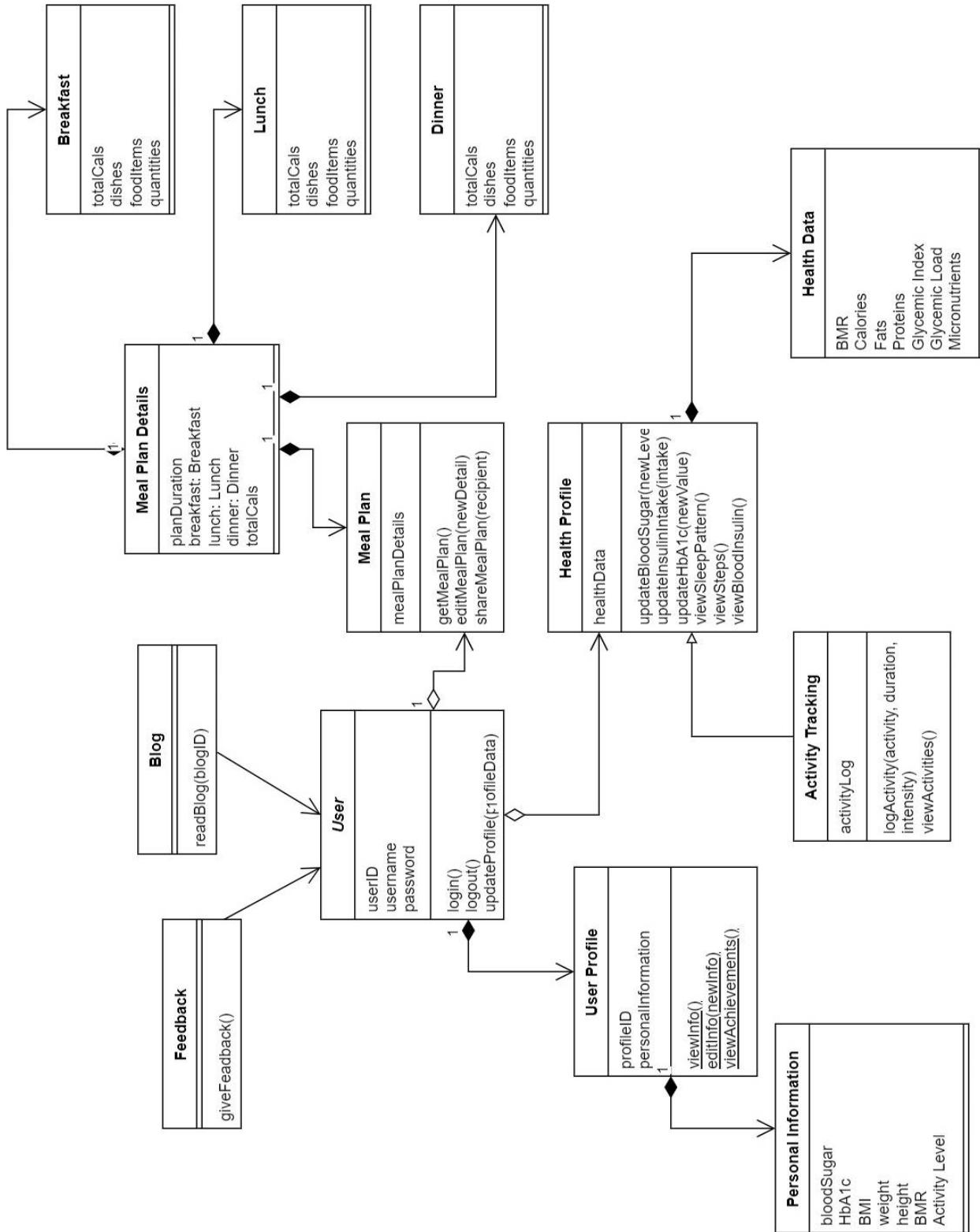
The Entity-Relationship (ER) Diagram depicts the data model of the SugarSage system, showing the entities (tables) like User Profiles, Admin, Blogs, Food, Dishes, and their relationships. It includes attributes of each entity and the types of relationships (one-to-many, many-to-many) between them.

### 3. Admin Class Diagram



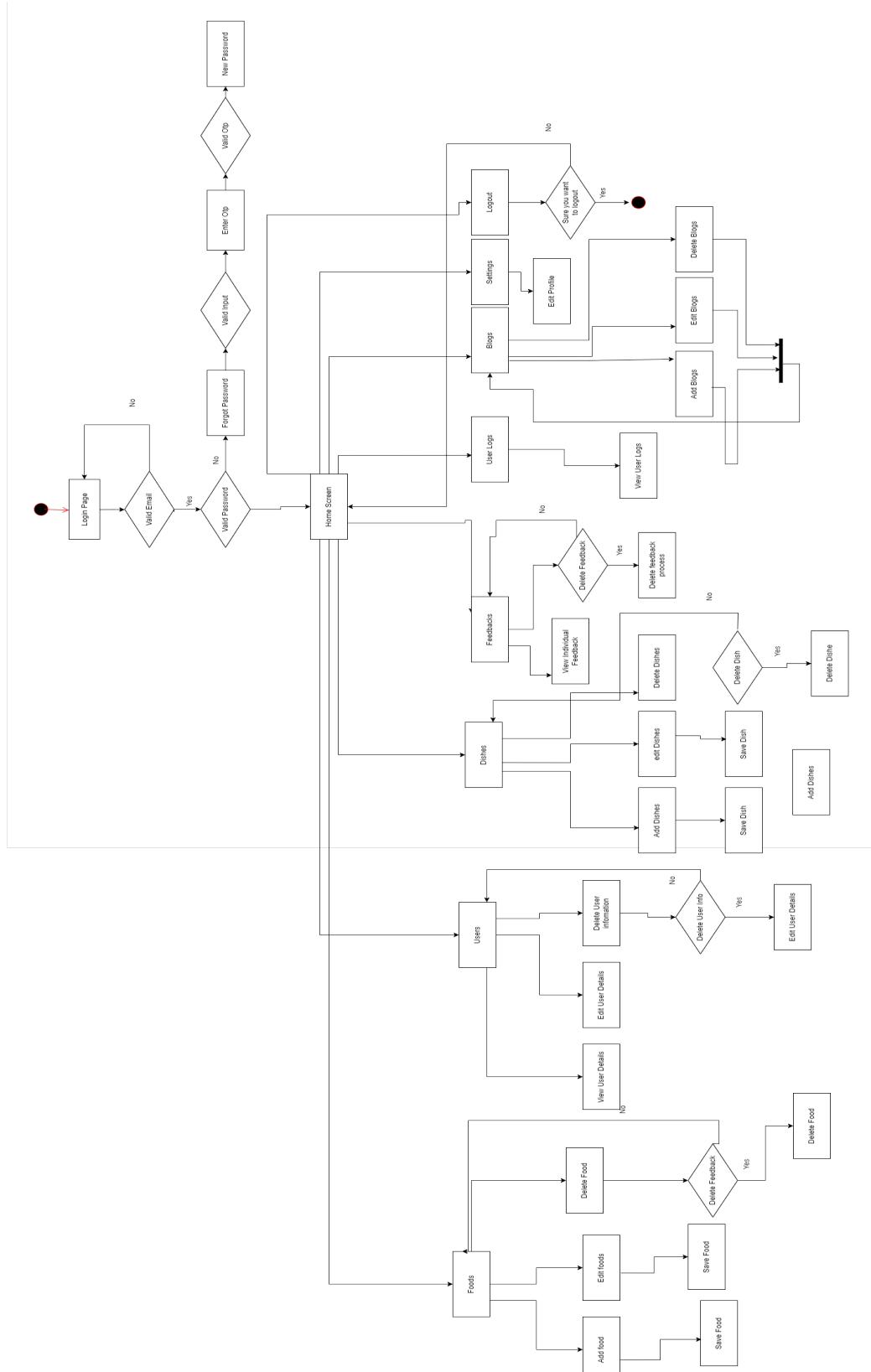
This diagram visualizes the structure of the administrative side of the SugarSage system, detailing the classes involved in the admin functionalities, their attributes, and methods. It includes classes like Admin, Blog Manager, Feedback Manager, Foods Manager, Dish Manager, Analytics, System Settings, User Manager, Content Manager, and Dashboard. The relationships (inheritance, composition, etc.) between the classes are also depicted.

#### 4. User Class Diagram



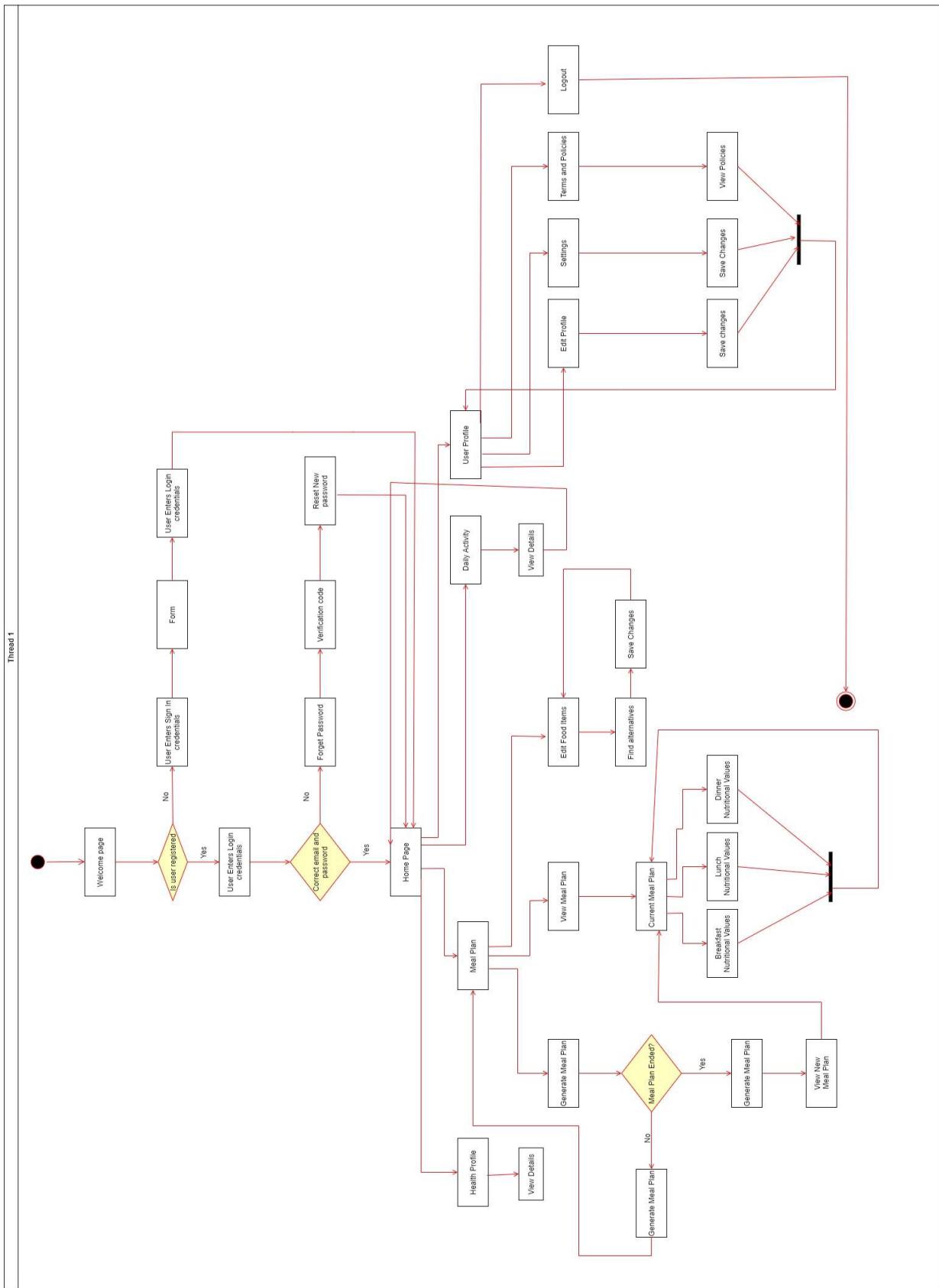
This diagram represents the classes related to the user functionalities within the SugarSage system. It shows classes such as User, User Profile, Personal Information, Activity Tracking, Blog, Feedback, Meal Plan, Health Profile, and Meal Plan Details. This diagram includes attributes, methods, and the relationships between the classes, emphasizing how users interact with the system's features.

## 5. Admin Activity Diagram



The Admin Activity Diagram is a flowchart that details the various actions an admin can perform within the SugarSage system. It covers processes such as logging in, managing user information, editing foods, handling feedback, and managing blog content, providing a visual guide to the admin's workflow and decision points.

