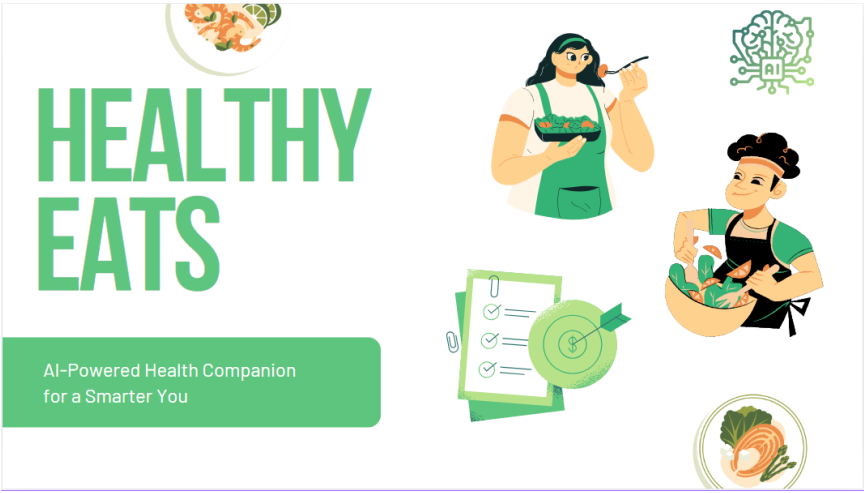
SYSTEM ANALYSIS AND DESIGN
CSE 3411 (E)



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Healthy Eats: An Expert Evaluation of a Comprehensive Health and Wellness Application

Chapter 1. Introduction:

The "Healthy Eats" application presents itself as a holistic platform designed to empower users in achieving their fitness and dietary goals while effectively managing their budgets. By integrating personalized workout and diet plans with financial tracking and community engagement features, the application aims to offer a unique and comprehensive solution in the increasingly crowded health and wellness market. Initial analysis suggests that its success will hinge on the strength of its differentiating features, particularly the seamless integration of budget management and the effective execution of its core functionalities. The market for fitness and diet applications is highly competitive, with several well-established players already offering a wide range of features.[1] Therefore, the ability of "Healthy Eats" to deliver on its promise of a truly integrated experience, particularly in the realm of cost-conscious healthy living, will be critical in carving out a sustainable market position. The inclusion of budgeting as a core component has the potential to attract a specific segment of users seeking to optimize both their health and their finances. However, the value of this integration will depend on its depth and how effectively it is woven into the meal planning and grocery shopping aspects of the application.

1.1 Purpose:

The purpose of the **Healthy Eats** system is to help urban working individuals in developing countries maintain a healthy lifestyle by providing affordable, personalized, and culturally relevant solutions for diet and fitness. The system leverages AI to generate meal plans using local ingredients, offers budget-friendly grocery suggestions, guides users through home-based workouts that require no equipment, and delivers support in simple Bangla to ensure accessibility. By addressing common barriers like time constraints, economic limitations, and lack of localized health guidance, Healthy Eats empowers users to make sustainable and informed health choices in their daily lives.

1.2 Problem Statement:

Maintaining a healthy lifestyle has become increasingly difficult for working individuals in urban areas, particularly in developing countries, due to a combination of poor dietary habits, lack of localized guidance, time constraints, and limited access to affordable, nutritious food and fitness resources.

Background

In many developing regions, including South Asia, urbanization and modern work culture have shifted

lifestyles towards increased sedentary behavior and processed food consumption. The rise in dual-income households, especially with women participating more in the workforce, has further intensified the demand for convenient food and health solutions. However, local markets often fail to provide affordable, nutritious alternatives, and most online health and wellness resources are geared toward Western audiences. This results in a growing gap between health awareness and actual healthy living practices.

Problem Description

Individuals—especially urban working adults—face significant barriers to adopting and maintaining a healthy lifestyle. These include:

- Limited access to fresh, healthy ingredients within a reasonable budget.
- Time constraints due to work and family responsibilities.
- Lack of culturally and geographically appropriate fitness and diet guidance.
- Dependence on fast food or highly processed meals for convenience.
- Misinformation and conflicting health advice, especially from non-expert sources.

These barriers contribute to increased cases of obesity, diabetes, fatigue, and other lifestyle-related diseases. Despite the growing awareness of health issues, there is a lack of integrated platforms offering personalized, practical, and local solutions tailored to their needs.

Problem Reasoning

The root causes of the problem can be broken down into several factors:

1. Economic Constraints
   Healthier food options and fitness programs are often priced beyond the average household's budget, making them inaccessible to the mass population.
2. Time Constraints
   Long working hours, commuting, and family responsibilities leave minimal time for meal prep or structured exercise routines.
3. Cultural Misalignment
   Most available fitness and dietary content is Western-centric, making it difficult to relate to or implement in a South Asian context. Traditional diets and small home spaces are not considered in typical plans.
4. Lack of Awareness
   Many individuals are unaware of affordable and healthy local alternatives or do not know how to adapt their existing lifestyles in a healthier way.
5. Technological Gap
   There is no widely-used platform that integrates AI-driven personalization, culturally relevant diet plans, and home-based fitness routines for the local population.

1.3 Goal:

The primary goal of the "Healthy Eats" application is to empower users—especially those with time and budget constraints—to achieve and maintain a healthy lifestyle through a fully integrated platform that combines:

- Personalized fitness plans
- Culturally relevant and cost-effective diet plans

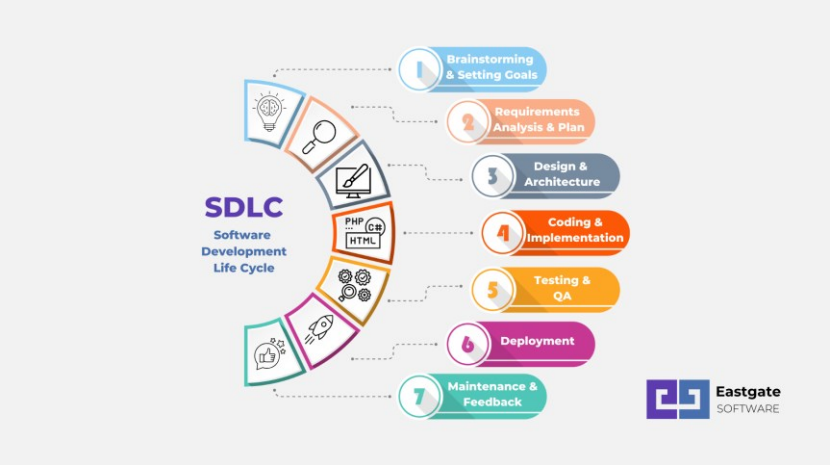
- Smart budgeting tools
- Community-based support and guidance

By addressing both the physical well-being and the financial limitations faced by users, the application aims to:

1. Enable informed dietary decisions by recommending affordable, nutritious meal options based on local availability and seasonal produce.
2. Promote consistent fitness habits through tailored, no-equipment workout routines suitable for small living spaces.
3. Assist with financial planning by integrating grocery budgeting and expense tracking directly into the health planning process.
4. Foster a supportive community where users can share experiences, tips, and motivation to stay consistent in their health journey.
5. Bridge the gap between awareness and actionable steps by offering localized, data-driven, and user-friendly guidance.

Ultimately, the application strives to become a go-to digital companion for individuals looking to live healthier lives without compromising financial stability or cultural dietary preferences.

1.4 Software Development Life Cycle (SDLC) Steps for Healthy Eats



i. Idea Generation (Optional)

The idea for Healthy Eats emerged from observing the health struggles of urban working individuals, especially women, in South Asia who lack access to affordable and culturally relevant diet and fitness solutions. The concept was sparked by real-life scenarios like Tasnim's story.

ii. Planning

In this phase, the project's goals, scope, and feasibility were defined. Key decisions were made regarding project timeline, required resources, and team roles. A roadmap was created to develop a web/mobile app with core features like AI-based meal planning, grocery budgeting, and home workouts.

iii. System Information/Requirement Gathering

Information was gathered through problem research, user stories, surveys and context and benchmark analysis. Requirements included:

- Functional: Meal plan generator, calorie tracker, budget tracker, AI chatbot, exercise planner
- Non-functional: User-friendly interface, support in Bangla, real-time responses, affordability focus

iv. Analysis

The collected requirements were analyzed to ensure feasibility and to eliminate ambiguity. The system's scope was finalized and divided into core modules: user profile, AI engine, grocery integration, workout guide, and chatbot interface.

v. Design

System architecture and data flow diagrams were created. Wireframes and UI mockups were

designed for key pages (meal planner, grocery list, dashboard, etc.). User experience was designed to be simple and inclusive, especially for non-tech-savvy users.

vi. Development/Construction/Coding

Frontend and backend development was carried out. The app was built using appropriate technologies (React for frontend; Node, MongoDB for backend). AI algorithms were integrated for personalization, and API connections were made for grocery price comparisons.

vii. Testing

Multiple testing phases were conducted:

- Unit testing for each module (e.g., recipe suggestions)
- Integration testing between components
- User testing with target demographic to refine usability Bug fixes and improvements were made based on feedback.

viii. Deployment

The application was deployed on a test server for presentation/demo purposes. Once stable, it can be published on a cloud server or app store. User onboarding and walkthrough features were added.

ix. Post-Implementation & Maintenance

After deployment, the system will be maintained through:

- Regular updates to AI suggestions and grocery pricing
- Bug fixing and performance optimization
- Gathering user feedback to introduce new features or improvements

Chapter 2 - System Study or Information Gathering

2.1 Introduction:

This chapter focuses on understanding the current landscape of fitness and diet solutions, identifying user needs, and gathering relevant data to shape the development of the "Healthy Eats" application. Through system analysis, user research, and market evaluation, it highlights the limitations of existing platforms and the gap this project aims to fill.

The goal is to ensure the solution is practical, user-focused, and aligned with real-world constraints—especially for individuals seeking affordable, healthy lifestyle options.

