

Senior Project

Group C

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Project Charter

Project Description

The AI Dietician System project aims to develop and implement an artificial intelligence-powered dietary recommendation system. This system will provide personalized diet plans and nutritional guidance to users based on their individual health goals, dietary restrictions, and medical conditions. The AI Dietician System will leverage advanced machine learning algorithms and a user-friendly interface to improve individuals' overall health and wellness by promoting healthier eating habits.

Scope

The project scope includes the following key components:

- **AI Dietician Algorithm:** AI algorithms will be integrated into our system to provide personalized dietary recommendations.
- **User Interface:** Create an intuitive web and mobile application for users to input their information, preferences, and goals.
- **Database:** Establish a robust database to store user profiles, dietary information, and nutritional data.
- **Integration:** Integrate the AI Dietician System with third-party devices.
- **Testing and Quality Assurance:** Ensure the system's accuracy, reliability, and security through rigorous testing.
- **Deployment:** Deploy the AI Dietician System for public use.

Business Case

The AI Dietician System project aligns with the following business objectives:

- **Improved Health:** Provide individuals with personalized dietary recommendations to improve their overall health and well-being.
- **Competitive Advantage:** Gain a competitive edge in the health-tech market by offering a cutting-edge AI-driven dietary solution.
- **User Engagement:** Increase user engagement by providing valuable dietary insights and promoting healthier lifestyles.

Constraints

- **Timeline:** The project must be completed within 4 months.
- **Regulatory Compliance:** Ensure compliance with health and data privacy regulations.
- **Resource Availability:** Availability of skilled personnel, hardware, and software resources.

Deliverables

- **Robust database for storing user data and meal planning.**
- **Comprehensive testing and quality assurance documentation.**
- **User-friendly interfaces.**
- **Deployment plan and implementation.**
- **Integration with wearable devices.**

KPIs (Measurable Results)

- **User Engagement Rate:** The percentage of registered users actively using the system on a regular basis.
- **Health Improvement Metrics:** Measurable improvements in users health metrics, such as weight loss and improved eating habits.
- **Data Security:** Ensure compliance with data privacy regulations and zero data breaches.
- **Accessibility Metrics and Satisfaction:** Compliance with accessibility standards and positive user feedback regarding accessibility.
- **Timely Project Delivery:** Adherence to project milestones and timelines.