## 6. User Activity Diagram



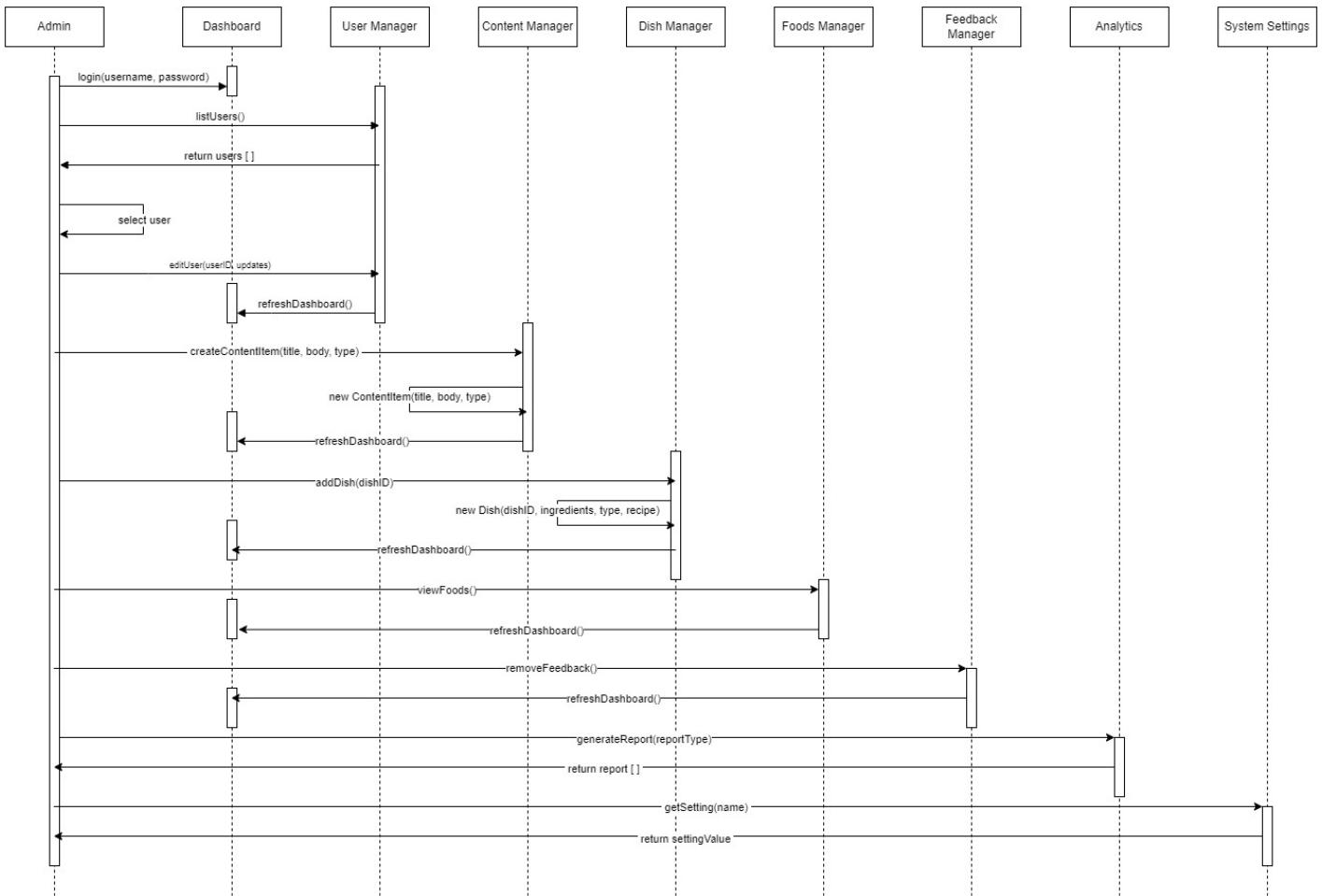
This diagram shows how users navigate the SugarSage system, from the welcome page to managing their health profile, meal plans, daily activities, and profile settings.

## 3.2 Component Interactions and Collaborations

The components interact through well-defined API calls and responses. The User Profile component communicates with the Health Tracker to update and retrieve health metrics. The Meal Planner interacts with the User Profile to tailor diet plans based on user health data. The Feedback module lets users communicate their experience directly to the system administrators. Blog Reading enables users to access educational content provided by the system.

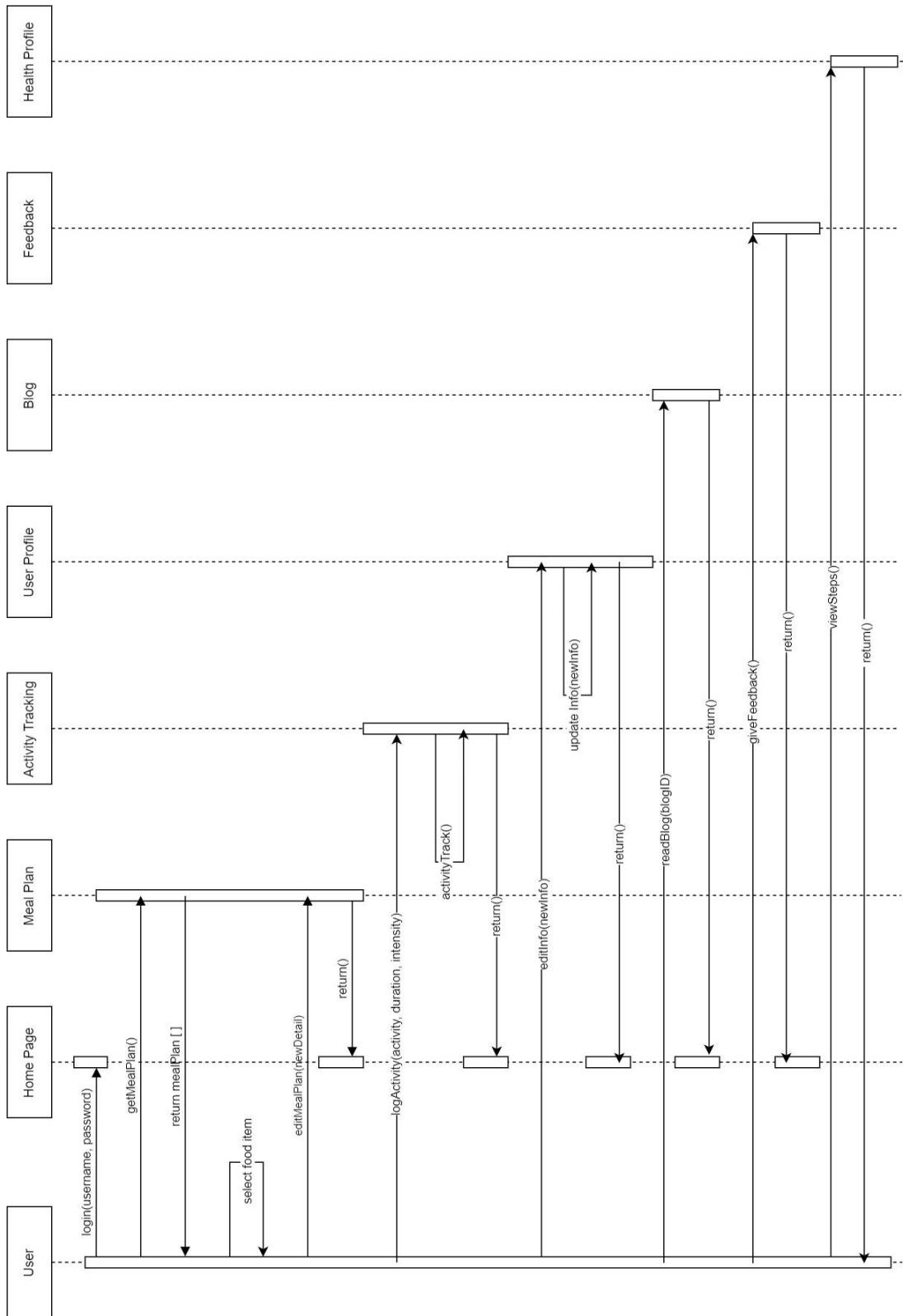
Design Level Sequence Diagrams, Collaboration Diagrams, and Event Trace diagrams will illustrate the detailed interactions and collaborations of these components. These diagrams will show more details than in Phase 1, with explicit message calls, return values, and sequence flows.

### 1. Admin Sequence Diagram



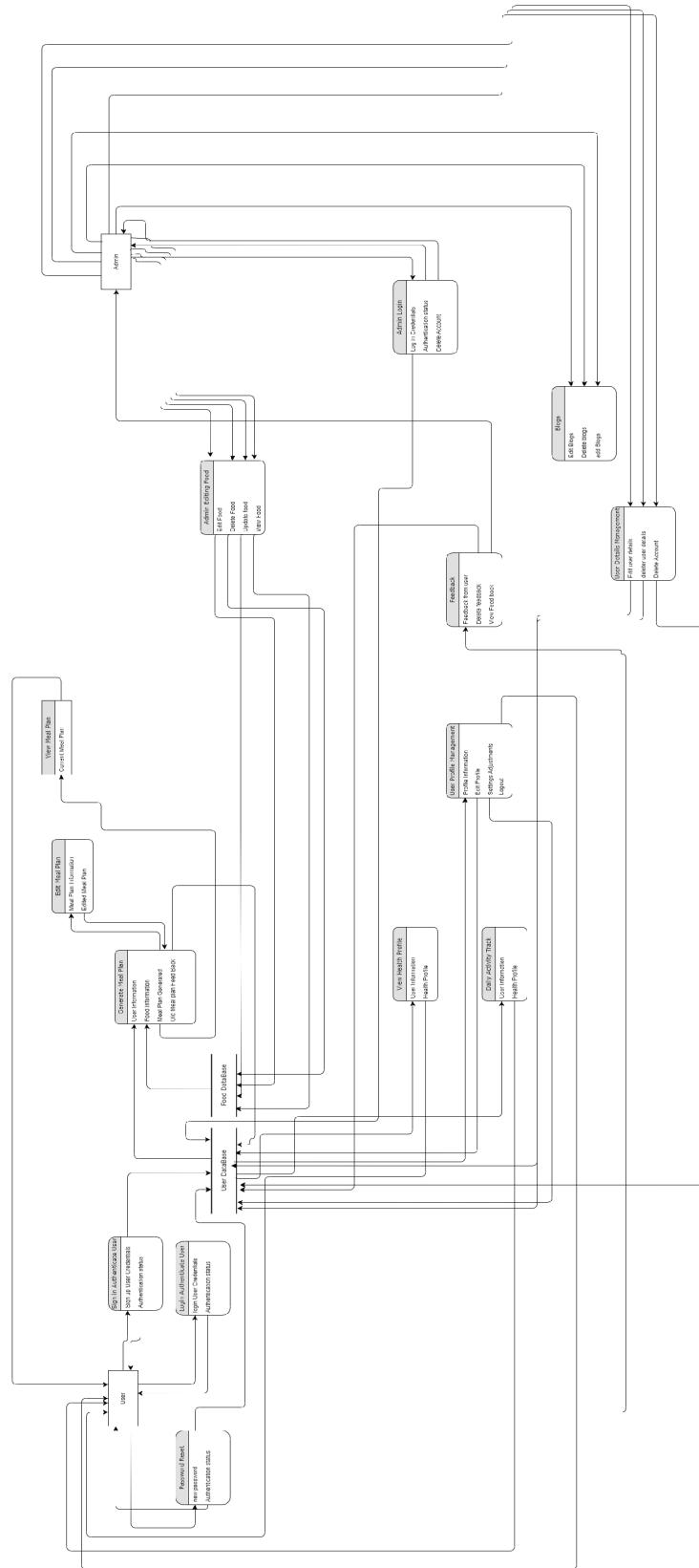
This sequence diagram provides a detailed interaction flow for administrative actions within the SugarSage system. It outlines the sequence of method calls between components such as the Admin, Dashboard, User Manager, Content Manager, Dish Manager, Foods Manager, Feedback Manager, Analytics, and System Settings when an admin performs tasks like user management or content creation.