2.2 Information Sources

Internal Sources

- Team brainstorming sessions
- Past experience of developers/designers with similar health or diet platforms
- Organizational goals and objectives
- Stakeholder inputs (e.g., project advisors, faculty guides)
- Existing internal documentation or reports
- Feedback from early test users (within the university or known circle)
- Prototype testing results

External Sources

- Surveys and interviews with potential users (e.g., working mothers, students)
- Online forums and communities (e.g., Bangladeshi health groups, Reddit, Facebook)
- Market research reports on diet and fitness trends in Bangladesh
- Competitor analysis (like MyFitnessPal, Chaldal, local health apps)
- Academic papers or articles on nutrition and urban health in developing countries

- Government health portals and nutritional guidelines
- YouTube vlogs and blogs from local fitness influencers or dietitians

2.3 Information Gathering

2.3.1. Review Documents, Procedures, Forms, etc.

- Examine health reports, diet charts, existing wellness app documentation, and nutritional guidelines relevant to Bangladeshi cuisine.
- Study government or NGO reports on urban health issues and food habits in Bangladesh.
- Review academic papers or published data about affordable nutrition and health in South Asia.

2.3.2. On-site Observation

- Visit local markets to observe the availability and price of healthy food items.
- Observe the daily routines and food habits of working individuals, especially women, in Dhaka or similar urban areas.
- Note common physical activity patterns and limitations in home environments (e.g., space for exercise).

2.3.3. Interview

- Talk to people of various working groups, to understand their struggles with diet, budget, and fitness.
- Interview dietitians or fitness trainers for professional insights.
- Interview local grocers to understand food pricing, trends, and customer preferences.

2.3.4. Questionnaires

- Create surveys to collect data on people’s eating habits, exercise routines, income levels,

and tech literacy.

- Ask users about their pain points with existing apps and what features they would prefer in a new one.

- Gather feedback on willingness to use an AI-based solution and language preferences (e.g., Bangla).

2.3.5. JAD (Joint Application Development)

- Conduct workshops or collaborative sessions with potential users, developers, nutritionists, and fitness experts.

- Use these sessions to brainstorm features, finalize requirements, and prototype key functions.

- Gather real-time feedback to reduce assumptions and increase user alignment.

2.3.6. Online (Benchmark Products, Literature, etc.)

- Research successful health and wellness apps (like MyFitnessPal, HealthifyMe) for inspiration and gap analysis.

- Look at literature on AI in nutrition, affordable fitness planning, and behavior change techniques.

- Explore forums or social media groups where urban users discuss diet and fitness challenges.

2.4 Research papers and articles

1. Free Calorie Counter, Diet & Exercise Journal | MyFitnessPal, accessed April 21, 2025, https://www.myfitnesspal.com/premium
2. How We Automate Your Meal Planning - Eat This Much, accessed April 21, 2025, https://www.eatthismuch.com/how-it-works
3. PlateJoy Meal Planning for Weight Loss, accessed April 21, 2025, https://briebrieblooms.com/platejoy-meal-planning-for-weight-loss/
4. Eat This Much: The Automatic Meal Planner, accessed April 21, 2025, https://www.eatthismuch.com/
5. Budget meal app! Yummly is amazing!! : r/Frugal - Reddit, accessed April 21, 2025, https://www.reddit.com/r/Frugal/comments/vexza5/budget_meal_app_yummly_is_amazing/
6. Is MyFitnessPal Premium worth it? The differences between the plans - Product Hunt, accessed April 21, 2025, https://www.producthunt.com/stories/is-myfitnesspal-premium-worth-it
7. PlateJoy Review 2025: Effortless Meal Planning - Deliveryrank.com, accessed April 21, 2025, https://www.deliveryrank.com/reviews/platejoy
8. Expert-Tested: PlateJoy Review (2025) - Garage Gym Reviews, accessed April 21, 2025, https://www.garagegymreviews.com/platejoy-review
9. App of the Week: Yummly Recipes & Cooking Tools - Inspire Visual, accessed April 21, 2025, https://www.inspirevisual.com/blog/yummly-cooking-app/
10. Meal Planning with Yummly - Bowl of Yum, accessed April 21, 2025, https://www.bowlofyum.com/2021/02/meal-planning-with-yummly/
11. Eat This Much - Meal Planner on the App Store, accessed April 21, 2025, https://apps.apple.com/us/app/eat-this-much-meal-planner/id981637806
12. What are the features of MyFitnessPal Premium?, accessed April 21, 2025, https://support.myfitnesspal.com/hc/en-us/articles/360032625951-What-are-the-features-of-MyFitnessPal-Premium
13. PlateJoy, A Tool That Makes Meal Planning a Cinch? - Jennifer Hunt Nutrition, accessed April 21, 2025, https://jenniferhuntnutrition.com/platejoy-a-tool-that-makes-meal-planning-a-cinch/
14. A Dietitian's Review of PlateJoy: Meal Planning Made Easy - Healthline, accessed April 21, 2025, https://www.healthline.com/nutrition/platejoy
15. Yummly Review - PCMag, accessed April 21, 2025, https://www.pcmag.com/reviews/yummly
16. Yummly meal planning app review: Streamlined tool for healthy eating - Reviewed, accessed April 21, 2025, https://www.reviewed.com/cooking/content/yummly-meal-planning-app-review
17. Eat This Much App Review: Pros and Cons, accessed April 21, 2025, https://www.plantoeat.com/blog/2023/10/eat-this-much-app-review-pros-and-cons/
18. Whirlpool's Yummly® Food Platform Introducing Smart Thermometer that Monitors and Alerts for Stress-Free, Precision Cooking, accessed April 21, 2025, https://whirlpoolpro.com/whirlpools-yummly-food-platform-introducing-smart-thermometer-that-monitors-and-alerts-for-stress-free-precision-cooking/
19. The Magic of MyFitnessPal: How One App Can Help You Achieve Your Fitness Dreams, accessed April 21, 2025, https://www.techaheadcorp.com/blog/the-magic-of-myfitnesspal-how-one-app-can-help-you-achieve-your-fitness-dreams/

2.5 Related Websites

1. **MyFitnessPal**
   https://www.myfitnesspal.com
   - Offers calorie tracking, meal logging, and exercise planning.
   - Lacks localized diet suggestions and budget tracking for South Asian users.
2. **HealthifyMe**
   https://www.healthifyme.com
   - Focuses on Indian users with local food tracking, diet plans, and virtual trainers.
   - Similar to your idea but doesn't emphasize budgeting or community-led health tips.
3. **Yazio**
   https://www.yazio.com
   - Provides meal plans, calorie tracking, and intermittent fasting features.
   - Focused more on Western diets; not budget or culture sensitive.
4. **Fittr**
   https://www.fittr.com
   - Community-driven health platform with trainers, articles, and nutrition support.
   - Offers fitness and diet planning, but budgeting isn't integrated.
5. **Lifesum**
   https://www.lifesum.com
   - Diet and meal planning with a polished UI and health goals.
   - Offers subscription-based plans; not tailored for low-budget users.

Chapter-3: System Analysis

3.1 Introduction:

System analysis is a critical phase in the development of the "Healthy Eats" application, aimed at understanding what the system should do and how it should perform. This chapter focuses on identifying the functional and non-functional requirements, user interactions, system architecture, and data flow.

By breaking down the components of the proposed system, this analysis ensures that the design is aligned with user needs, business goals, and technical feasibility. It serves as a blueprint for building a solution that is efficient, scalable, and user-friendly—especially for individuals seeking affordable and practical health solutions.

3.2 Benchmark Analysis:

Platform/App	Health Metrics (e.g., BMI, Caloric Goals)	Taste & Dietary Preferences	Budget Considerations	Personalized Meal Planning	ML/AI-driven Recommendations
Ours	Yes	Yes	Yes	Yes	Yes
Eat This Much	Yes	Yes (via food preferences)	Yes (meal cost estimation)	Yes (automated meal planning)	No
PlateJoy	Yes(Focuses on dietary needs rather than detailed metrics)	Yes (customized to tastes and dietary restrictions)	No(Some cost-awareness but not in-depth budgeting)	Yes (personalized meal plans)	No
MyFitnessPal	Yes(Tracks BMI, calories, and various nutrition data)	No (Limited personalization)	No	Yes (Bacis)	Yes (Basic)
Yummly	Yes (Primarily a recipe recommendation engine)	Yes (robust taste and dietary filtering)	No	Yes (recipe-based planning)	Yes

Table 1: Competitive Feature Comparison

Feature	Healthy Eats (Planned)	Eat This Much (Free)	Eat This Much (Premium)	PlateJoy	MyFitnessPal (Free)	MyFitnessPal (Premium)	Yummly (Free)	Yummly (Premium)
Personalized Meal Plans	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
AI Chatbot	Yes	No	No	No	No	No	No	No
Adaptive Reminders	Yes	No	No	Yes	Yes	Yes	No	Yes
Budget-Based Meal Recomm.	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Wearable Integration	Fitbit, Apple, Google, Samsung	No	Apple Health	Apple	Fitbit, Apple, Garmin	Fitbit, Apple, Garmin	No	No
Grocery List Optimization	Yes (AI-Powered, Local)	Yes	Yes	Yes	No	Yes	Yes	Yes
Grocery Delivery Integration	Chaldal, Daraz (Potential)	Instacart, Amazon, Walmart	Instacart, Amazon, Walmart	Instacart, Amazon	No	Instacart, Walmart, Kroger, Amazon, Whole Foods	Yes (via store apps)	Yes (via store apps)
Recipe Database	Not Specified	6,000+	6,000+	Thousands	Millions	Millions	2 Million+	2 Million+
Video Tutorials	Potential	No	No	Yes	Yes	Yes	Yes	Yes
Community Features	Yes (Forum)	Yes	Yes	No	Yes	Yes	No	No
Exercise Planning	Yes (Pre-set Routines)	No	No	No	Yes (Pre-set)	Yes (Guided)	No	No
Price (Monthly Approx.)	Not Specified	Free	$5-$10	$13	Free	$10-$20	Free	$5