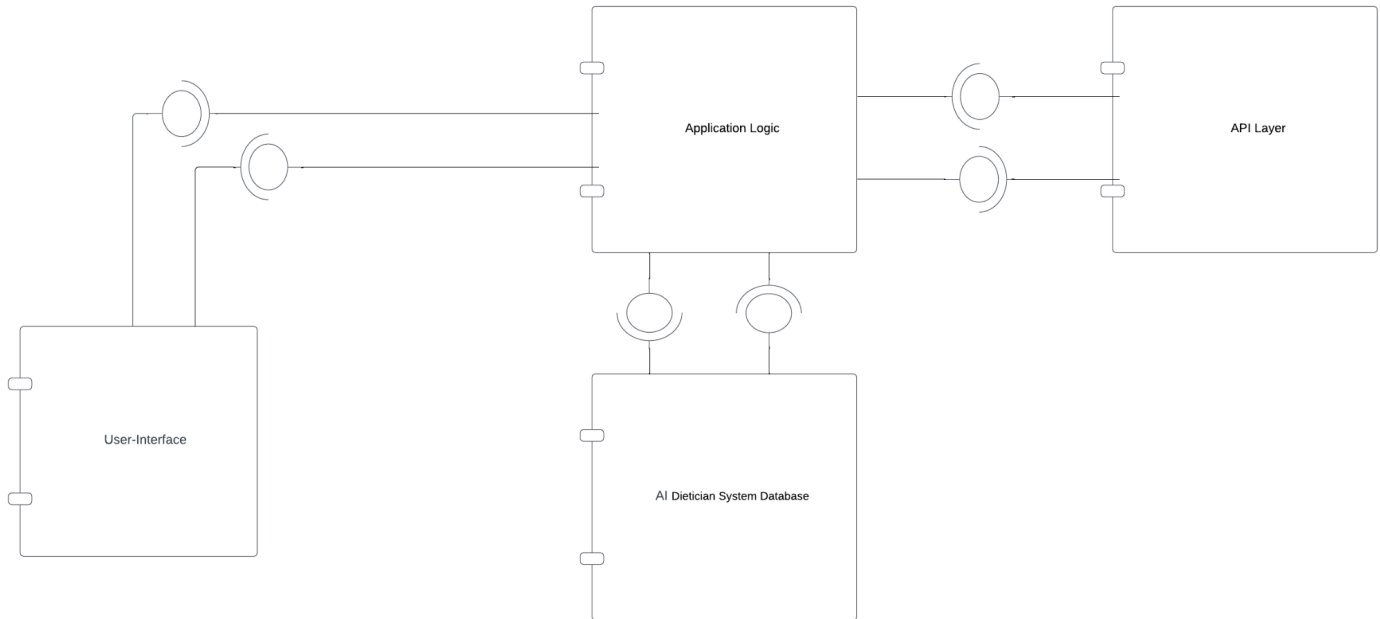
Key Stakeholders

- **Project Sponsor**
- **Project Manager**
- **Software Development Team**
- **Quality Assurance Team**
- **User Experience (UX) Design Team**
- **End Users**

Risks

- **Lack of User Adoption:** Users may not fully engage with the system or find it challenging to incorporate its recommendations into their daily routines.
- **Data Privacy Breaches:** Risks related to the handling of sensitive user data, including data breaches or unauthorized access.
- **Technological Challenges:** Technical complexities in implementing machine learning algorithms, integrating with wearable devices, or ensuring real-time data accuracy.
- **Regulatory Compliance:** Adherence to data protection regulations, healthcare regulations (if applicable), and ethical standards.
- **Resource Constraints:** Limited availability of skilled AI and software development resources.
- **Market Competition:** Increasing competition in the health-tech industry.

High-level System Architecture



Selecting a suitable software architecture for an AI dietitian system involves considering various factors such as scalability, maintainability, performance, and the specific requirements of the application. Below, we chose a microservices architecture for an AI dietitian system and explain why it is a suitable choice:

Microservices Architecture:

1. Scalability: A dietitian system may experience varying levels of user activity throughout the day. Microservices architecture allows you to scale individual components independently, making it easier to handle increased user loads in real-time. For instance, you can scale up the recommendation engine during peak usage while keeping other services at their base levels.

2. Maintainability: In a microservices architecture, each functionality is isolated into separate microservices, making it easier to maintain and update the system. This modularity allows you to improve or update specific parts of the system without affecting the entire application, reducing the risk of introducing bugs and downtime.

3. Flexibility and Agility: Microservices provide flexibility in technology stack and development methodologies. Different services can use different programming languages, frameworks, and databases, enabling you to choose the best tools for each specific task. This flexibility can be valuable when integrating various AI components.

4. Fault Isolation: With microservices, if one component fails or experiences issues, it does not necessarily bring down the entire system. This fault isolation enhances the system's resilience and availability.

5. Decoupled Development: Different teams or developers can work on separate microservices, enabling parallel development and specialization. Also, this will allow to perform debugging of the system easily.

6. Data Separation and Privacy: If your AI dietitian system deals with sensitive user data, microservices can help in segregating data and access controls, enhancing data privacy and security.

Detailed User Stories

User Story 1: Profile Creation

1. As a user, I want to create a profile with my personal information, dietary preferences, and health goals.

Acceptance Criteria:

- Users should be able to register and create a personalized profile.
- Profile information should include age, gender, weight, height, activity level, allergies, and dietary preferences (e.g., vegetarian, vegan, gluten-free).
- Users should set specific health goals such as weight loss, muscle gain, or maintenance.