## 2. User Sequence Diagram



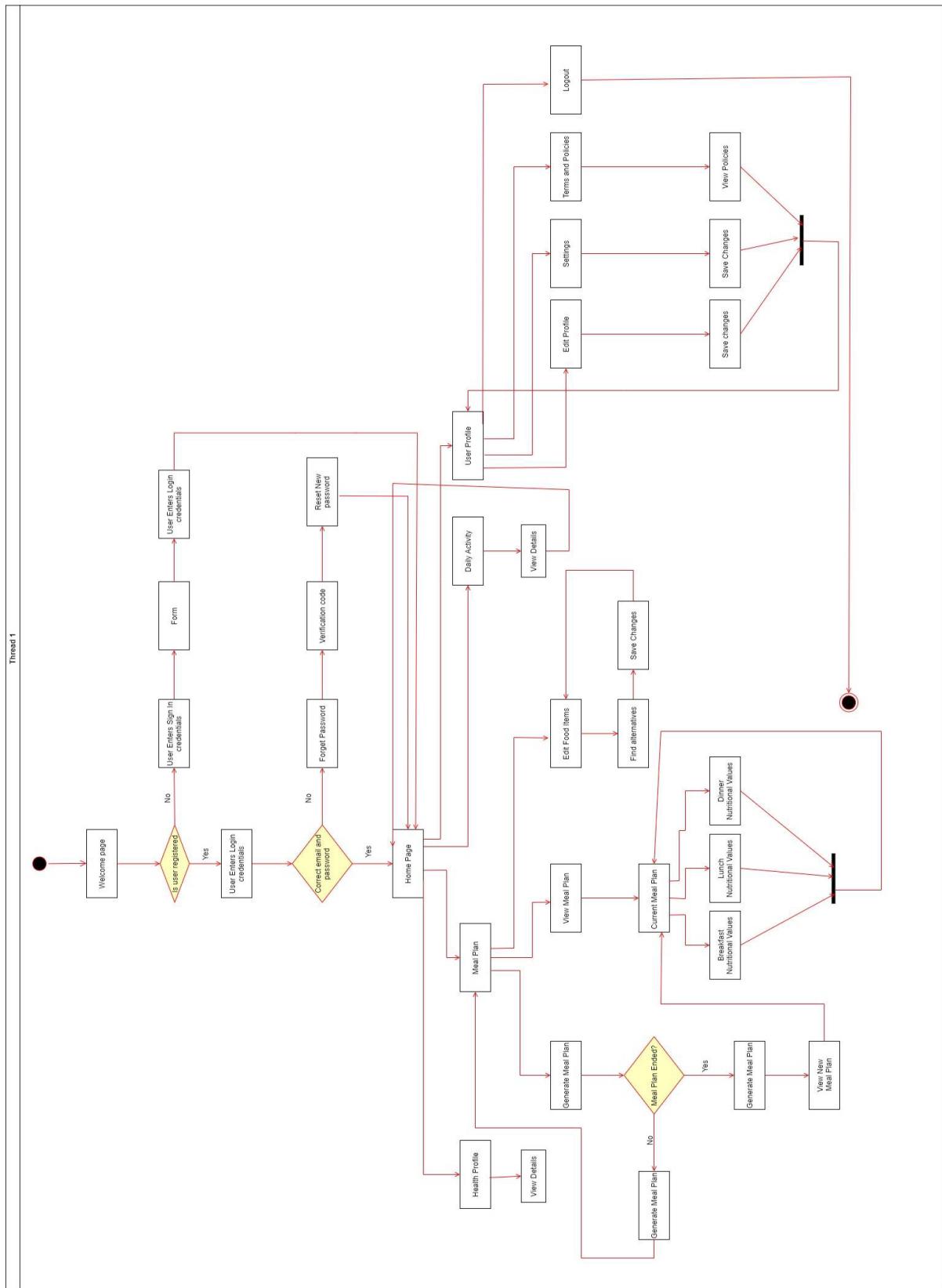
This diagram displays the sequence of interactions from a user's perspective as they navigate the SugarSage system. It includes method calls among components like User, Home Page, Meal Plan, Activity Tracking, User Profile, Blog, Feedback, and Health Profile. It shows how users might log in, manage their meal plans, track activities, and read blogs.

### **3. Data Flow Diagram**



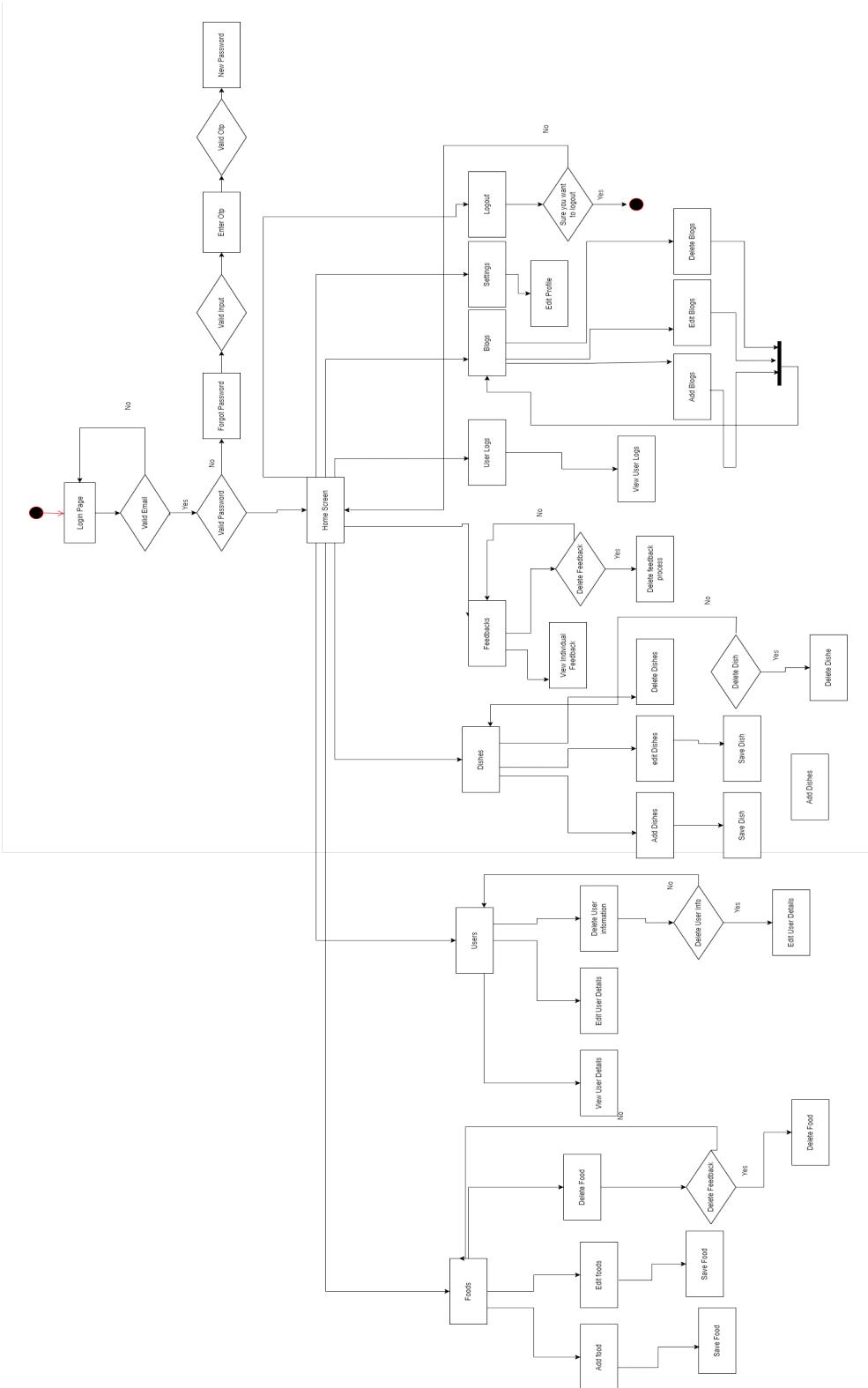
The Data Flow Diagram visually represents data flow within the SugarSage system. It maps out how data is input, processed, and output by different entities in the system, including user and admin interactions, information storage, and the processing of health data, meal plans, and feedback.

#### 4. User Activity Diagram



This diagram shows how users navigate the SugarSage system, from the welcome page to managing their health profile, meal plans, daily activities, and profile settings.

## **5. Admin Activity Diagram**



The Admin Activity Diagram is a flowchart that details the various actions an admin can perform within the SugarSage system. It covers processes such as logging in, managing user information, editing foods, handling feedback, and managing blog content, providing a visual guide to the admin's workflow and decision points.

### **3.3 Design Reuse and Design Patterns**

In developing our SugarSage system, we will incorporate strategies for design reuse and apply design patterns to ensure efficiency, maintainability, and scalability.

#### **Design Reuse:**

- Common Libraries:

We will abstract functions and classes that are common across different parts of the system into common libraries. This will include components for user authentication, data validation routines, and error handling. Reusing these libraries will decrease development time and increase code consistency.

- UI Component Library:

A set of reusable user interface components will be created to ensure a consistent user experience across the mobile and web applications. These components will range from form elements to complex data visualization tools.

- Service Layer:

Our system will feature a service layer that abstracts business logic from the controllers, promoting reuse for different parts of the application that require similar business rules processing.

#### **Design Patterns:**

- Model-View-Controller (MVC):

We will employ the MVC pattern to separate concerns, making our system easier to maintain and extend. The Model will manage the data and business logic; the View will handle the presentation of information to the user; the Controller will process user input and update the Model and View accordingly.

- Observer Pattern:

We will utilize the Observer pattern to enable a publish-subscribe model, allowing components to listen and react to events or changes in other components. This pattern will be particularly useful in the SugarSage system for updating user interfaces in response to changes in health data or for dispatching notifications.

- Singleton Pattern:

We will ensure that classes such as the database connection manager or the configuration manager are instantiated only once throughout the application to manage shared resources effectively.

### **3.4 Technology Architecture**

Our anticipated infrastructure for the SugarSage system is designed to be robust and adaptable to the dynamic needs of users and system administrators. The core of our infrastructure will rely on a cloud-based environment, which provides several key advantages:

#### **Cloud-Based Environment:**

- Auto-Scaling:

Our system will leverage the auto-scaling capabilities of the cloud to adjust resources dynamically based on the current load. This ensures the system remains responsive during peak usage times without incurring unnecessary costs during off-peak times.

- High Availability:  
The cloud infrastructure is designed for high availability, with redundancy and failover mechanisms to minimize downtime and ensure users have continuous access to the system.

### **Connectivity Requirements:**

- Internet Access:  
Reliable internet access is a foundational requirement for SugarSage, enabling users to interact with the system from anywhere. Our system will utilize HTTPS protocols to secure all client and server communications.
- Data Security:  
Secure communication channels will be established using the latest encryption standards to protect sensitive user data, including health metrics and personal information.

### **Modes of Operation:**

- Synchronous Online Transactions:  
Our system will support synchronous online transactions, essential for immediate and interactive user experiences. This includes actions like logging meals, tracking blood sugar levels, and receiving real-time feedback.
- Asynchronous Batch Processing:  
In addition to real-time interactions, our system will also handle asynchronous batch processing tasks. These tasks are critical for data analysis, health report generation, and other processes that do not require immediate user interaction.

### **Technology Stack:**

- Open-Source and Proprietary Solutions:  
The technology stack for SugarSage will comprise both open-source and proprietary solutions. Open-source technologies offer the benefits of community support and flexibility, while proprietary solutions can provide specialized functionalities that are crucial for certain aspects of the system.
- Programming Languages and Frameworks:  
We will select programming languages and frameworks that best fit the needs of each component of the system, considering factors such as performance, scalability, and developer expertise.

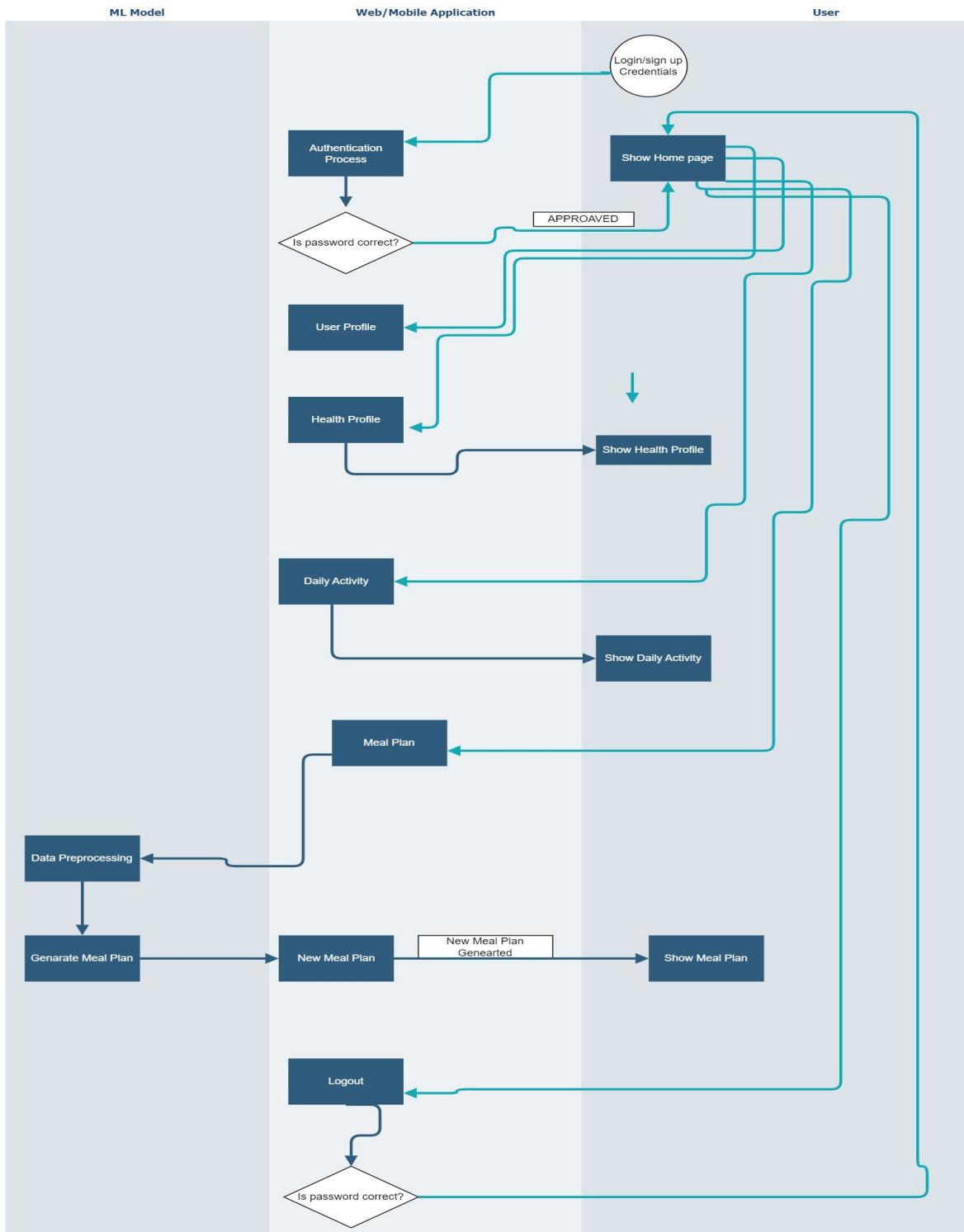
### **System Hosting and Platform:**

- Cloud Platforms:  
Platforms such as AWS or Azure will be used to host our system, offering a range of services from compute instances to managed databases, which are essential for building a scalable and secure system.