Feature Fixation

AI-Based Features (MERN + AI Models)

- AI-Powered Personalized Plans
- AI Chatbot for Fitness Guidance
- AI-Powered Meal Recommendations
- AI-Powered Grocery List Optimization

Non-AI Features (MERN Stack)

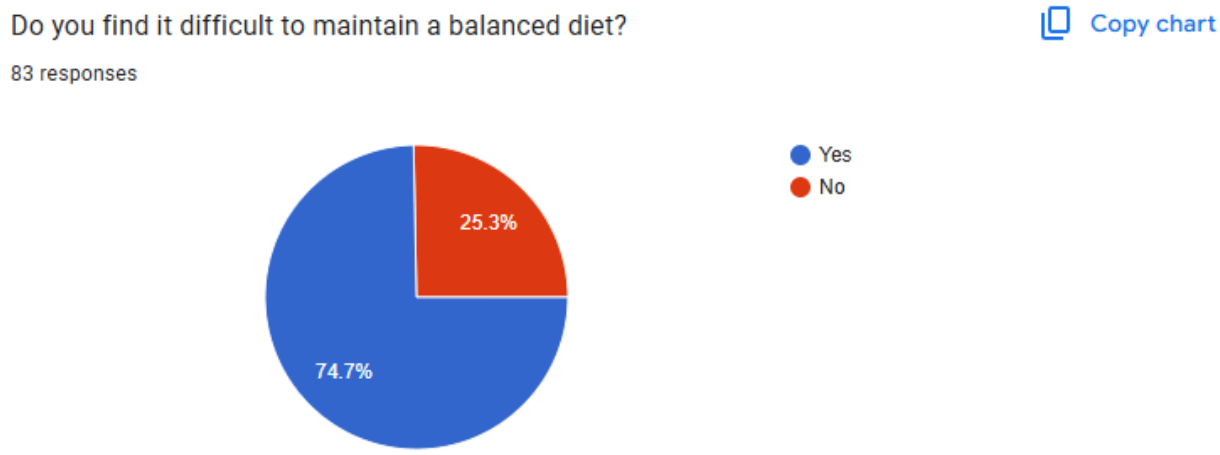
- User Profile & Health Data
- Meal Plan Page
- Recipe & Cooking Guide
- Budget Tracker
- Exercise Planner

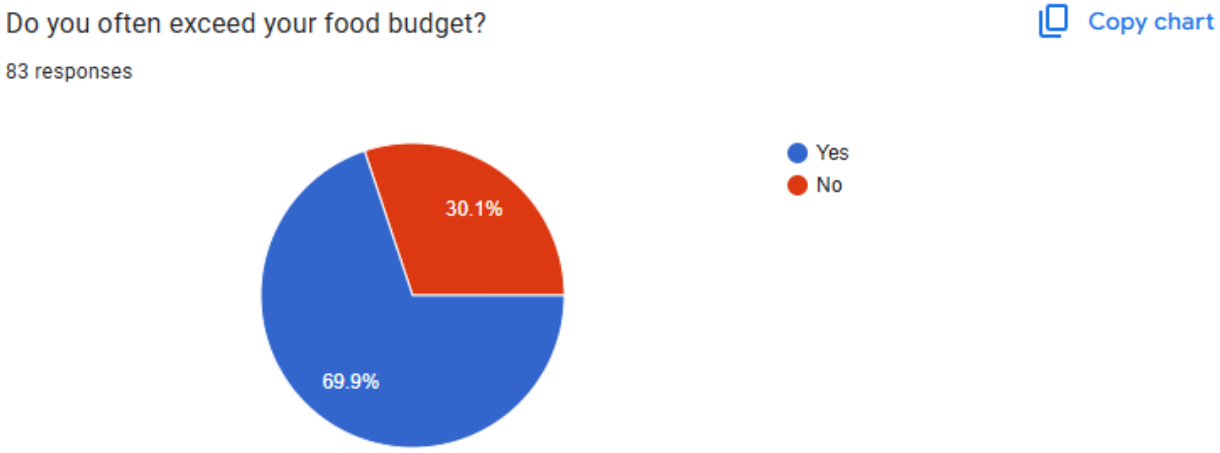
3.3 Gap Analysis:

Area	Current State	Desired State	Gap
Access to Healthy Food Guidance	Scattered, mostly Western-centric content not suited for local needs	Localized, culturally relevant and personalized meal plans	Lack of local content and personalization
Fitness Support	Limited access to affordable or home-based routines	Tailored fitness plans suitable for small spaces & busy schedules	Lack of culturally/context-aware fitness tools
Time & Budget Management	Time-consuming to plan meals or track expenses manually	AI-driven quick planning and budget-friendly suggestions	No integrated smart solution for time+budget users
Use of Technology	Most people rely on basic apps or none at all	Smart, AI-based platform that learns and adapts	No existing all-in-one smart solution available
User Awareness	Low awareness of healthier, affordable local options	Platform educates users while guiding them	Gap in education + guidance in a single space

3.4 Survey:

The survey is conducted on **83** people. The statistical representation of the results are presented below:





Do you have trouble finding healthy recipes that fit your diet and budget?

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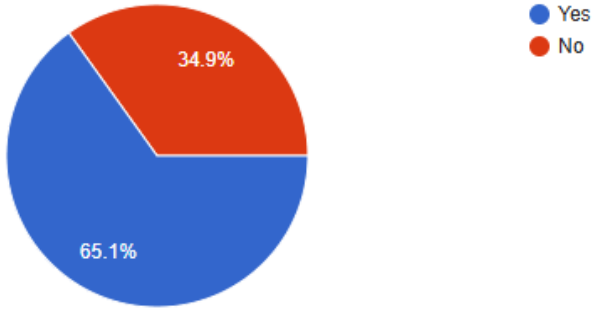
83 responses



Do you find it challenging to stay consistent with your workout routine.

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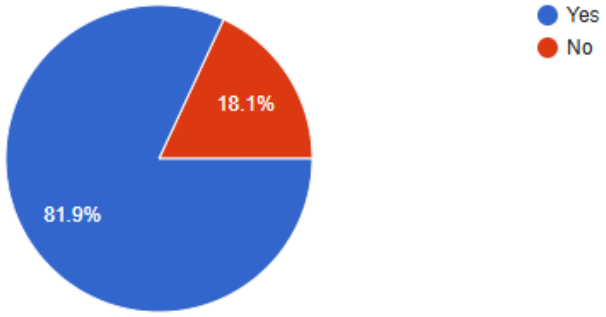
83 responses



How difficult is it for you to find a diet that meets your health and fitness goals? (Easiest to most difficult)

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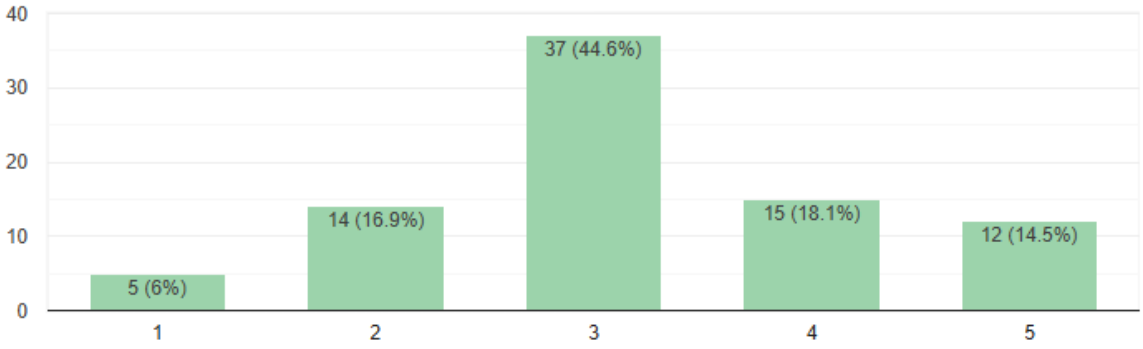
83 responses



How often do you rely on digital tools/apps for diet or workout tracking?

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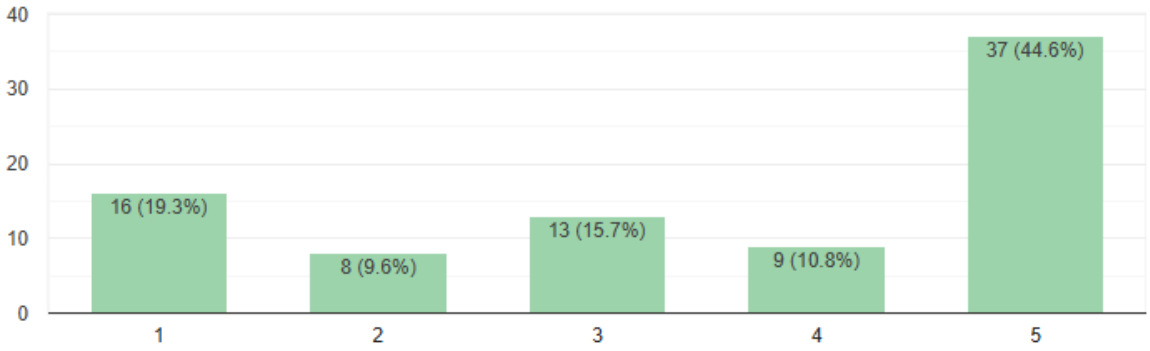
83 responses



Would you use an AI-generated customized meal and workout plan?