User Story 2: Manual Food Intake Input

2. As a user, I want to input my daily food intake manually, so the system can analyze its nutritional content.

Acceptance Criteria:

- Provide a user-friendly interface to manually log food items, portion sizes, and meal times.
- Allow users to add custom recipes or meals for accurate tracking.
- Calculate and display nutritional information, including calories, macronutrients, and micronutrients, for each entry.

User Story 3: Barcode Scanning

3. As a user, I want to scan barcodes of food items to input them into the system easily.

Acceptance Criteria:

- Implement a barcode scanning feature using the device's camera.
- Integrate with a comprehensive food database to retrieve nutritional data.
- Enable users to review and confirm scanned items for accuracy.

User Story 4: Personalized Dietary Recommendations

4. As a user, I want to receive personalized dietary recommendations based on my profile.

Acceptance Criteria:

- Utilize user profile data and food intake history to generate personalized dietary recommendations.
- Recommendations should align with the user's health goals and dietary preferences.
- Provide suggestions for portion control and meal timing.

User Story 5: Meal Plan Suggestions

5. As a user, I want the system to suggest meal plans for my dietary goals.

Acceptance Criteria:

- Create meal plans based on the user's profile and dietary preferences.
- Include breakfast, lunch, dinner, and snack options with recipes and portion sizes.
- Allow users to customize and save meal plans.

User Story 6: Reminders

6. As a user, I want to receive reminders to drink water and eat at regular intervals.

Acceptance Criteria:

- Implement customizable reminders for water intake and meal times.
- Consider the user's daily schedule and preferences for timing.

User Story 7: Health Metrics Tracking

7. As a user, I want to track my weight, body measurements, and other health metrics over time.

Acceptance Criteria:

- Provide a dedicated section for tracking weight, body measurements (e.g., waist, hips), and other health metrics (e.g., blood pressure, cholesterol levels).
- Display historical data in graphs and charts for visual progress tracking.

User Story 8: Wearable Fitness Tracker Integration

8. As a user, I want the system to integrate with my wearable fitness tracker to automatically update my activity and health data.

Acceptance Criteria:

- Integrate with popular wearable fitness tracker APIs (e.g., Fitbit, Apple Health) to collect data automatically.
- Sync daily steps, heart rate, sleep data, and other relevant metrics.

User Story 9: Healthy Recipe Database

9. As a user, I want access to a database of healthy recipes tailored to my dietary needs.

Acceptance Criteria:

- Offer a searchable database of recipes that match the user's dietary preferences and health goals.
- Include filtering options based on ingredients, cuisine, and dietary restrictions.

User Story 10: Nutrition Education

10. As a user, I want educational content on nutrition and healthy eating habits.

Acceptance Criteria:

- Provide a dedicated section for educational content, including articles, videos, and tips.
- Offer information on balanced nutrition, meal planning, and lifestyle choices.