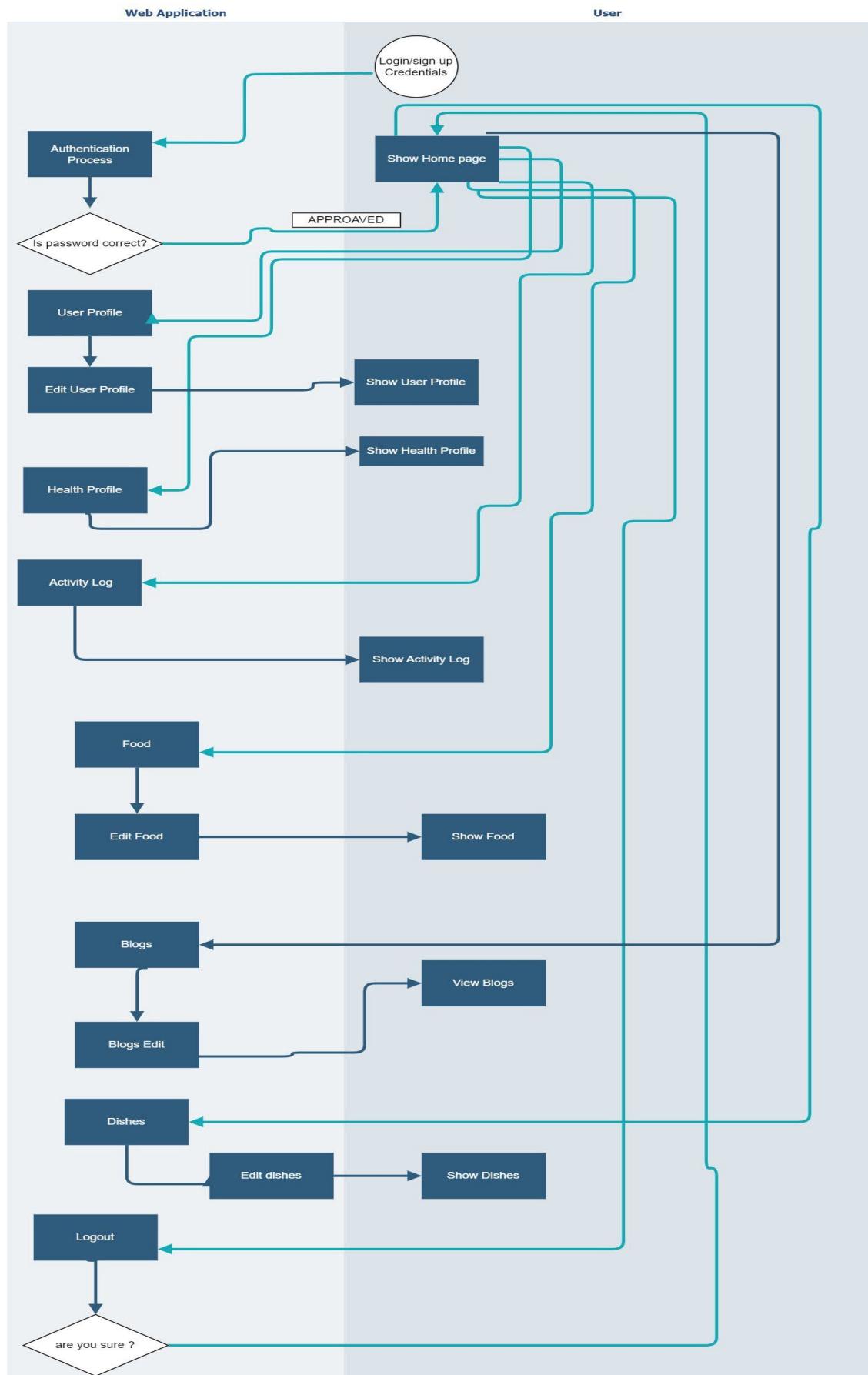
## 4. Screenshots/Prototype

### 4.1 Workflow

#### 1. User Workflow



## 2. Admin Workflow



## 4.2 Screens

### 4.2.1 Mobile App Screens



Welcome to SugarSage!

**Log in**

Don't have an account? [Register](#)

Email Address

Email is required

Password

[Forgot password?](#)

Continue

**Forgot Password**

Email Address

Email is required

Send reset Link



Verify Code

Send reset Link

Reset Password

Password

Confirm Password

Reset





## Sign in

Already have an account? [Login](#)

Email Address

Email is required

Password

Confirm Password

Next

## SugarSage



Kindly enter your latest details

Name

Age

Gender

Blood Sugar Level

Tested 1-3 hours ago

Blood Pressure Level

Tested 1-3 hours ago

HbA1c test percentage value

Body Mass Index (BMI)

Family History

Continue

AGGREMENT

# Terms of Service

Last updated on 5/1/2024

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit qui in ea voluptate velit esse quam nihil molestiae consequatur, vel illum qui dolorem eum fugiat quo voluptas nulla pariatur?



## Eat Healthy

Maintaining good health should be the primary focus of everyone

I agree with all terms and conditions

Continue

Get Started



## Healthy and Local Recipes

Have access to healthy and local recipes



**Get Started**

## Track Your Health

With amazing inbuilt tools you can track  
your progress



**Get Started**



Hello Sara!

Blog

All you need to know about Glycemic Index and Diabetes

Read now



Generate

View now



Weekly Progress

View now



View Meal Plan

View now

Your latest Sugar level

100 mg/dL



Edit Food Items

View now



**SugarSage**

## Breakfast

**Banana Smoothie**

Ingredients

- 1 medium banana
- 2 cup milk
- 1 tbsp peanut butter

**Toast**

Ingredients

- 2 slices of bran bread
- 1 tspn of salted butter

**Nutritional Values**

## Lunch

**Daal Chawal**

Ingredients

- 2 cup Daal masoor
- 1 tbsp red chilli powder
- 3 cloves garlic (chopped)
- 1/3 cup oil
- 3 cup Basmati Chawal
- 1 tbsp salt

**Nutritional Values**

## Dinner

**Chicken Karhai**

Ingredients

- 1kg chicken

**Nutritional Values**

**SugarSage**

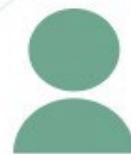
**1. Banana Smoothie ▾**

Calories (kcal)	135
Calories from Fat (g)	8
Total Fat (g)	1
Saturated Fat (g)	0
Cholesterol (mg)	0
Sodium (mg)	18
Total Carbohydrates (g)	41
Dietary Fiber (g)	3
Sugars (g)	28
Protein (g)	3
Vitamin A (% DV)	3%
Vitamin C (%DV)	15%
Calcium (% DV)	5%
Iron (% DV)	2%

**Icons:** Heart, Fork and Spoon, Home, Running, Person.



Profile



Edit Photo



Edit Profile



Settings



Terms and Policy



Logout



Done

Cancel

naufalaziz@email.com

@naufalaziz

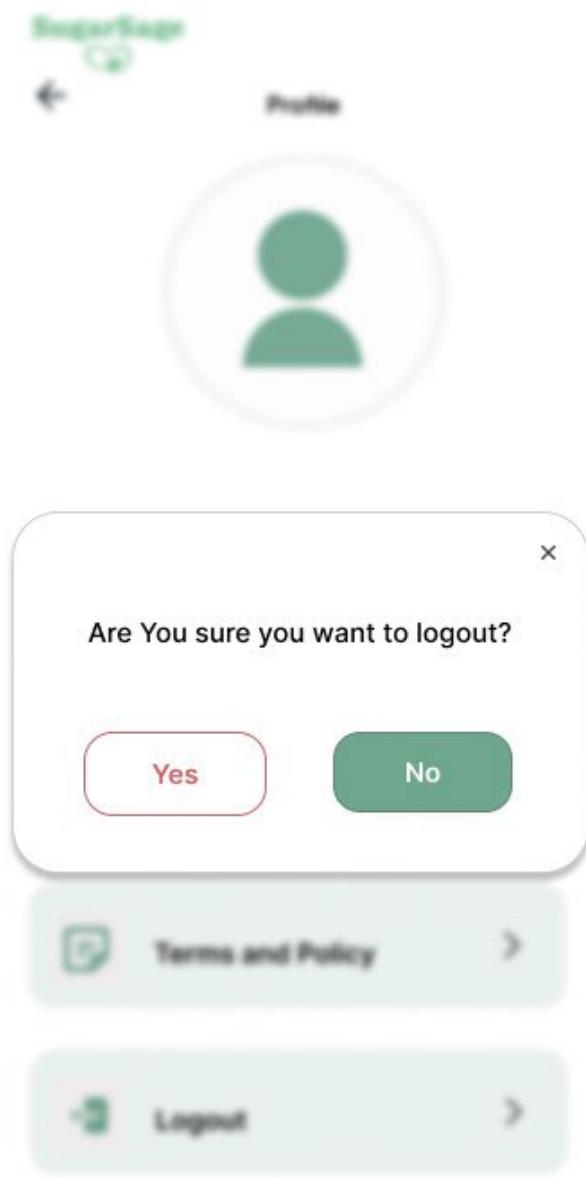
Naufal Aziz

08123456789

••••••••

SHOW





AGGREMENT

## Terms of Service

Last updated on 5/1/2024

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit qui in ea voluptate velit esse quam nihil molestiae consequatur, vel illum qui dolorem eum fugiat quo voluptas nulla pariatur?

Back

The screenshot shows the SugarSage mobile application's Settings screen. At the top left is a back arrow icon. The title "Setting" is centered above a large, stylized heart icon composed of concentric circles in light green, pink, and blue. To the right of the heart are three performance metrics: "Steps" (220 / 10,000), "Active time" (2 / 90 mins), and "Activity Cals" (7 / 500 Cal). Below these metrics is a summary section with "Total Burned Calories" (1,043 cal) and "Distance While Active" (0.16 km). On the left side of the screen, there are several settings options with corresponding toggle switches:

- Edit profile (with a right arrow icon)
- Change password (with a right arrow icon)
- Add a payment method (with a plus sign icon)
- Push notifications (with a toggle switch, currently off)
- Dark mode (with a toggle switch, currently off)

At the bottom of the screen is a navigation bar with five icons: a heart with a plus sign, a fork and knife, a house, a person running, and a magnifying glass.