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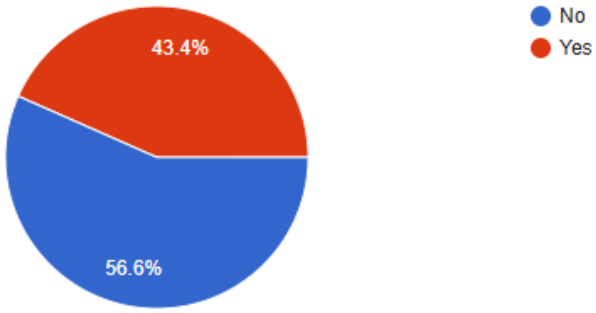
83 responses



Would you find an AI chatbot helpful for fitness and diet guidance?

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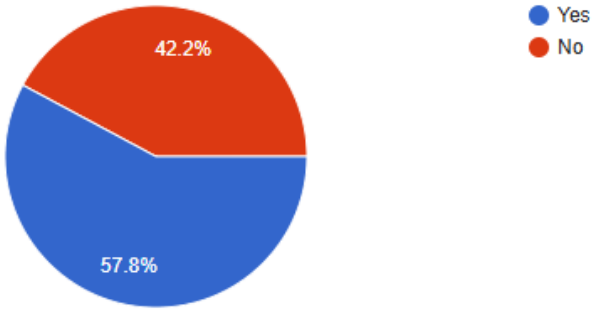
83 responses



Would you like to get reminders for exercise and meal times?

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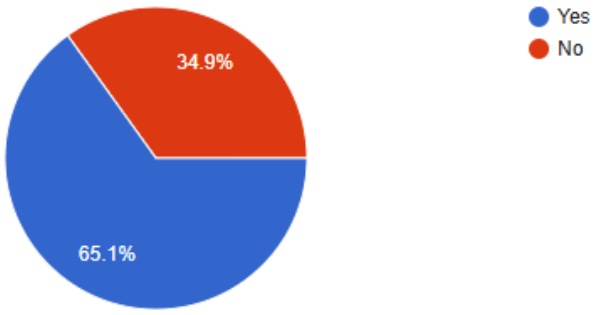
83 responses



How useful would a budget tracker for food expenses be in managing your meals?

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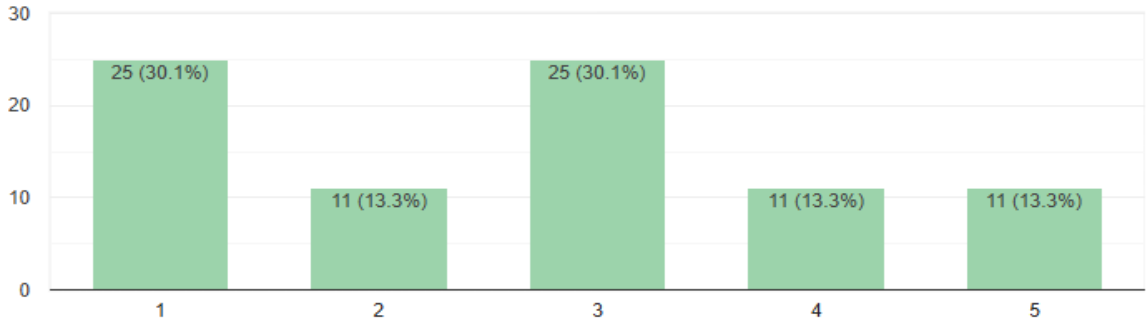
83 responses



How useful would a meal recommendation feature be for you?

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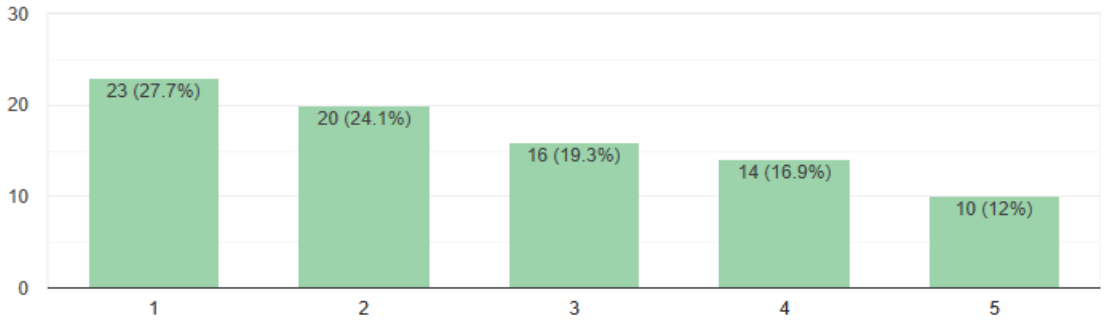
83 responses



3.5 SWOT Analysis:

Strengths
•AI-driven personalized meal and workout plans
•AI chatbot for real-time fitness and diet guidance
•Grocery list optimization helps users shop efficiently
•Budget tracker promotes cost-effective meal planning
•Intuitive UI/UX makes it easy to use for all age groups
•Uses RAG & Generative AI for accuracy.

Weakness
•Requires AI fine-tuning for accurate meal plans.
•Requires constant updates to keep AI models relevant and effective
•Limited food database may affect recommendations.

Opportunities
•Growing demand for AI-powered health and wellness solutions
•Expansion into wearable device integration for real-time tracking
•Potential integration with grocery delivery services for added convenience
•Subscription-based premium features for additional revenue
•Increasing awareness of the importance of balanced diets and fitness
•Partnership with restaurants & dieticians for better suggestions

Threats
•AI biases affecting personalized recommendations.
•Data privacy concerns regarding health & budget details
•High competition from established fitness and diet-tracking apps
•Market saturation with similar AI-based fitness and meal-planning solutions

3.6 Detailed Feature Analysis:

3.6.1 AI-Powered Personalized Workout & Diet Plans:

The application intends to leverage artificial intelligence to generate tailored meal and exercise plans based on individual user inputs, including Body Mass Index (BMI), age, weight, allergies, activity level, and fitness goals. This personalized approach is a common feature among existing solutions. For instance, Eat This Much creates meal plans specific to user needs in seconds after users provide information about their diet preferences and goals. Similarly, PlateJoy emphasizes its ability to create ultra-personalized menus by considering over 50 different data points related to user preferences, dietary restrictions, and schedules. MyFitnessPal, while primarily focused on

tracking, also offers personalized calorie goals and, in its premium version, custom meal plans.[6] The key to "Healthy Eats's" success in this area will lie in the sophistication and accuracy of its AI algorithms. User feedback on competitors like Eat This Much indicates that algorithms can sometimes struggle with providing sufficient variety in meal suggestions.[8] This highlights the importance of ensuring that the AI powering "Healthy Eats" is capable of generating dynamic and engaging plans that adapt to user feedback and evolving needs over time. A smooth and intuitive onboarding process for collecting the necessary user data will also be crucial to avoid overwhelming new users and ensuring the AI has the information it needs to create effective plans.

3.6.2 AI Chatbot for Fitness Guidance:

A notable feature of "Healthy Eats" is the planned integration of an AI chatbot capable of answering user questions related to nutrition and workouts in real-time using Natural Language Processing (NLP) models. The provided research material does not explicitly mention similar AI chatbot functionalities in competing applications. This suggests a potential unique selling proposition for "Healthy Eats." An AI chatbot could offer significant value by providing instant support and guidance, potentially enhancing user engagement and retention. Unlike static Frequently Asked Questions (FAQs) or community forums, a chatbot can offer immediate and personalized responses to user queries, making it a valuable resource for both beginners and experienced individuals seeking fitness and dietary advice. However, the effectiveness of this feature will depend heavily on the accuracy and comprehensiveness of the chatbot's knowledge base. The NLP models need to be robust enough to understand and respond to natural language effectively, ensuring that the information provided is relevant, reliable, and easy to understand. A poorly implemented chatbot that offers inaccurate or unhelpful information could negatively impact user experience. Therefore, significant investment in training the NLP models and curating a high-quality knowledge base will be essential.

3.6.3 Adaptive Exercise & Meal Reminders:

The application plans to implement adaptive reminders for exercise and meals, which will not only send daily notifications but also dynamically adjust them based on user activity or preferences. While some existing apps offer reminder functionalities, the adaptive nature of "Healthy Eats's" approach could provide a more personalized and effective experience. For example, MyFitnessPal offers reminders for logging meals and water intake, and PlateJoy allows users to set the frequency of their reminders. The ability to tailor reminders based on actual user behavior and preferences has the potential to improve adherence to the planned fitness and diet regimens. Generic reminders can often be easily dismissed or ignored, whereas reminders that are contextually relevant and adapt to the user's daily routines are more likely to be helpful and encourage consistent engagement. When implementing this feature, it will be important to consider user privacy. Tracking user activity to personalize reminders necessitates transparency about how this data is being collected and used. Users should have clear control over their

reminder settings and be informed about the benefits of allowing the application to adapt reminders to their specific needs.

3.6.4 AI-Powered Meal Recommendations:

"Healthy Eats" aims to provide AI-powered meal recommendations that consider not only the user's dietary needs and taste preferences but also their budget. This focus on cost-effectiveness aligns directly with the "Saver" aspect of the application and could be a significant differentiator. While some competitors also consider budget, the emphasis in "Healthy Eats" suggests this should be a core strength. Eat This Much explicitly states that it helps users create meal plans based on their budget, and PlateJoy highlights its budget-friendly options. Yummly also allows users to find recipes based on their pantry contents, which can implicitly help in reducing food waste and saving money. To excel in this area, the AI in "Healthy Eats" will need to effectively balance health, taste, and cost when generating meal suggestions. This will likely require access to real-time pricing data from local grocery stores, as indicated by the plan for AI-powered grocery list optimization. By integrating budget considerations directly into the meal recommendation process, the application can provide truly relevant and actionable cost-saving suggestions to its users.