Github Repository Link

https://github.com/AbdulrhmanAissa/SeniorProject_AI_DieticianSystem.git

Sprint 1 User Stories

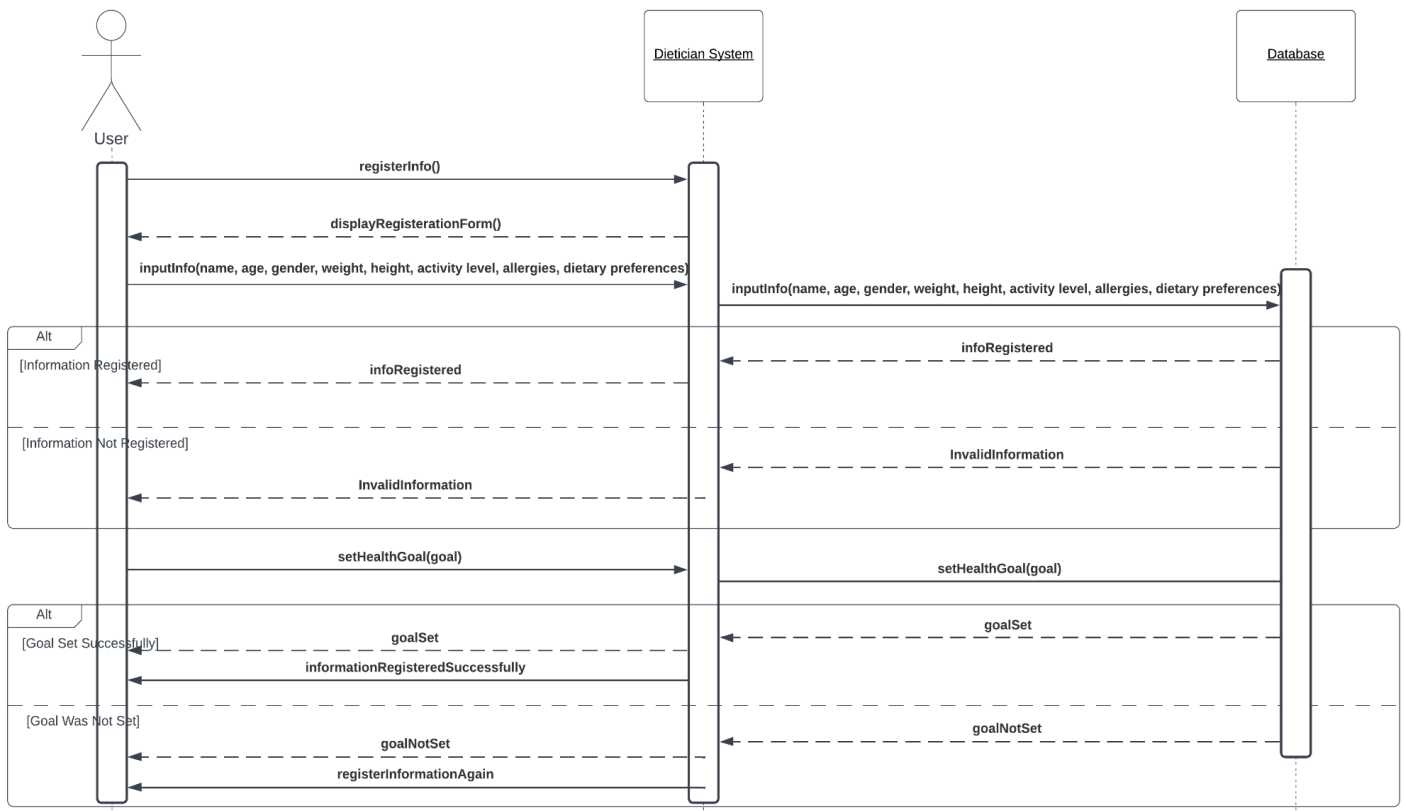
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Profile Creation Sequence Diagram:



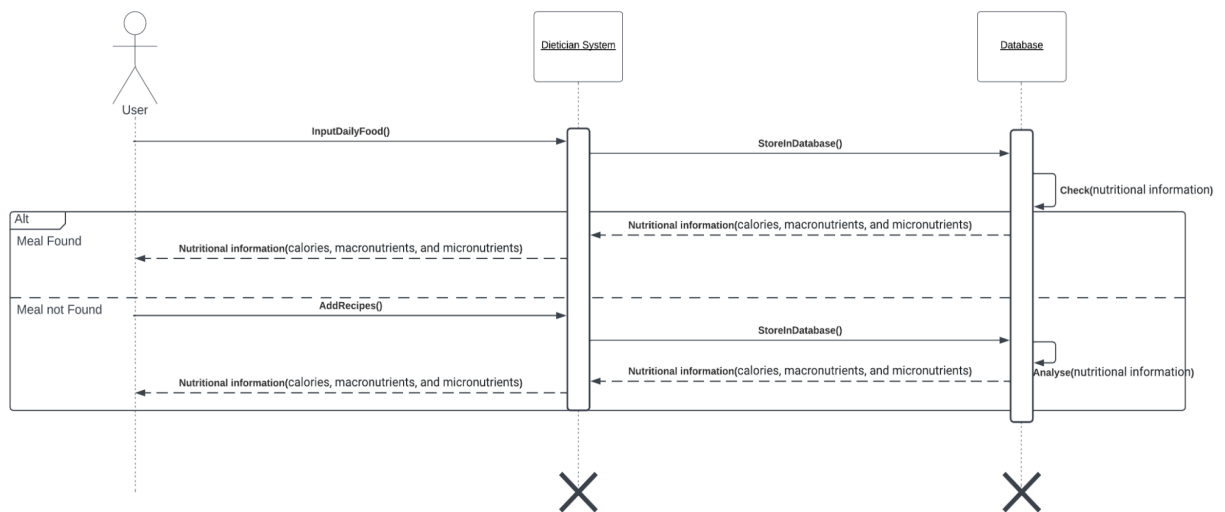
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Manual Food Intake Input Sequence Diagram:



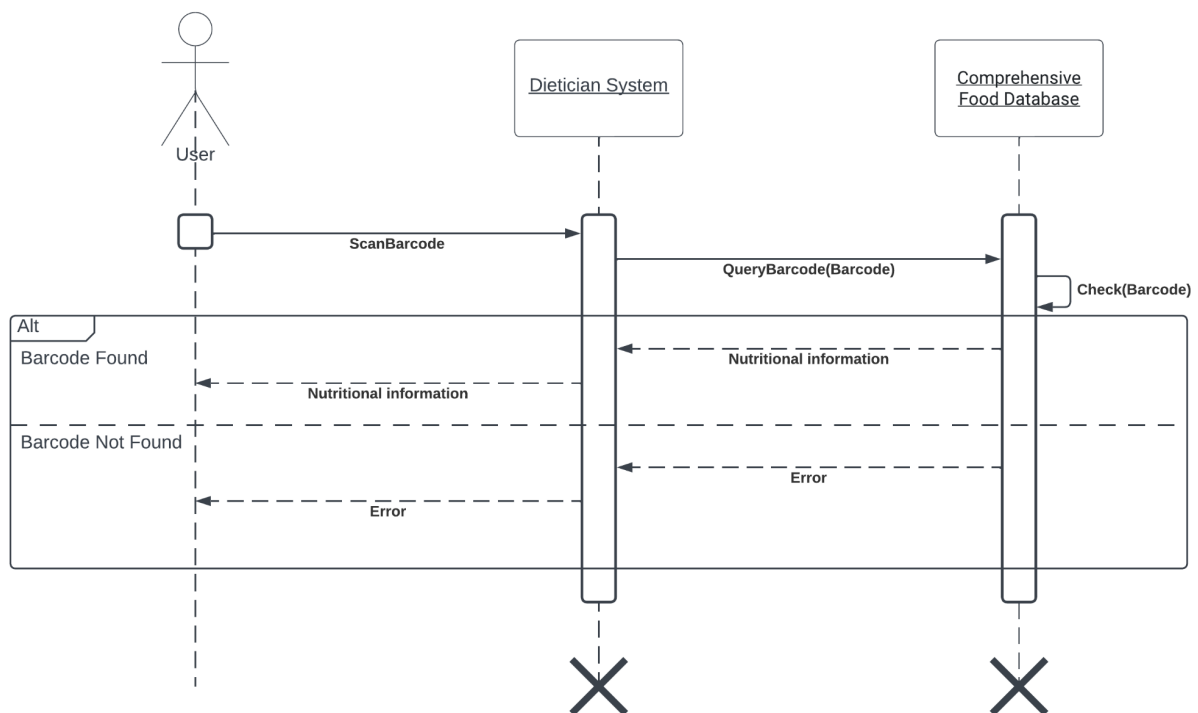
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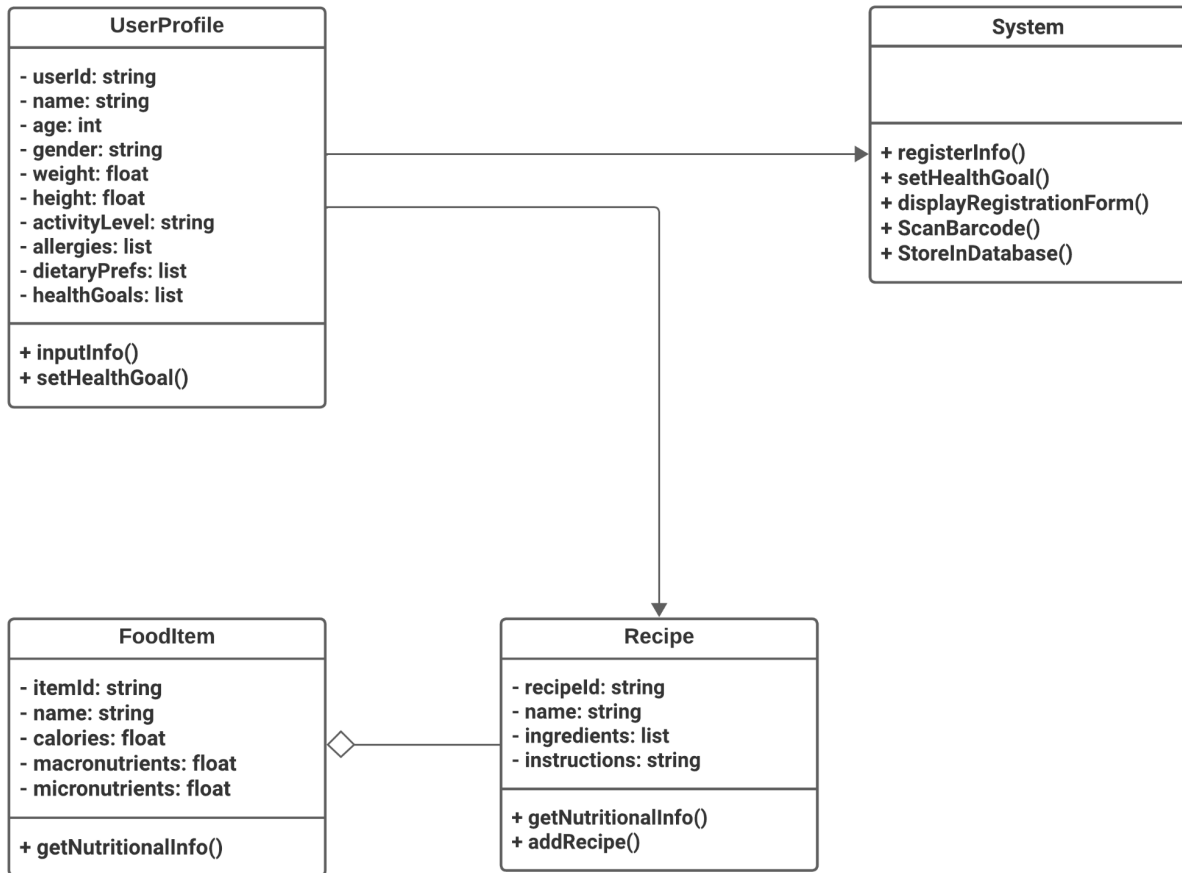
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Barcode Scanning Sequence Diagram:



Class Diagram (Sprint 1 User Stories)



Database Schema (Sprint 1 User Stories)