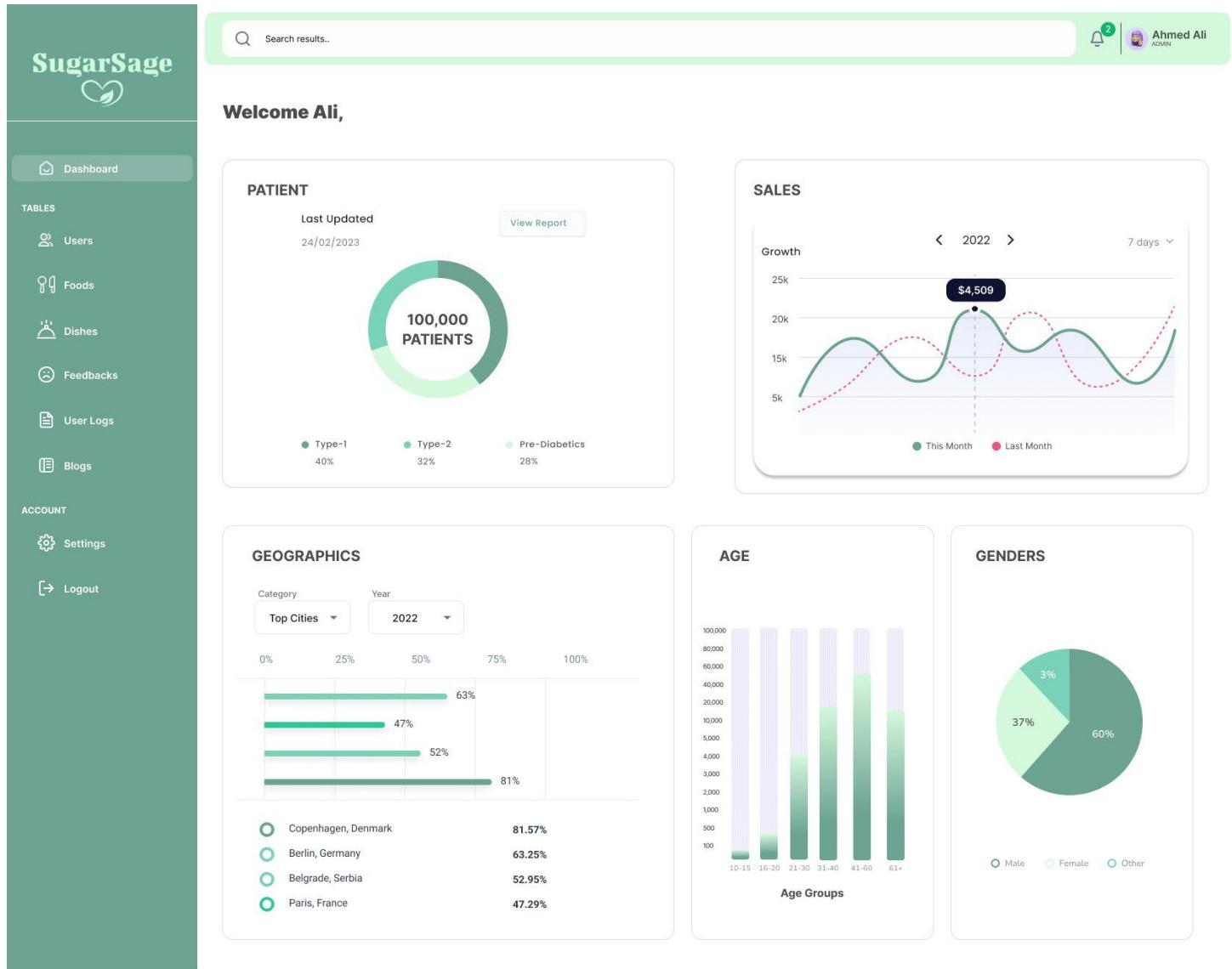


## Health Profile

Diabetic Type	1
BMI value	26.0
BMR value	40.0
HbA1c	5.8%
Glucose Level	85.5
Insulin Level	85.5
Caloric Need	1800
FAT%	25%
Carb%	35%
Protein%	40%



### 4.2.2 Admin Web App Screens





**SugarSage**

Search results..
2
Ahmed Ali  
ADMIN

## Admin Account

**Basic details**


Upload Image

Save

**Delete Account**

Delete your account and all of your source data. This is irreversible.

Delete account



**SugarSage**

Search results..
2
Ahmed Ali  
ADMIN

## Feedbacks

Search user feedbacks
Last update (newest)

FEEDBACK ID	EMAIL ADDRESS	DESCRIPTION	FEEDBACK TYPE	TIME	DATE	ACTIONS
01	carson.derrin@deverlo.co	The diet planner is...	POSITIVE	19:30:01	27/01/2024	<span>→</span> <span>⋮</span>
02	carson.derrin@deverlo.co				27/01/2024	<span>→</span> <span>⋮</span>
03	carson.derrin@deverlo.co				27/01/2024	<span>→</span> <span>⋮</span>
04	carson.derrin@deverlo.co				27/01/2024	<span>→</span> <span>⋮</span>
05	carson.derrin@deverlo.co	Thanks to this app...	POSITIVE	00:20:05	27/01/2024	<span>→</span> <span>⋮</span>

Rows per page: 5 1-5 of 100

Are you sure you want to logout?

Cancel
Logout

**SugarSage**  


Search results..
Sort By  
Last update (newest)

## Feedbacks

FEEDBACK ID	EMAIL ADDRESS	DESCRIPTION	FEEDBACK TYPE	TIME	DATE	ACTIONS
01	carson.darrin@devias.io	The diet planner is...	POSITIVE	15:30:01	27/01/2024	
02	carson.darrin@devias.io	I had a great...	POSITIVE	02:31:59	27/01/2024	
03	carson.darrin@devias.io	It's superubbbl!	POSITIVE	24:31:31	27/01/2024	
04	carson.darrin@devias.io	Best dinner recom...	POSITIVE	06:35:24	27/01/2024	
05	carson.darrin@devias.io	Thanks to this app..	POSITIVE	00:20:05	27/01/2024	

Rows per page: 5 ▾ 1-5 of 100 < >

**SugarSage**  


Search results..
Sort By  
Last update (newest)

## Feedbacks

FEEDBACK ID	EMAIL ADDRESS	DESCRIPTION	FEEDBACK TYPE	TIME	DATE	ACTIONS
01	carson.darrin@devias.io	The diet planner is...	POSITIVE	15:30:01	27/01/2024	
02	carson.darrin@devias.io	Are you sure you want to delete this feedback?			27/01/2024	
03	carson.darrin@devias.io	Best dinner recom...	POSITIVE	06:35:24	27/01/2024	
04	carson.darrin@devias.io	Thanks to this app..	POSITIVE	00:20:05	27/01/2024	

Rows per page: 5 ▾ 1-5 of 100 < >

**SugarSage**



- Dashboard
- Tables
  - Users
  - Foods
  - Dishes
  - Feedbacks
- User Logs
- Blogs
- Account
  - Settings
  - Logout

Search results..

2 | Ahmed Ali ADMIN

## Feedbacks

**Feedback #10**

Email Address	carson.darrin@gmail.com	Feedback Type	Positive
Description	15:30:01 @ 27/01/2024		
<p>Dear SugarSage Team,</p> <p>I wanted to take a moment to share my experience using your diabetic diet planner app. As someone who has been managing diabetes for several years, finding the right tools to support my dietary needs has been crucial, and I must say your app has been a game-changer for me.</p> <p>First and foremost, the personalized meal plans based on my current sugar levels have been incredibly helpful. The ability to input my glucose readings and have the app generate meal suggestions tailored to my needs has made managing my condition much easier. It takes the guesswork out of meal planning and ensures that I'm making choices that are in line with my health goals.</p> <p>I also appreciate the variety of meal options available. Whether I'm in the mood for something light and refreshing or a more hearty meal, the app offers a wide range of recipes and meal ideas to choose from. The recipes are not only delicious but also easy to follow, which is perfect for someone like me who isn't a master chef in the kitchen.</p> <p>Another feature that I find particularly useful is the ability to track my progress over time. Being able to see how my glucose levels have responded to different meals and dietary changes has been eye-opening. It allows me to identify patterns and make adjustments as needed to keep my diabetes in check.</p> <p>Overall, I couldn't be happier with your app. It has truly become an indispensable tool in my daily routine, and I'm grateful for the positive impact it has had on my health and well-being. Thank you for creating such a valuable resource for individuals like myself who are managing diabetes.</p> <p>Sincerely, Mohammad Ali</p>			

<< Go Back

**SugarSage**



- Dashboard
- Tables
  - Users
  - Foods
  - Dishes
  - Feedbacks
  - Activity Logs
- Blogs
- Account
  - Settings
  - Logout

Search results..

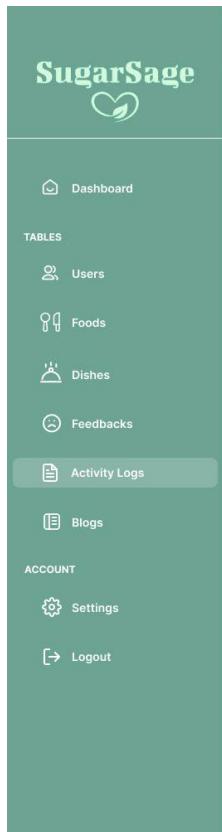
2 | Ahmed Ali ADMIN

## Activity Log

#	ACT ID	EMAIL ADDRESS	DESCRIPTION	TIME	DATE	ACTIONS
01	01	carson.darrin@devias.io	User has updated their BMI values.	15:30:01	27/01/2024	<a href="#">→</a>
02	02	carson.darrin@devias.io	User has initiated a meal plan request.	02:31:59	27/01/2024	<a href="#">→</a>
03	03	carson.darrin@devias.io	User has entered their daily glucose input.	24:31:31	27/01/2024	<a href="#">→</a>
04	04	carson.darrin@devias.io	User has updated their name.	06:35:24	27/01/2024	<a href="#">→</a>
05	05	carson.darrin@devias.io	User has uploaded a feedback.	00:20:05	27/01/2024	<a href="#">→</a>

Sort By  
Last update (newest)

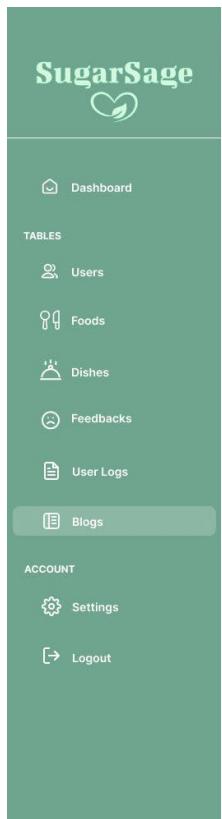
Rows per page: 5 ▾ 1–5 of 10,032 < >



Activity Log

#	ACT ID	EMAIL ADDRESS	DESCRIPTION	TIME	DATE	ACTIONS
01	01	carson.darrin@devias.io	User has updated their BMI values.	15:30:01	27/01/2024	<a href="#">→</a>
02	02	carson.darrin@devias.io	User has initiated a meal plan request.	02:31:59	27/01/2024	<a href="#">→</a>
03	03	carson.darrin@devias.io	User has entered their daily glucose input.	24:31:31	27/01/2024	<a href="#">→</a>
04	04	carson.darrin@devias.io	User has updated their name.	06:35:24	27/01/2024	<a href="#">→</a>
05	05	carson.darrin@devias.io	User has uploaded a feedback.	00:20:05	27/01/2024	<a href="#">→</a>

Rows per page: 5 ▾ 1–5 of 10,032 < >



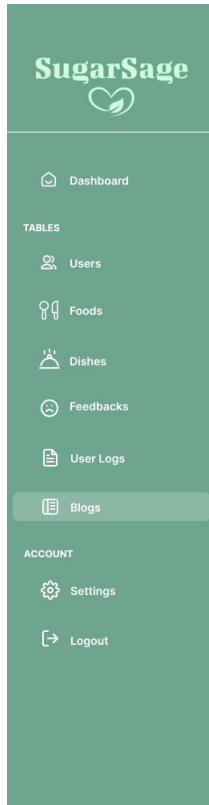
Blogs

Add Blog

#	BLOG ID	SUBJECT	DESCRIPTION	AUTHOR	DATE	TIME	URL	ACTIONS
01	01	What is Diabetes Type-1? Symptoms, Causes, Diagnosis..	The American Diabetes Association's...	Sheryl Huggins Salomon	27/01/2024	15:30:01	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
02	02	Even Temporary Type 2 Diabetes Remission Brings Huge..	New study results are..	K. Aleisha Fettters	10/08/2023	21:10:01	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
03	03	The Effects of Plant-Based Diets on Blood Sugar & Type 2 Diabetes	Countless studies consistently...	Diana Licalzi	21/02/2023	05:02:00	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
04	04	The Type 2 Diabetes Facts and Statistics You Need to Know	Type 2 diabetes..	Sheryl Huggins Salomon	02/01/2022	01:00:55	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
05	05	Why You Should Be Lifting Weights if You Have Type 2 Diabetes	Strength training shows..	K. Aleisha Fettters	17/05/2024	18:46:20	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>

Rows per page: 5 ▾ 1–5 of 150 < >

## SugarSage – AI Companion For Diabetics



Search results..

Ahmed Ali ADMIN 2

### Blogs > Add Blog

#### Blog

Author: Diana Licalzi URL: <https://www.everydayhealth.com/type-1-diabetes/guide/>

Subject: What Is Type 1 Diabetes? Symptoms, Causes, Diagnosis, and Treatment

Description:

In the normal digestive process, your body breaks down much of the food you eat into glucose, a simple sugar that's stored in your body and used for energy. The hormone insulin, produced by the pancreas, regulates the amount of glucose in your blood by helping liver, muscle, and fat cells absorb the sugar. (2)

With type 1 diabetes, the body's immune system attacks and destroys the pancreas's insulin-producing beta cells. Without that hormone, blood sugar rises too high, causing hyperglycemia.

"We don't know exactly what triggers this autoimmune process to start," says Charles Scott Thomas, MD, an endocrinologist at Kaiser Permanente Los Angeles Medical Center in Los Angeles. "There is likely a genetic component that places patients at risk, with some environmental influences as well."

People who have type 1 diabetes must replace insulin every day through injections or infusion and monitor their blood glucose throughout the day. (1)

Type 1 vs. Type 2 Diabetes

Type 1 and type 2 diabetes produce the same result: blood sugar that is too high. But they do it in very different ways.

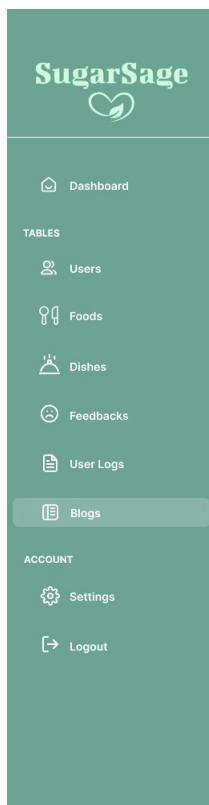
As mentioned, type 1 diabetes is an autoimmune disorder that results in the body being able to produce little or no insulin. It cannot be prevented. (3)

Type 2 diabetes develops when liver, muscle, and fat cells don't respond properly to insulin and become "insulin resistant." Glucose doesn't enter the cells as efficiently as before and instead builds up in the bloodstream.