3.6.5 Email-Based Weekly Progress Reports:

"Healthy Eats" intends to provide users with weekly progress reports via email, including analytics on their achievements and motivational tips. Regular progress updates can be a valuable tool for keeping users engaged and motivated towards their goals. Eat This Much sends weekly meal plans and grocery lists via email to its premium users, while MyFitnessPal offers a Weekly Report feature within the app to summarize user progress. Premium users of MyFitnessPal also gain access to unlimited weekly digests. To maximize the effectiveness of these reports, "Healthy Eats" should ensure they are visually appealing, easy to understand, and highlight key metrics relevant to the user's goals. Including personalized analytics and motivational content can further enhance their impact and encourage continued adherence to the planned fitness and diet routines. Overly complex or data-heavy reports might be overwhelming for some users, so clarity and conciseness will be important design considerations.

3.6.6 User Profile & Health Data Input:

The application will require users to create profiles and input personal and health-related information. This is a standard requirement for any personalized fitness and diet application. Competitors like PlateJoy utilize detailed onboarding questionnaires, sometimes with over 50 questions, to gather comprehensive information about user preferences and goals.[5] The user interface for this data input process should be intuitive and user-friendly to ensure a smooth onboarding experience. It is crucial to strike a balance between collecting sufficient information for effective personalization and avoiding an overly lengthy or cumbersome sign-up process that could lead to user drop-off. Asking for the right amount of relevant information will be key.

3.6.7 Meal Plan Page:

The application will feature a dedicated meal plan page displaying recommended meals along with their nutritional breakdowns. Users will also have the ability to swap out meals according to their preferences. This level of user control and transparency is essential for a positive experience. Eat This Much allows users to review their generated meal plans and easily swap out meals they don't like.[8] PlateJoy also provides functionality for users to customize their weekly menus and exchange recipes.[21] Similarly, MyFitnessPal offers customizable meal plans for its premium subscribers.[7] Providing clear and comprehensive nutritional information for each meal, along with an easy-to-use interface for swapping options, will empower users to make informed choices and adhere to their dietary goals.

3.6.8 Recipe & Cooking Guide:

"Healthy Eats" plans to offer a recipe and cooking guide, providing step-by-step cooking instructions, potentially including video tutorials, and calorie breakdowns for each recipe. A robust recipe library with high-quality content can significantly enhance the application's value. Eat This Much boasts a database of over 6,000 recipes.[1] Yummly is particularly strong in this area, offering access to millions of recipes, often with video tutorials and step-by-step guides.[4] Providing clear, concise cooking instructions, and especially video demonstrations for more complex techniques, can make healthy cooking more accessible and enjoyable, particularly for users with limited cooking experience. Accurate calorie breakdowns are also crucial for users who are actively tracking their nutritional intake.

3.6.9 Budget Tracker:

A dedicated budget tracker will allow users to set a meal budget and monitor their food expenses. This feature directly addresses the "Saver" aspect of the application and distinguishes it from many competitors. While some apps offer features that indirectly support budgeting, such as highlighting cost-effective recipes or integrating with grocery delivery services, a dedicated budget tracker provides a more direct and comprehensive approach to financial management related to food. Eat This Much offers an option to set a daily price limit for meal plans [24], and PlateJoy emphasizes its ability to help users save money.[11] The budget tracker in "Healthy Eats" should ideally allow users to set customizable budgets (daily, weekly, or monthly) and provide clear visualizations of their spending patterns, helping them stay within their financial limits while pursuing their health goals.

3.6.12 Exercise Planner:

"Healthy Eats" will include an exercise planner that displays pre-set workout routines for users to follow. Providing structured workout plans can be beneficial for users who are unsure where to start

or need guidance on their fitness activities. MyFitnessPal offers pre-set training plans in its free version and more comprehensive guided workout plans for premium users.[13] PlateJoy also provides fitness-related content, including educational videos.[5] The workout routines offered by "Healthy Eats" should ideally cater to different fitness levels and goals, providing variety and progression to keep users engaged and challenged.

3.7 External Interface Requirements:

3.7.1 User Interfaces:

The key user interface components will include a Landing Page, Sign up/Log in, Onboarding Questions, Dashboard, Meal Plan Page, Recipe Page, Budget Tracker, Grocery Shopping & Delivery section, and Community & Support forum. The design and navigation flow across these components will be critical for user experience. The interface should be intuitive, visually appealing, and easy to navigate, ensuring that users can seamlessly access and utilize the various features of the application. Consistency in design elements and navigation patterns will be essential to create a cohesive and user-friendly experience across all functionalities, from personalized plan generation to budget tracking and community engagement.

3.7.2 Hardware Interfaces:

The application will support integration with popular wearable devices, specifically Fitbit, Apple Health, Google Fit, and Samsung Health. This focus on widely used platforms will ensure broad compatibility and cater to a significant portion of the target audience. Future expansions could consider integrating with other wearable devices based on user demand and market trends.

3.7.3 Software Interfaces:

Integration with wearable devices will be facilitated through OAuth APIs provided by the respective platforms. For the AI-powered grocery list optimization and the grocery shopping & delivery features, the application will require APIs from local grocery stores such as Chaldal and Daraz. The availability, reliability, and stability of these external APIs will directly impact the functionality and user experience of these key features. Establishing and maintaining these integrations will be crucial for the application's success.

3.7.4 Communications Interfaces:

Data exchange between the frontend, backend, and external services will likely utilize standard communication protocols such as RESTful APIs over HTTPS. These protocols are widely adopted for web and mobile applications, providing a secure and efficient means of transferring data. Ensuring reliable communication between the different components of the system is fundamental for the application's overall performance and functionality.

3.8 Non-Functional Requirements:

3.8.1 Performance Requirements:

The application should exhibit acceptable response times for various user actions. For instance, loading pages and generating meal plans should be quick and efficient to prevent user frustration. Specific performance targets, such as maximum loading times for different sections of the application, should be defined and rigorously tested to ensure a smooth and responsive user experience. Slow performance can lead to user abandonment, so optimizing for speed and efficiency is crucial.

3.8.2 Security Requirements:

Protecting user data, especially sensitive health and potentially financial information, is paramount. The application must implement robust security measures, including secure authentication and authorization mechanisms, to prevent unauthorized access and data breaches. Compliance with relevant data privacy regulations and industry best practices for data security will be essential to build and maintain user trust.

3.8.3 Usability Requirements:

The application should be designed with an intuitive and user-friendly interface that is easy to learn and use for individuals with varying levels of technical expertise. User testing and feedback should be incorporated throughout the development process to identify and address any usability issues, ensuring a seamless and enjoyable experience for all users.

3.8.4 Reliability Requirements:

The application is expected to have high uptime and availability, ensuring that users can access its features whenever they need them. Downtime can disrupt user routines and lead to dissatisfaction. Therefore, the infrastructure and architecture should be designed to minimize downtime and ensure consistent availability.

3.8.5 Scalability Requirements:

The application architecture should be designed to accommodate potential future growth in the user base and the volume of data being managed. The system should be able to scale its resources as needed to maintain performance and reliability as the number of users increases. Planning for scalability from the outset will prevent performance bottlenecks and ensure the application can handle future growth effectively.

3.9 Data Requirements:

3.9.1 Data Entities:

The system will need to manage various data entities, including User profiles (containing personal and health information), Meal plans (personalized and stored for users), Recipes (with ingredients, instructions, and nutritional information), Grocery items (with pricing and availability data), Budget information (user-defined budgets and spending history), Exercise routines (pre-set plans and user activity logs), Forum posts (user-generated content), and Health data from wearables (metrics like heart rate, steps, and calories burned). A well-defined data model outlining these entities and their relationships will be crucial for efficient data management.

3.9.2 Data Dictionary:

A comprehensive data dictionary will be required to define the attributes and data types for each data entity. This will ensure consistency and clarity in how data is stored and managed within the system, facilitating development, maintenance, and data integrity.

3.9.3 Data Storage:

The SRS specifies the use of MongoDB for data storage. MongoDB is a NoSQL database known for its flexibility and scalability, which could be advantageous for handling the potentially large and varied datasets associated with user profiles, meal plans, and other application data. The development team should possess expertise in working with MongoDB to leverage its capabilities effectively.

3.10 Use Cases:

Elaborating on the user flow for key interactions, such as creating a personalized plan, logging a meal, tracking budget, and engaging with the community forum, will be essential for understanding how users will interact with the application and identifying potential areas for improvement in the user experience.

Assumptions and Dependencies:

The successful implementation and functionality of "Healthy Eats" rely on several key assumptions and dependencies. The availability and reliability of APIs from wearable device manufacturers and local grocery stores are critical for features like data synchronization and grocery list optimization. The accuracy of the data provided by users during onboarding and ongoing use is also assumed, as this data forms the basis for personalized recommendations and tracking. Finally, stable internet connectivity for users is a fundamental requirement for accessing and utilizing the application's features. These dependencies highlight potential risks

that need to be considered during development and deployment.

Future Enhancements (Optional but Recommended):

The proposed future enhancements suggest a promising direction for the application's evolution. Integrating with a wider range of wearable devices and grocery stores would broaden its reach and convenience. Incorporating advanced analytics and insights into user progress could provide more personalized feedback and motivation. Personalized workout video recommendations could further enhance the exercise planning feature. Integrating with local restaurants for healthy food delivery options could cater to users who prefer to eat out while staying within their dietary plans. Finally, adding gamification features could significantly enhance user engagement and make the process of achieving fitness and diet goals more enjoyable. Prioritizing these enhancements based on user feedback and market trends will be crucial for the long-term success of the application.

Glossary:

A glossary defining any technical terms or acronyms used in the SRS document will be important for ensuring clear communication and understanding among all stakeholders involved in the project.

Conclusions and Recommendations:

The "Healthy Eats" application presents a compelling vision for a comprehensive health and wellness platform, particularly with its focus on integrating budget management into the fitness and diet journey. The inclusion of AI-powered personalization, a chatbot for guidance, and adaptive reminders aligns with current trends in the market and has the potential to provide a highly tailored user experience. The planned integration with local grocery stores for price comparison and potential delivery is a significant differentiator that directly addresses the "Saver" aspect and could attract a specific segment of budget-conscious users.