In type 2 diabetes, the pancreas responds to these increased blood glucose levels by producing more insulin. Eventually, however, it can no longer make enough insulin to handle spikes in glucose levels, such as routine rises in blood sugar after a meal.

Type 2 diabetes accounts for 90 to 95 percent of all diagnosed cases of diabetes. It can be prevented or delayed in many cases with diet and exercise changes. (4)

Upload Cancel



Search results..

Ahmed Ali ADMIN 2

### Blogs > Edit Blog

#### Blog

Author: Diana Licalzi URL: <https://www.everydayhealth.com/type-1-diabetes/guide/>

Subject: Causes, Diagnosis, Treatment of Type-1 Diabetes

Description:

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Type 1 and type 2 diabetes produce the same result: blood sugar that is too high. But they do it in very different ways.

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Update Cancel

## SugarSage – AI Companion For Diabetics

**SugarSage**

Dashboard

Tables

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Account

- Settings
- Logout

Search results..

Ahmed Ali ADMIN

### Blogs

Add Blog

Search blog

Sort By Last update (newest)

#	BLOG ID	TOPIC	DESCRIPTION	AUTHOR	URL	ACTIONS
01	01	What Is Diabetes Type-1? Symptoms, Causes, Diagnosis...	The American Diabetes Association...	Sheryl Huggins Salomon	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
02	02	Even Temporary Remission Brings...			<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
03	03	The Effects of P... on Blood Sugar &...			<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
04	04	The Type 2 Diabetes Statistics You Need...			<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>
05	05	Why You Should Be Lifting Weights If You Have Type 2 Diabetes	Strength training shows...	K. Aleisha Fetters	<a href="#">LINK</a>	<a href="#"></a> <a href="#"></a>

Are you sure you want to delete this blog?

[Cancel](#) [Delete](#)

Rows per page: 5 1-5 of 150 < >

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Search results..

Ahmed Ali ADMIN

### Users

User Profile Health Profile

Search user

Sort By Last update (newest)

#	EMAIL ID	FULL NAME	DOB	PASSWORD	COUNTRY	SEX	WEIGHT (KGS)	HEIGHT	PHONE NO.	ACTIONS
01	ahmed@gmail.com	Ahmed Ali	10/11/2002	pass%123	Pakistan	M	95	6.2	+92 3123123121	<a href="#"></a> <a href="#"></a>
02	alex@outlook.com	Alex Wassabi	25/02/1992	pass%123	United States	M	95	5.11	+92 3123123121	<a href="#"></a> <a href="#"></a>
03	khizar@gmail.com	Khizar Iqbal	28/04/2000	pass%123	KSA	M	95	5.7	+92 3123123121	<a href="#"></a> <a href="#"></a>
04	hamail@outlook.com	Hamail Shahbaz	16/06/2003	pass%123	UAE	M	95	5.3	+92 3123123121	<a href="#"></a> <a href="#"></a>
05	safoora@gmail.com	Safoora Masood	18/02/2002	pass%123	Pakistan	M	95	5.2	+92 3123123121	<a href="#"></a> <a href="#"></a>

Rows per page: 5 1-5 of 150 < >

## SugarSage – AI Companion For Diabetics

**SugarSage**



Dashboard

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Search results..

Ahmed Ali ADMIN # A001

**Users**

User Profile **Health Profile**

Search user

Sort By **Last update (newest)**

#	EMAIL ID	TYPE	BMI	BMR	HBA1C	GLUCOSE LEVELS	INSULIN LEVELS	CALORIC NEEDS	FAT%	CARB%	PROTEIN%	LIKES	DISLIKES	ALLGGERIES	ACTIONS
01	ahmed@gmail.com	1	26.0	40.0	5.8%	85.5	85.5	1800	25%	35%	40%				
02	alex@outlook.com	2	26.0	39.0	7.0%	95.5	75	1800	25%	35%	40%				
03	khizar@gmail.com	2	26.0	39.5	7.0%	82.5	55.3	1800	25%	35%	40%				
04	hamail@outlook.com	1	26.0	37.0	7.0%	81.5	91.4	1800	25%	35%	40%				
05	safoora@gmail.com	2	26.0	37.5	7.0%	75.5	64.3	1800	25%	35%	40%				

Rows per page: 5 ▾ 1-5 of 150 < >

**SugarSage**



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Search results..

Ahmed Ali ADMIN

**Users** > Edit User

**User # 01**

First Name Ahmed	Last Name Ali				
Email Address ahmedali.syed359@gmail.com	Password pass123				
Phone Number +92 3123123121	Country Pakistan	Sex Male			
Weight (in KGs) 95	Sugar Levels 95	HbA1c Score 95	Sugar Levels 95	Insulin Levels 95	Diabetes Type Type-1
Birth Date 10 Nov 2002					
Likes Watermelon <input checked="" type="checkbox"/> Potato <input checked="" type="checkbox"/> Apple..	Dislikes Eggplant <input checked="" type="checkbox"/> Grapes <input checked="" type="checkbox"/>	Allergies Peanuts <input checked="" type="checkbox"/> Cinnamon <input checked="" type="checkbox"/>			

**Update** **Cancel**

**SugarSage**



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- Blogs

ACCOUNT

- Settings
- Logout

Search results..

Ahmed Ali  
ADMIN # ADO

## Users

User Profile Health Profile

#	EMAIL ID	FULL NAME	DOB	PASSWORD	COUNTRY	SEX	WEIGHT (KGS)	HEIGHT	PHONE NO.	ACTIONS	
01	ahmed@gmail.com	Ahmed Ali	10/11/2002	pass%123	Pakistan	M	95	6.2	+92 3123123121		
02	alex@outlook.com	Alex Wassat						5.11	+92 3123123121		
03	khizar@gmail.com	Khizar Iqbal						5.7	+92 3123123121		
04	hamail@outlook.com	Hamail Shahba						5.3	+92 3123123121		
05	safoora@gmail.com	Safoora Masood	18/02/2002	pass%123	Pakistan	M	95	5.2	+92 3123123121		

Sort By Last update (newest)

Are you sure you want to delete this user?

Cancel Delete

Rows per page: 5 1-5 of 150 < >

**SugarSage**



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Search results..

Ahmed Ali  
ADMIN # ADO

## Foods

Add Food

#	FOOD ID	FOOD NAME	FOOD CATEGORY	SEASON	ENERGY (KCAL)	FATS (G)	PROTEIN (G)	CARBS (G)	GLYCEMIC INDEX	ACTIONS	
01	01	Boiled Potato	Vegetables	Any	93	0.1	1.95	21.45	80		
02	02	Pineapple	Fruits	Summer	50	0.12	0.54	13.12	66		
03	03	Blueberries	Fruits	Any	85	37	78	78	78		
04	04	Whole Milk	Dairy	Any	61	3.2	3.27	4.63	31		
05	05	Apple	Fruits	Any	95	0	1	25	78		

Sort By Last update (oldest)

Rows per page: 5 1-5 of 150 < >

## SugarSage – AI Companion For Diabetics

The screenshot shows the SugarSage application's food addition form. The left sidebar has a dark green background with the SugarSage logo at the top. Below it are sections for TABLES (Users, Foods, Dishes, Feedbacks, User Logs, Blogs) and ACCOUNT (Settings, Logout). The main area has a light green header with a search bar and a notification bell icon with a '2'.

**Foods > Add Food**

**Food # 151**

Form fields:

- Food Name: Banana
- Season: Any
- Food Category: Fruits
- Energy (kCal): 100
- Fats (G): 0
- Protein (G): 1
- Carbohydrates (G): 28
- Glycemic Index: 51

Description box:

A banana is an elongated, edible fruit – botanically a berry – produced by several kinds of large herbaceous flowering plants in the genus Musa. In some countries, bananas used for cooking may be called "plantains", distinguishing them from dessert bananas.

Add Cancel

This screenshot shows the SugarSage application's food update form for the same banana entry. The left sidebar and header are identical to the previous screenshot.

**Foods > Add Food**

**Food # 151**

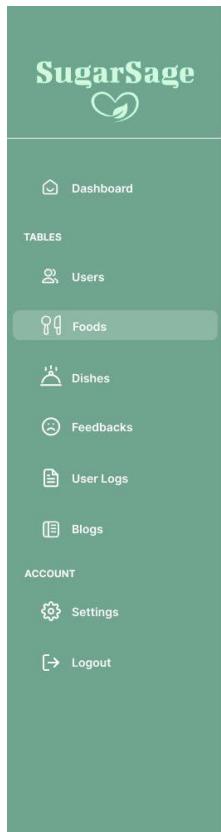
Form fields (updated values):

- Food Name: Banana
- Season: Any
- Food Category: Fruits
- Energy (kCal): 120
- Fats (G): 0
- Protein (G): 5
- Carbohydrates (G): 30
- Glycemic Index: 51

Description box:

Bananas are one of the most popular fruits in the world, especially the yellow Cavendish banana. There are over 1,000 different varieties of bananas. This healthy fruit grows on a banana palm, a large herb, in tropical climates all over the world.

Update Cancel



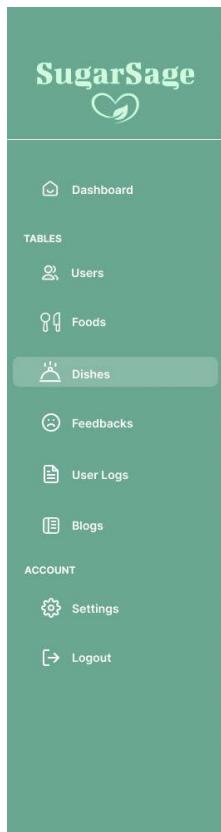
Search results..

Sort By Last update (oldest)

#	FOOD ID	FOOD NAME	FOOD CATEGORY	SEASON	ENERGY (KCAL)	FATS (G)	PROTEIN (G)	CARBS (G)	GLYCEMIC INDEX	ACTIONS
01	01	Boiled Potato	Vegetables	Any	93	0.1	1.95	21.45	80	
02	02	Pineapple	Fruits	Any	1312	66				
03	03	Blueberries	Fruits	Any	78	78				
04	04	Whole Milk	Dairy	Any	4.63	31				
05	05	Apple	Fruits	Any	95	0	1	25	78	

Are you sure you want to delete this Food Item?

Rows per page: 5 ▾ 1–5 of 150 < >



Search results..

Sort By Last update (newest)

#	DISH ID	DISH NAME	DISH CATEGORY	SEASON	TOTAL CALORIES (PER 100G)	PROTEIN (G)	CARBS (G)	FATS(G)	GLYCEMIC LOAD	INGREDIENTS	RECIPE	ACTIONS
01	01	Chapati	Bread	Any	282	9.7	54.7	2.0	28.4	Wheat flour, Salt, Water	Add salt in flour and..	
02	02	Daal Masoor Curry	Lentils	Any	96	5.2	12.6	2.5	25	Lentils, Oil, Garlic, Salt..	Soak lentils in 2 cups of..	
03	03	Alu Ghosht	Curry	Any	120	7.0	13.0	4.0	15.4	Beef, Oil, Potatoes, Onion..	Fry Onions, garlic, ginger..	
04	04	Kofta	Meatballs	Any	152	13.5	14.5	4.0	22.4	Minced Beef, Onion, Green chilli..	Chop all the ingredients..	
05	05	Shami Kebab	Snacks	Any	137	10.2	16.3	3.0	9.4	Minced Chicken, Lentils, Onion, Garlic..	Boil minced meat, daal..	

Rows per page: 5 ▾ 1–5 of 102 < >

**SugarSage**



Dashboard

**TABLES**

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- User Logs
- Blogs

**ACCOUNT**

- Settings
- Logout

Search results..

**Dishes > Add Dish**

**Dish # 103**

Dish Name Chicken Curry	Season Any	Dish Category Curry	
Total Calories (Per 100G) 167	Fats (G) 0	Protein (G) 1	Carbohydrates (G) 28
Glycemic Index 51			
Ingredients Chicken 500g   Oil 100g Onion 200g	Recipe Fry chicken pieces in oil and keep aside. In the same oil fry onions, ginger & garlic. Add spices and tomatoes. Fry well so it resembles a paste. Add chicken pieces and cook until chicken is almost tender. Add water & simmer for 10 minutes. Add garam masala & coriander leaves and serve hot.		

Add Cancel

**SugarSage**



Dashboard

**TABLES**

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- Foods
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- Blogs

**ACCOUNT**

- Settings
- Logout

Search results..

**Dishes > Add Dish**

**Dish # 103**

Dish Name Chicken Curry	Season Any	Dish Category Curry	
Total Calories (Per 100G) 167	Fats (G) 0	Protein (G) 1	Carbohydrates (G) 28
Glycemic Index 51			
Ingredients Chicken 500g   Oil 100g Onion 200g	Recipe Fry chicken pieces in oil and keep aside. In the same oil fry onions, ginger & garlic. Add spices and tomatoes. Fry well so it resembles a paste. Add chicken pieces and cook until chicken is almost tender. Add water & simmer for 10 minutes. Add garam masala & coriander leaves and serve hot.		

Update Cancel

## SugarSage



Search results..
2
Ahmed Ali  
ADMIN # ADD

Dishes												
<a href="#" style="color: #2e6b2e; font-weight: bold;">Add Dish</a>												
Search dishes <span style="float: right;">Sort by Last update (newest)</span>												
#	DISH ID	DISH NAME	DISH CATEGORY	SEASON	TOTAL CALORIES (PER 100G)	PROTEIN (G)	CARBS (G)	FATS(G)	GLYCEMIC LOAD	INGREDIENTS	RECIPE	ACTIONS
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02	01	Daal Masoor Curry	Lentils	Any	180	10.2	16.3	3.0	28.4	Lentils, Oil, Garlic, Salt..	Soak lentils in 2 cups of..	 
03	01	Alu Ghosht	Curry	Any	137	10.2	16.3	3.0	28.4	Beef, Oil, Potatoes, Onion..	Fry Onions, garlic, ginger..	 
04	01	Kofta	Meat	Any	137	10.2	16.3	3.0	28.4	Minced Beef, Onion, Green chili..	Chop all the ingredients..	 
05	01	Shami Kebab	Snacks	Any	137	10.2	16.3	3.0	28.4	Minced Chicken, Lentils, Onion, Garlic..	Boil minced meat, daal..	 

Rows per page: 5 < 1-5 of 150 >

Welcome to SugarSage!

#### Log in

Email is required

Forgot password?

[Continue](#)

F23CS014

SDP Phase II (SDS)

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←

**Forgot password**

Email Address



Email is required

Send reset link



←

**Verify code**

Code:

Verify



←

**Reset password**

Password

Password (Confirm)

Confirm

### **4.2.3 User Web App Screens**



Welcome to SugarSage!

**Log in**

Don't have an account? [Register](#)

Email Address

Email is required

Password

[Forgot password?](#)

[Continue](#)



←

[Forgot password](#)

Email Address

Email is required

[Send reset link](#)





**Sign in**

Already have an account? [Login](#)

Email Address

Email is required

Password

Confirm Password

Next



Kindly enter your latest details

Name

Age

Gender

Blood Sugar Level

Tested 1-3 hours ago

Blood Pressure Level

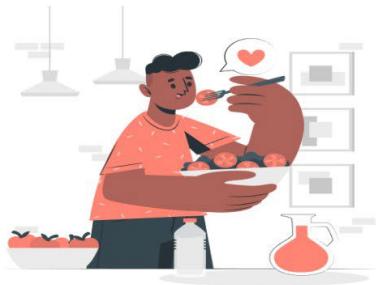
Tested 1-3 hours ago

HbA1c test percentage value

Body Mass Index (BMI)

Family History

Continue



### Eat Healthy

Maintaining good health  
should be the primary focus  
of everyone



[Get Started](#)



### Healthy and Local Recipes

Have access to healthy and  
local recipes



[Get Started](#)



### Track your Health

With amazing inbuilt tools  
you can track your progress



Get Started

**Welcome Ali,**

**MOVE**

**49/300 CAL**

12:00 6:00 12:00 6:00

TOTAL: 1,847 CAL

**ACTIVITY**

**Move 24/300CAL**  
Steps 991  
Distance 0.69KM

**SLEEP STATS**

● Deep	● Light
%45	%32
● Awake	● Quality
%28	%87

**IDEAL WEIGHT**

Your Weight Ideal Weight

80 kg  
70 kg  
60 kg  
50 kg  
40 kg  
30 kg

**RECENT BLOGS**

By Sheryl Huggins Salomon  
What Is Type 1 Diabetes? Symptoms, Causes, Diagnosis, and Treatment

By Diana Licalzi  
The Effects of Plant-Based Diets on Blood Sugar in Type 2 Diabetes

By Sheryl Huggins Salomon  
The Type 2 Diabetes Facts and Statistics You Need to Know

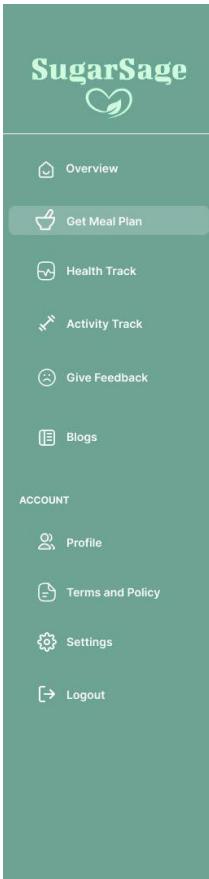
Overview
Get Meal Plan
Health Track
Activity Track
Give Feedback
Blogs

Profile
Terms and Policy
Settings
Logout

2

Khizar Iqbal

USER #003



Search results..

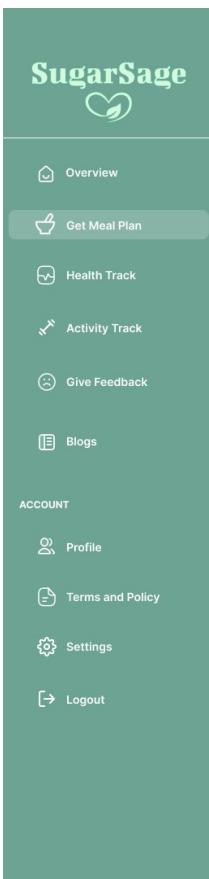
2 Ahmed Ali ADMIN

## Meal Planning

Generate Meal Plan
View now

View Meal Plan
View now

Edit Meal Plan
View now



Search results..

2 Ahmed Ali ADMIN

## Meal Planning > View Meal Plan

**Meal Plan 1**

**Breakfast**

**Banana Smoothie**

Ingredients

- 1 medium banana
- 2 cup milk
- 1 tbsp peanut butter

**Toast**

Ingredients

- 2 slices of bran bread
- 1 tspn of salted butter

Nutritional Values

**Meal Plan 2**

**Breakfast**

**Strawberry Smoothie**

Ingredients

- 4-5 strawberries
- 2 cup milk
- 1 tbsp peanut butter

**Toast**

Ingredients

- 2 slices of bran bread
- 1 tspn of salted butter

Nutritional Values

**Meal Plan 3**

**Breakfast**

**Chai**

Ingredients

- 1.5 cup milk
- Tea leaves
- 1/2 tspn sugar

**Toast**

Ingredients

- 2 slices of bran bread
- 1 tspn of salted butter

Nutritional Values

**Lunch**

**Daal Chawal**

Ingredients

- 2 cup Daal masoor
- 1 tbsp red chilli powder
- 3 onions (chopped)
- 1/3 cup oil
- 3 cup Basmati Chawal
- 1 tbsp salt

Nutritional Values

**Lunch**

**Alu Ghosht**

Ingredients

- Beef 250g
- Oil 50g
- Potatoes (pieces)
- Onion (chopped)
- Tomato (chopped)

Nutritional Values

**Lunch**

**Daal Chawal**

Ingredients

- 2 cup Daal masoor
- 1/2 cup red chilli powder
- 3 onions (chopped)
- 1/3 cup oil
- 3 cup Basmati Chawal
- 1 tbsp salt

Nutritional Values

**Dinner**

**Chicken Karhai**

Ingredients

- 1kg chicken
- 3 onions (chopped)
- 1 tbsp garlic-ginger paste
- 2 tbps salt
- 1 pinch red chilli powder
- 1/3 cup oil

Nutritional Values

**Dinner**

**Daal Masur Curry**

Ingredients

- Lentil (daal masur) (1 cup) 250g
- Ghee/oil (4 tablespoon) 40g
- Garlic (crushed) (3 cloves) 3g
- Iodized rock salt (1/2 teaspoon) 4g
- Red chilli powder (1/2 teaspoon) 2g
- Turmeric powder (1/4 teaspoon) 2g
- Cumin seeds (1/2 teaspoon) 2g
- Water (4-5 cups) 1000-2000ml

Nutritional Values

**Dinner**

**Chicken Karhai**

Ingredients

- 1kg chicken
- 1/2 cup red chilli powder
- 1 tbps garlic-chilli powder
- 2 tbps salt
- 1 pinch red chilli powder
- 1/3 cup oil

Nutritional Values

**SugarSage**

- Overview
- Get Meal Plan**
- Health Track
- Activity Track
- Give Feedback
- Blogs

**ACCOUNT**

- Profile
- Terms and Policy
- Settings
- Logout

Search results..

**Meal Planning > View Meal Plan > Nutrition Table**

## Banana Smoothie

NUTRIENTS	AMOUNT
Calories (kcal)	135
Calories from Fat (g)	8
Total Fat (g)	1
Saturated Fat (g)	0
Cholesterol (mg)	0
Sodium (mg)	18
Total Carbohydrates (g)	41
Dietary Fiber (g)	3
Sugars (g)	28
Protein (g)	3
Vitamin A (% DV)	3%
Vitamin C (%DV)	15%
Calcium (% DV)	5%
Iron (% DV)	2%

**SugarSage**

- Overview
- Health Track
- Activity Track
- Feedbacks**
- Blogs

**ACCOUNT**

- Profile
- Terms and Policy
- Settings
- Logout

Search results..

**Feedbacks**

Email Address: mohammad@gmail.com | Feedback Type: Positive

Description: Dear SugarSage Team,  
I wanted to take a moment to share my experience using your diabetic diet planner app. As someone who has been managing diabetes for several years, finding the right tools to support my dietary needs has been crucial, and I must say your app has been a game-changer for me.  
First and foremost, the personalized meal plans based on my current sugar levels have been incredibly helpful. The ability to input my glucose readings and have the app generate meal suggestions tailored to my needs has made managing my condition much easier. It takes the guesswork out of meal planning and ensures that I'm making choices that are in line with my health goals.  
I also appreciate the variety of meal options available. Whether I'm in the mood for something light and refreshing or a more hearty meal, the app offers a wide range of recipes and meal ideas to choose from. The recipes are not only delicious but also easy to follow, which is perfect for someone like me who isn't a master chef in the kitchen.  
Another feature that I find particularly useful is the ability to track my progress over time. Being able to see how my glucose levels have responded to different meals and dietary changes has been eye-opening. It allows me to identify patterns and make adjustments as needed to keep my diabetes in check.  
Overall, I couldn't be happier with your app. It has truly become an indispensable tool in my daily routine, and I'm grateful for the positive impact it has had on my health and well-being. Thank you for creating such a valuable resource for individuals like myself who are managing diabetes.

Sincerely,  
Mohammad Ali

15:29:50 @ 27/01/2024

Upload Cancel

Search results..

2 | Ahmed Ali ADMIN

### Feedbacks

Email Address: mohammad@gmail.com | Feedback Type: Positive

Description: Dear SugarSage Team,  
I wanted to take a moment to share my experience with your app. I must say your app has been a game-changer for me. First and foremost, the personalized meal plan has made managing my condition much easier. It's simple and user-friendly. I also appreciate the variety of meal options available, which are not only delicious but also easy to follow, which is great for someone like me who is not very experienced in cooking. Another feature that I find particularly useful is the ability to track my blood sugar levels and receive reminders to take my insulin. Overall, I couldn't be happier with your app. It has truly become an indispensable tool in my daily routine, and I'm grateful for the positive impact it has had on my health and well-being. Thank you for creating such a valuable resource for individuals like myself who are managing diabetes.

15:29:50 @ 27/01/2024

Sincerely,  
Mohammed Ali

Are you sure you want to upload this feedback?

Upload | Cancel

Upload | Cancel

Search results..