However, the competitive landscape is already crowded with established players like Eat This Much, PlateJoy, MyFitnessPal, and Yummly, all offering a range of features and functionalities. To succeed, "Healthy Eats" must ensure that its core differentiating features, especially the budget integration and the AI-powered grocery list optimization, are implemented effectively and provide tangible value to users. The reliability and availability of APIs from local grocery stores will be a critical factor in the success of the cost-saving features.

Recommendations:

1. **Prioritize Local Grocery Store API Integrations:** Given the emphasis on budget savings, securing reliable and comprehensive API integrations with local grocery stores like Chaldal and Daraz should be a top priority. This will be crucial for the AI-powered grocery list optimization and the potential for direct ordering.
2. **Invest in AI Algorithm Sophistication:** Focus on developing robust and dynamic AI algorithms for personalized meal and workout plans that can provide variety and adapt to user feedback to avoid the common pitfall of repetitive suggestions seen in competitor reviews.
3. **Thoroughly Develop and Test the AI Chatbot:** The AI chatbot has the potential to be a strong differentiator. Ensure its knowledge base is accurate and comprehensive, and that the NLP models are effective in understanding and responding to user queries in a helpful manner. Extensive testing will be necessary to refine its performance.
4. **Focus on User Experience:** The user interface should be intuitive and easy to navigate across all features. A smooth onboarding process and clear presentation of information will be key to user adoption and retention.
5. **Build a Strong Community:** Actively moderate and nurture the community forum to create a supportive and engaging environment for users. Consider incorporating expert advice or hosting Q&A sessions to add value.

By focusing on these recommendations, "Healthy Eats" can leverage its unique features and potentially carve out a successful niche in the competitive health and wellness application

Requirement Specification

Functional Requirements

These outline what the *Healthy Eats* system must do to fulfill user needs and deliver its promised features:

1. User Account Management
   The system must allow users to create personal accounts, log in securely, update their profiles, and manage individual health-related data such as age, weight, goals, allergies,

and dietary preferences. This forms the basis for personalized content generation.

2. AI-Powered Personalized Plans
   Using machine learning algorithms, the system must generate dynamic, data-driven meal and workout plans tailored to the user's health profile, fitness objectives, and lifestyle. Plans should automatically adjust based on changes in user input or progress.

3. AI Chatbot for Fitness Guidance
   An interactive AI chatbot must be integrated to guide users in real-time by answering questions, providing motivation, suggesting workouts or meals, and assisting with app navigation. It should be available 24/7 within the platform.

4. AI-Based Meal Recommendations
   The application must suggest personalized meal options based on the user's calorie goals, food preferences, dietary restrictions, and available ingredients, using a trained AI model that evolves with user interaction and feedback.

5. AI-Powered Grocery List Optimization
   Based on the weekly meal plan and user location or budget range, the system should generate a smart grocery list optimized for affordability and nutritional value. It should consider real-time ingredient needs and help avoid food waste.

6. Meal Plan Page
   A dedicated section of the application should allow users to view their daily and weekly meal plans, including preparation instructions, nutritional information, and the ability to replace or adjust meals as per preference or availability.

7. Recipe & Cooking Guide
   The system should offer a structured recipe library, with each recipe featuring cooking steps, estimated prep/cook time, portion sizes, and full nutritional breakdowns to support healthy decision-making.

8. Budget Tracker
   Users must be able to enter, categorize, and monitor their food-related expenses over time. The system should display visual summaries (charts/graphs) of spending patterns and alert users if they approach or exceed their budget limits.

9. Exercise Planner
   The application must allow users to create, customize, and schedule workout routines. It should track completed exercises, provide performance insights, and allow editing or skipping of scheduled activities.

Non-Functional Requirements

These specify the overall quality, performance, and constraints under which the *Healthy Eats* system must operate:

1. Performance
   The system should deliver quick and responsive interactions. All user actions (e.g., loading plans, updating data, interacting with the chatbot) must be completed in under 2 seconds to ensure a smooth user experience, even under heavy load.

2. Scalability
   The system architecture must support scaling both vertically and horizontally to accommodate growing user numbers, larger data sets, and increased usage of AI models without performance degradation.

3. Usability
   The application must be intuitive and easy to navigate, even for non-technical users. UI elements should follow standard design conventions with helpful tooltips, accessible buttons, and clear feedback mechanisms.

4. Availability
   The system should maintain high uptime (minimum 99.9%), ensuring that users can reliably access features like meal planning, budget tracking, and chatbot support without unexpected downtimes or service interruptions.

5. Security
   The application must protect sensitive user data through robust security measures including password hashing, encrypted data storage, secure authentication, and protection against threats like SQL injection, XSS, and CSRF attacks.

6. Compatibility
   Healthy Eats must work seamlessly across modern web browsers (Chrome, Firefox, Safari, Edge) and be responsive on all major screen sizes including desktops, tablets, and smartphones, ensuring a consistent user experience.

7. Maintainability
   The codebase should be modular, well-documented, and follow best practices in software engineering. This will facilitate easy updates, feature additions, and debugging over the product's lifecycle.

8. Data Privacy & Compliance
   All user data must be handled with transparency and care. The application must comply with local and international data protection regulations (such as GDPR) and offer users control over their data, including access, correction, and deletion.

Chapter-4: Design of the system

4.1 Introduction:

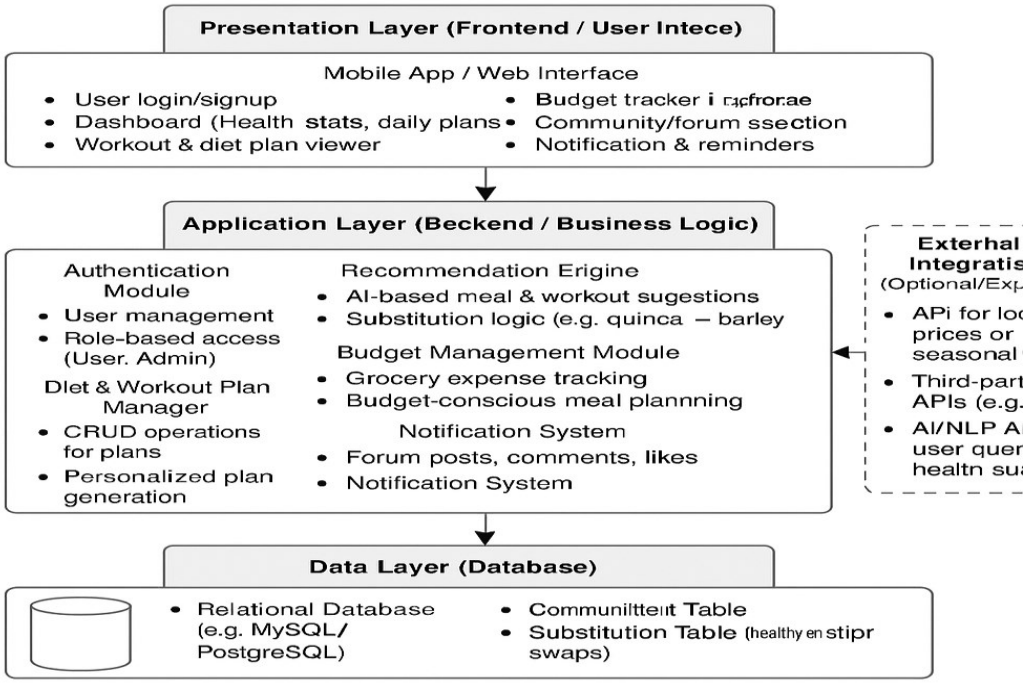
This chapter focuses on the structural and visual design of the "Healthy Eats" application, laying the foundation for its development. It presents key design components that define how the system will function, store data, and interact with users and external elements.

To ensure clarity and efficiency, the following diagrams are included:

- System Architecture – to illustrate the overall structure of the system.
- Context Diagram – to show the system's interaction with external entities.
- Use Case Diagram – to represent how all the actors (users) will interact with the use cases (features) within the system.
- Use Case Description
- Data Flow Diagram (DFD) – to map out how data moves through the system.
- Activity Diagram – to represent the flow of activities within the system.

These design elements ensure that the system is well-structured, maintainable, and capable of fulfilling its intended purpose.