2 | Ahmed Ali ADMIN

### User Profile

Personal Information

Upload Image

First Name: Khizar	Email Address: ahmedali.syed359@gmail.com	Password: pass123
Last Name: Iqbal	Phone Number: +92 3123123121	Country: Pakistan
Last Name: Iqbal	Birth Date: 10 Nov 2002	

Update

### Health Profile

Weight (in KGs): 95	Sugar Levels: 95	HbA1C Score: 4.0	Sugar Levels: 95	Insulin Levels: 20	Diabetes Type: Type-1
Likes: Watermelon, Potato, Apple..	Dislikes: Eggplant, Grapes	Allergies: Peanuts, Cinnamon			

Update

## SugarSage – AI Companion For Diabetics

**SugarSage**  

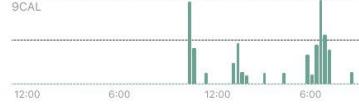

Search results..
2

 Khizar Iqbal  
USER # 003

### Activity Tracking

**MOVE**

**49/300CAL**



9CAL  
12:00 6:00 12:00 6:00  
TOTAL: 1,847 CAL

**ACTIVITY**

**Move 24/300CAL**  
Steps 991  
Distance 0.69 KM

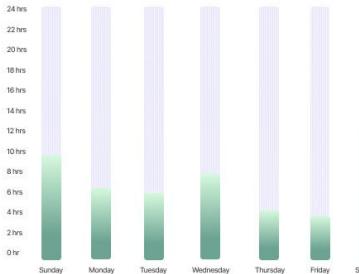


**SLEEP STATS**



- Deep %45
- Light %32
- Awake %28
- Quality %87

**SLEEP PATTERNS**



24 hrs  
22 hrs  
20 hrs  
18 hrs  
16 hrs  
14 hrs  
12 hrs  
10 hrs  
8 hrs  
6 hrs  
4 hrs  
2 hrs  
0 hr  
Sunday Monday Tuesday Wednesday Thursday Friday Saturday

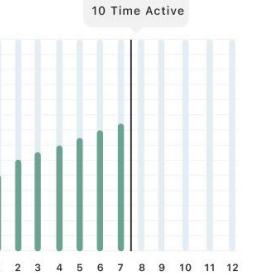
**GOALS**

Lose Weight  
95 kg Current → 85 kg Goal

Steps  
8000 Current → 10,000 Goal

**App Time**

Total 10 Time Active



140  
120  
100  
80  
70  
50  
30  
10  
0  
1 2 3 4 5 6 7 8 9 10 11 12

**SugarSage**  


Search results..
2

 Khizar Iqbal  
USER # 003

### Health Tracking

**BLOOD SUGAR HISTORY**

Select Year  
2023



200  
180  
160  
140  
120  
100  
April June August October December

**CURRENT HEALTH STATUS**

Weight (in KGs)  
64

Height  
5.6

HbA1c Score  
3.2

Current Sugar Levels  
95

Current Insulin Levels  
40

**Update**

**NUTRITIONS**

31% 20g carbs	31% 35g fats	60% 150g protein
---------------------	--------------------	------------------------



1600 Kcal  
-200

F23CS014

SDP Phase II (SDS)

Page 88

## SugarSage – AI Companion For Diabetics

**SugarSage**

Search results..

Khizar Iqbal  
USER # 003

**Blogs**

By Diana Licalzi  
**What Is Type 1 Diabetes? Symptoms, Causes, Diagnosis, and Treatment**

Description

In the normal digestive process, your body breaks down much of the food you eat into glucose, a simple sugar that's stored in your body and used for energy. The hormone insulin, produced by the pancreas, regulates the amount of glucose in your blood by helping liver, muscle, and fat cells absorb the sugar. (2)

With type 1 diabetes, the body's immune system attacks and destroys the pancreas's insulin-producing beta cells. Without that hormone, blood sugar rises too high, causing hyperglycemia.

"We don't know exactly what triggers this autoimmune process to start," says Charles Scott Thomas, MD, an endocrinologist at Kaiser Permanente Los Angeles Medical Center in Los Angeles. "There is likely a genetic component that places patients at risk, with some environmental influences as well."

People who have type 1 diabetes must replace insulin every day through injections or infusion and monitor their blood glucose throughout the day. (1)

Type 1 vs. Type 2 Diabetes

Type 1 and type 2 diabetes produce the same result: blood sugar that is too high. But they do it in very different ways.

As mentioned, type 1 diabetes is an autoimmune disorder that results in the body being able to produce little or no insulin. It cannot be prevented. (3)

Type 2 diabetes develops when liver, muscle, and fat cells don't respond properly to insulin and become "insulin resistant." Glucose doesn't enter the cells as efficiently as before and instead builds up in the bloodstream.

In type 2 diabetes, the pancreas responds to these increased blood glucose levels by producing more insulin. Eventually, however, it can no longer make enough insulin to handle spikes in glucose levels, such as routine rises in blood sugar after a meal.

Type 2 diabetes accounts for 90 to 95 percent of all diagnosed cases of diabetes. It can be prevented or delayed in many cases with diet and exercise changes. (4)

By Sheryl Huggins Salomon  
**The Type 2 Diabetes Facts and Statistics You Need to Know**

Description

Many of the foods and beverages that you consume contain glucose, which your body processes to make energy. Your pancreas produces a hormone called insulin to help the glucose in your blood enter your muscles, fat, and liver to provide energy.

When the body doesn't use insulin properly, your pancreas initially makes more insulin to overcome this resistance. But when the pancreas can no longer keep up with the demand, your blood glucose rises too high and hyperglycemia results. Type 2 diabetes leads to hyperglycemia that results primarily from insulin resistance.

[1]

Less often, an autoimmune response in the body can attack, destroying the beta cells in the pancreas that make insulin, leaving an individual without the ability to make enough, or any, insulin. That condition is known as type 1 diabetes.

Pregnant women develop a certain level of insulin resistance to ensure there's enough energy available for the growing fetus, and gestational diabetes can sometimes result. It typically goes away after the child is born, all

**SugarSage**

Search results..

Ahmed Ali  
ADMIN

**Feedbacks**

Email Address: mohammad@gmail.com

Feedback Type: Positive

Description

Dear SugarSage Team,

I wanted to take a moment to share my experience using your diabetic diet planner app. As someone who has been managing diabetes for several years, finding the right tools to support my dietary needs has been crucial, and I must say your app has been a game-changer!

First and foremost, the personalized meal plans have made managing my condition much easier. It takes me only a few minutes to input my preferences and receive meal suggestions tailored to my needs. The variety of meal options available is impressive, and the app's user interface is intuitive and easy to navigate.

Another feature that I find particularly useful is the ability to track my blood glucose levels and adjust my insulin intake accordingly. This feature has helped me manage my diabetes more effectively and feel more confident in my self-care.

Overall, I couldn't be happier with your app. It has become an essential resource for individuals like myself who are managing diabetes.

Sincerely,  
Mohammed Ali

Are you sure you want to logout?

Cancel Logout

Upload Cancel

#### 4.2.4 Preliminary Model Results

##### 4.2.4.1 Extra Trees Regressor:

## Extra Trees Regressor

### Results:

#### Caloric Needs Model:

**RMSE:** 17.74 (*values range from 1500 - 3500*)

**R<sup>2</sup>:** 0.998

#### Nutrition Distribution Model:

**RMSE:** 2.66 (*values range from around 20 to around 65*)

**R<sup>2</sup>:** 0.539

##### 4.2.4.2 Random Forest:

## Random Forest Model

### Results:

#### Caloric Needs Model:

**RMSE:** 25.20 (*values range from 1500 - 3500*)

**R<sup>2</sup>:** 0.996

#### Nutrition Distribution Model:

**RMSE:** 2.58 (*values range from around 20 to around 65*)

**R<sup>2</sup>:** 0.567

#### **4.2.4.3 Gradient Boosting Model**

## **Gradient Boosting Regressor**

### **Results:**

#### Caloric Needs Model:

**RMSE:** 30.81 (*values range from 1500 - 3500*)

**R<sup>2</sup>:** 0.995

#### Nutrition Distribution Model:

**RMSE:** 2.48 (*values range from around 20 to around 65*)

**R<sup>2</sup>:** 0.560

#### **4.2.4.4 Random Forest With Hyper Tuning**

## **Random Forest with Hyper Tunning**

### **Results:**

#### Caloric Needs Model:

**RMSE:** 25.20 (*values range from 1500 - 3500*)

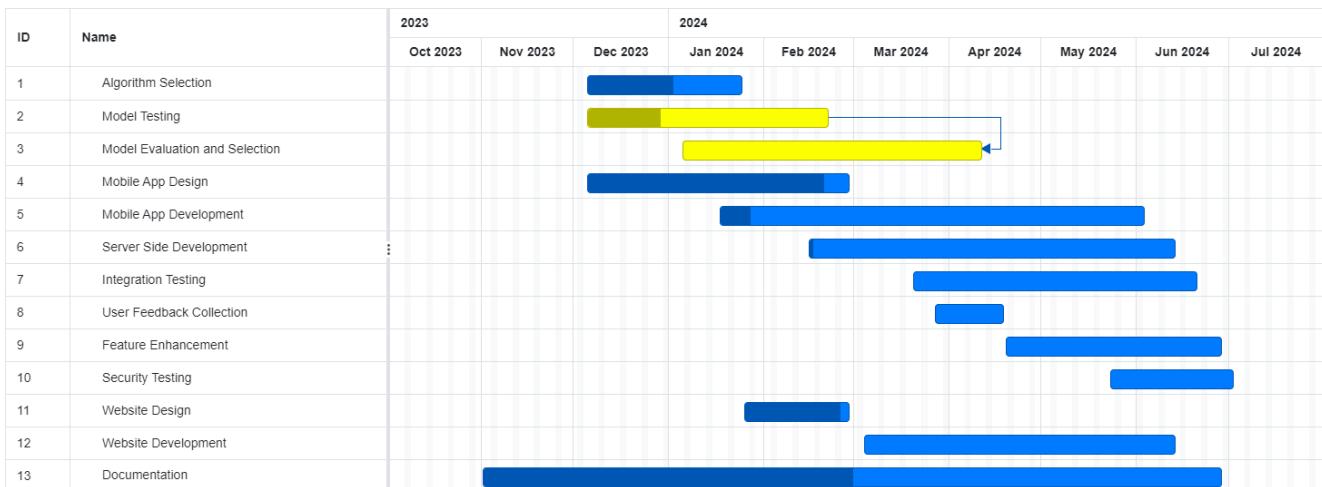
**R<sup>2</sup>:** 0.996

#### Nutrition Distribution Model:

**RMSE:** 2.50 (*values range from around 20 to around 65*)

**R<sup>2</sup>:** 0.594

## 5. Revised Project Plan



The initial and crucial stages of SugarSage as per planned schedule have been successfully completed. The timely completion of these foundational tasks positions us well for the next phase of development, where we will build upon this groundwork to achieve our project milestones.

1. Project Plan: This initial task involved creating a comprehensive plan for SugarSage. It included timelines, resource allocation and a clear outline of the project's objectives and deliverables. Completing this step established a roadmap for the project and set expectations.
2. Dataset Gathering: Gathering a dataset is a crucial step. It involved collecting, validating, and storing data that the project will use. This data formed the foundation upon which our data-driven functionalities are built.
3. Finalize Project Scope: Finalizing the project scope meant defining the boundaries of what the project will and will not include. This step is critical to prevent scope creep and to ensure that the project remains focused on its goals. It includes specifying project features, tasks, deliverables, and the work required to complete the objectives.

With the completion of these tasks, we have laid the groundwork for the next phase of the project, where the focus will shift towards more in-depth development and execution based on the initial planning and scoping work done in this phase. The tasks mentioned in the Gantt chart provided above are in progress. Proper timelines have been identified and goals have been set to complete these mentioned tasks within the expected time frame.

## Appendix A: Glossary

1. AI (Artificial Intelligence): Technology that enables machines to simulate intelligent human behavior. In the context of SugarSage, it refers to the algorithm used for generating personalized diet plans.
2. SRS (Software Requirements Specification): A detailed description of the software to be developed, including its functional and non-functional requirements.
3. Personalized Diet Planning: A feature within SugarSage that uses AI to create customized diet plans for diabetics based on their health metrics, medication regimens, and activity levels.
4. Local Food Database: A database within SugarSage that includes various local Pakistani foods and their nutritional information, allowing the system to align dietary recommendations with local dietary habits and preferences.
5. Mobile Application: The end-user platform of SugarSage, designed to provide a user-friendly interface for diabetics to manage their diet and monitor their health.
6. Singleton Pattern: A design pattern that ensures a class has only one instance and provides a global point of access to it. For SugarSage, it will be used for classes like the database connection manager or the configuration manager to manage shared resources effectively.
7. Cloud-Based Environment: A technology infrastructure that utilizes cloud computing to provide scalable and reliable service hosting, including capabilities such as auto-scaling to adjust resources based on demand.
8. Auto-Scaling: A feature of cloud services that automatically adjusts the number of computational resources according to the system's current load, ensuring responsiveness and cost-efficiency.
9. Admin Activity Diagram: A flowchart that illustrates the various actions an administrator can perform within the SugarSage system, including user management, content editing, and feedback processing.
10. User Activity Diagram: A diagram that outlines the flow of user interactions within the SugarSage system, from the welcome page to health profile management and meal plan adjustment.
11. API (Application Programming Interface): A set of protocols for building and interacting with software applications. SugarSage components use APIs for communication and data exchange.
12. User Profile Component: A part of the SugarSage system that stores and manages user-specific information such as health metrics and preferences.
13. Health Tracker: A component of SugarSage that monitors and records health-related data for users.
14. Meal Planner: A feature in SugarSage that generates personalized diet plans based on user health data and dietary preferences.
15. Feedback Module: A system within SugarSage that allows users to communicate feedback directly to system administrators.

16. Blog Reading: A functionality in SugarSage that provides users with access to educational content on diabetes management
17. GI (Glycemic Index) - A number representing the relative ability of a carbohydrate food to increase the level of glucose in the blood.
18. UI (User Interface) - The space where interactions between humans and machines occur.
19. ML (Machine Learning) - A subset of AI that provides systems the ability to automatically learn and improve from experience.

## **Appendix B: IV & V Report**

**(Independent verification & validation)**

**IV & V Resource**

---

Name Signature

S#	Defect Description	Origin Stage	Status	Fix Time	
				Hours	Minutes
1					
2					
3					
...					

**Table 3: List of non-trivial defects**

This document has been adapted from the following:

1. Previous project templates at UCP
2. High-level Technical Design, Centers for Medicare & Medicaid Services. ([www.cms.gov](http://www.cms.gov))