4.2 System Architecture:



4.3 Context Diagram:

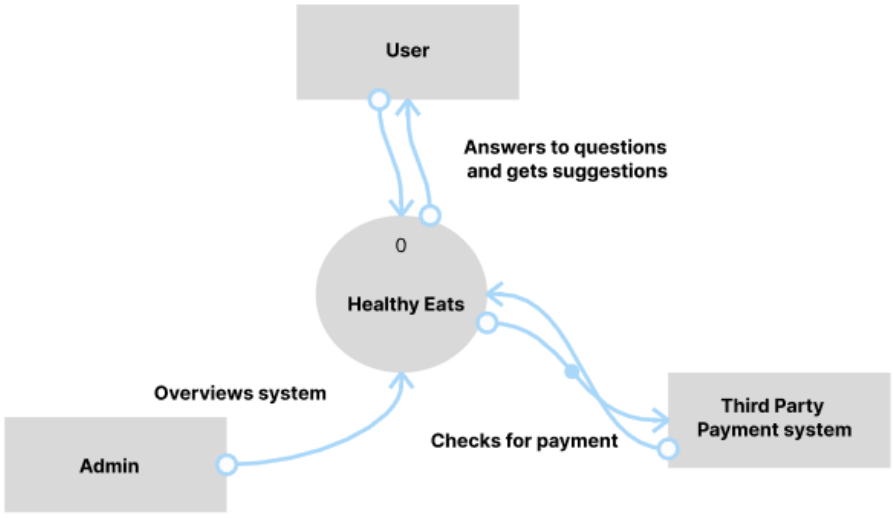


Fig: Context Diagram-Healthy Eats

4.4 Use Case Diagram:

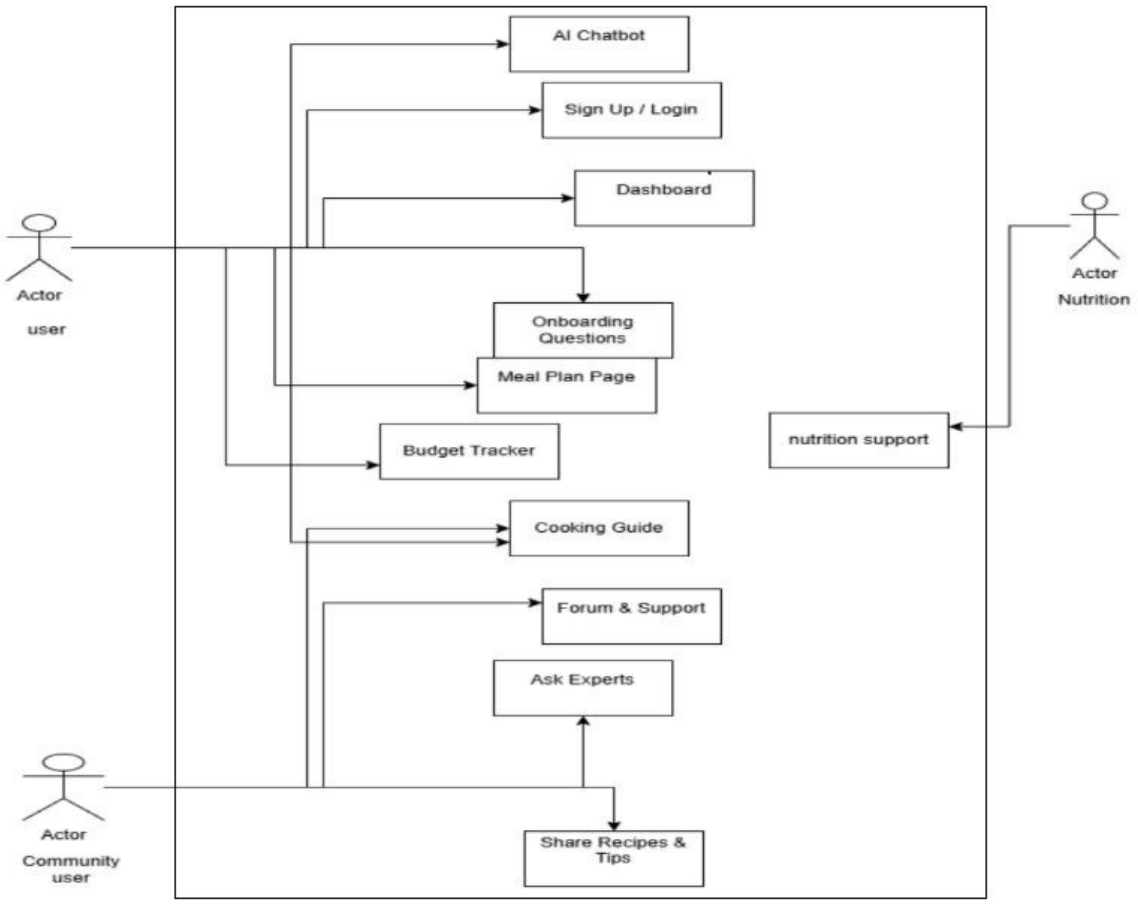


Fig: Use Case Diagram - Healthy Eats

4.5 Use Case Description:

Use Case: Generate Personalized Meal Plan

Description:
This use case describes how a registered user receives a personalized daily meal plan based on their health data, dietary preferences, and budget. The system uses AI to generate suggestions that are tailored to the user's profile.

Stakeholders and Interest:

- User: Wants a healthy, affordable, and personalized meal plan without manual effort.
- System: Aims to provide accurate and useful recommendations based on available user data.

Primary Actor:
Registered User

Preconditions:

- The user must be logged into the system.
- The onboarding process must be completed with health, taste, and budget preferences stored.

Success Scenario:

1. User logs in and accesses the dashboard or meal plan section.
2. The system retrieves the user's stored health and preference data.
3. The AI engine processes the data and returns a personalized meal plan.
4. The system displays meals for the day (Breakfast, Lunch, Dinner) with nutritional values.
5. User can view, accept, or swap meals.
6. Ingredients can be added to the grocery list with one click.

Alternate Scenario:

- 3a. If the AI model fails or data is incomplete, the system loads a default plan based on the user’s age group and dietary preference.
- 5a. If the user swaps a meal, the system re-runs AI logic for that specific slot and updates the plan.

Postcondition:

- A meal plan is successfully generated and displayed.
- Grocery list is updated if selected by the user.

- User can proceed to recipe or budget sections based on the generated plan.

4.6 Activity Diagram:

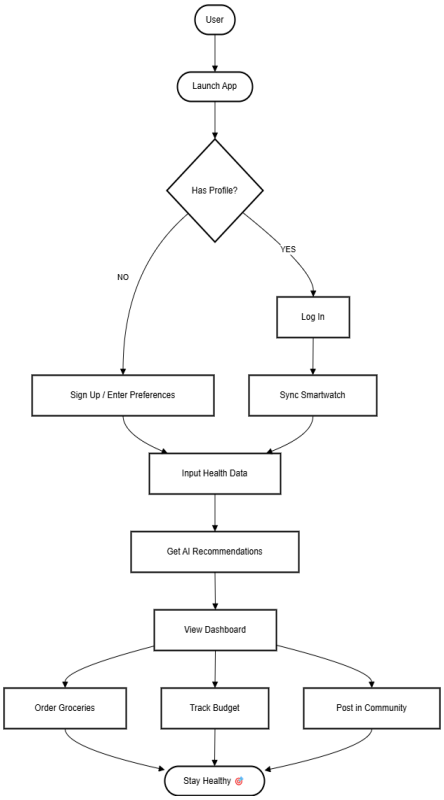


Fig: Activity Diagram - Healthy Eats

4.6 Data Flow Diagram (DFD):

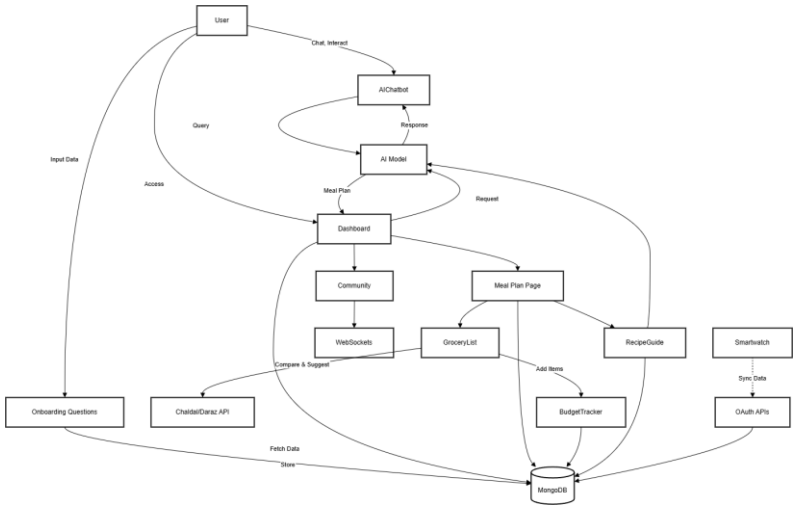
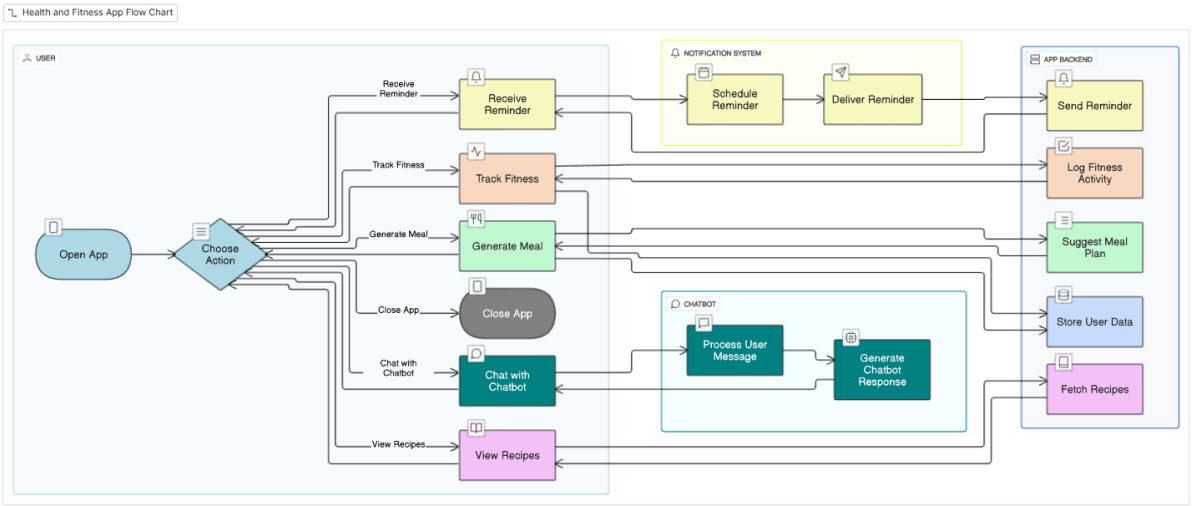
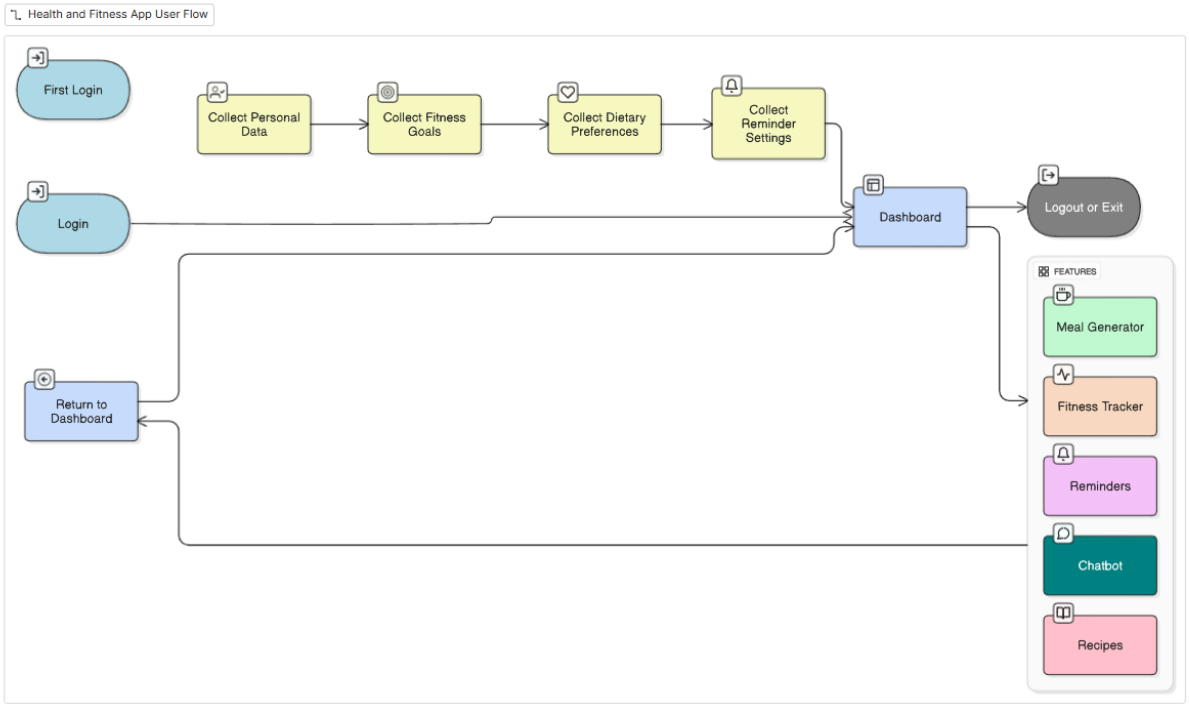


Fig: Data Flow Diagram (DFD) - Healthy Eats

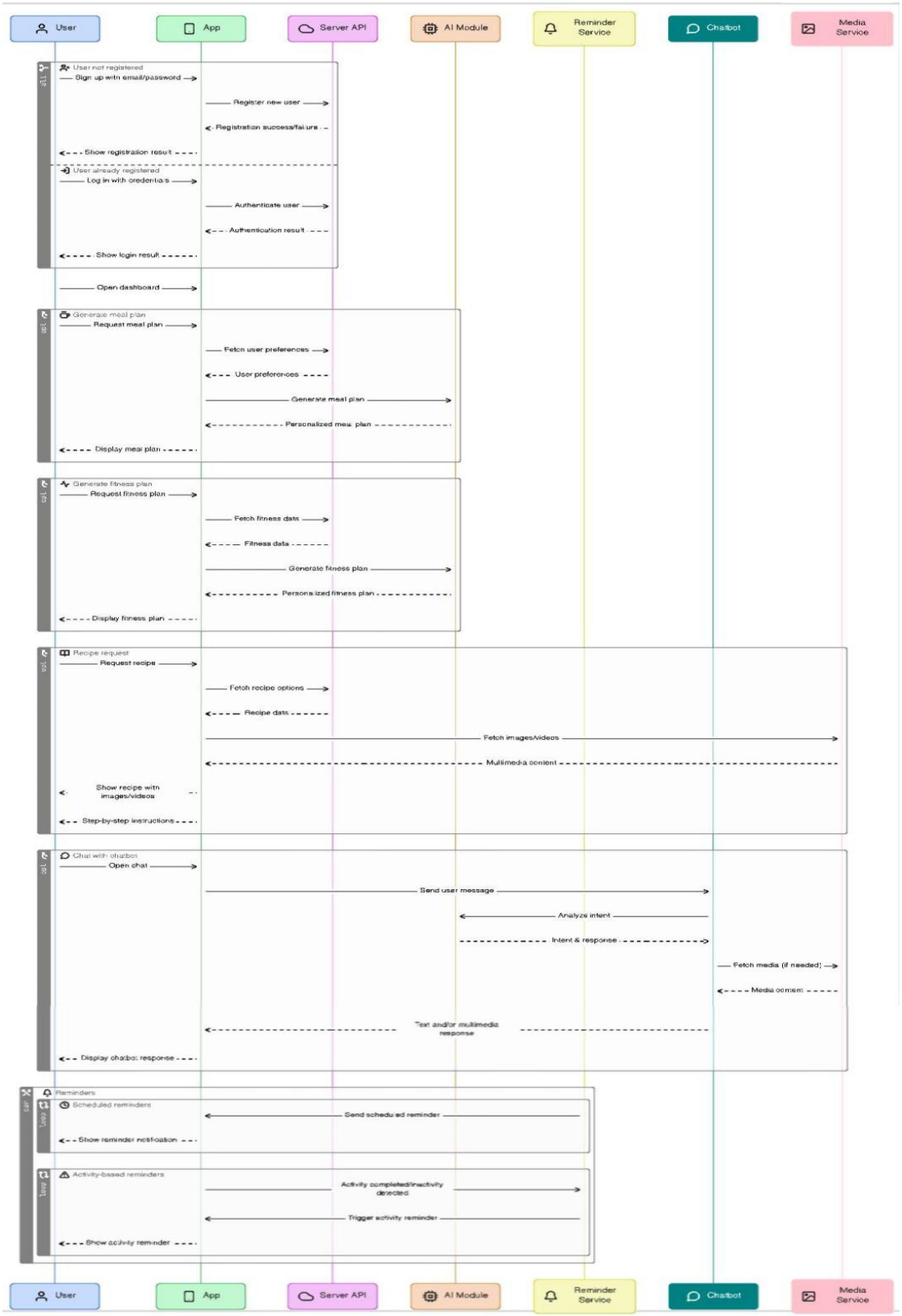
4.7 Swimlane Diagram:



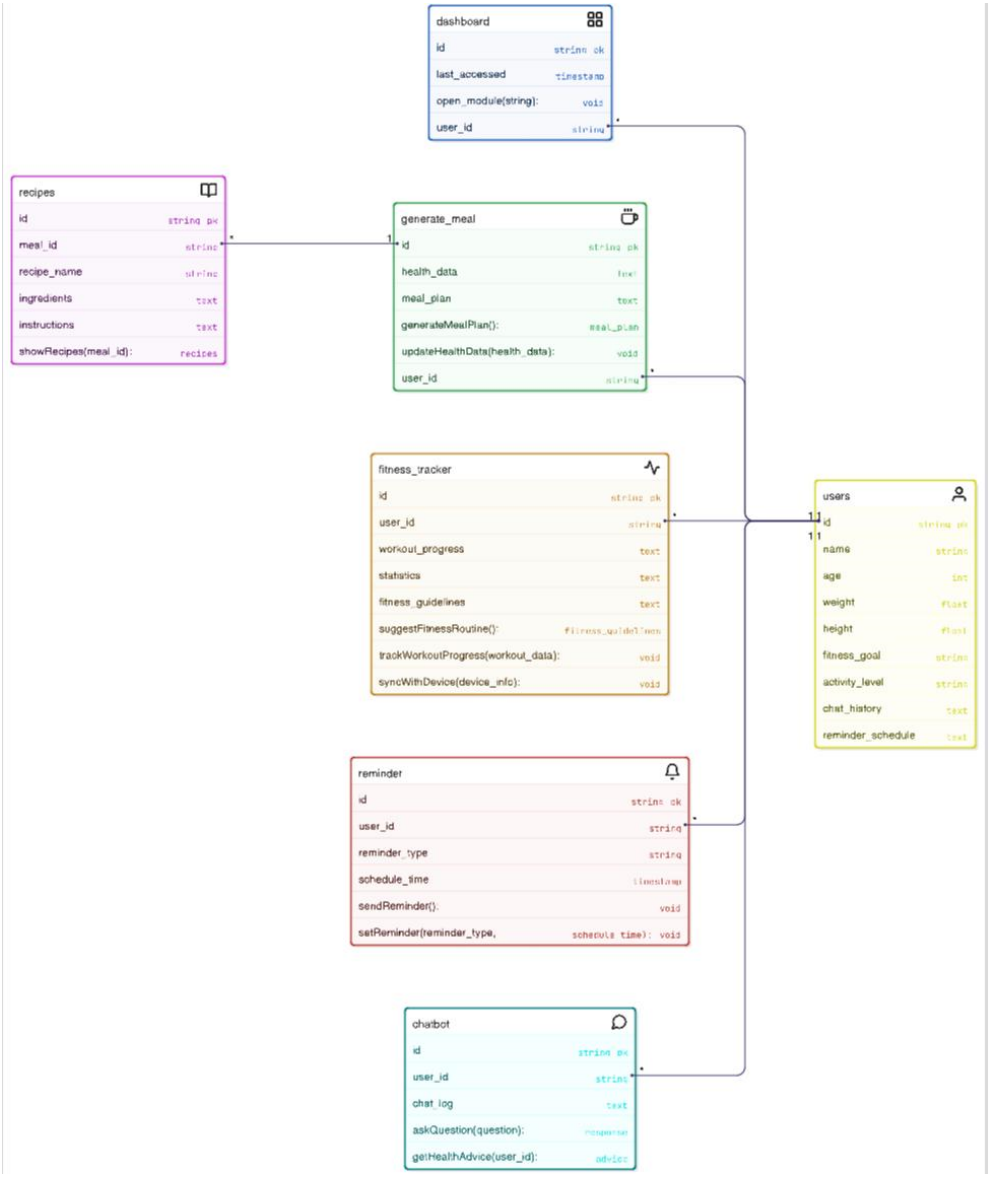
4.8 State Diagram :



4.9 Sequence Diagram :

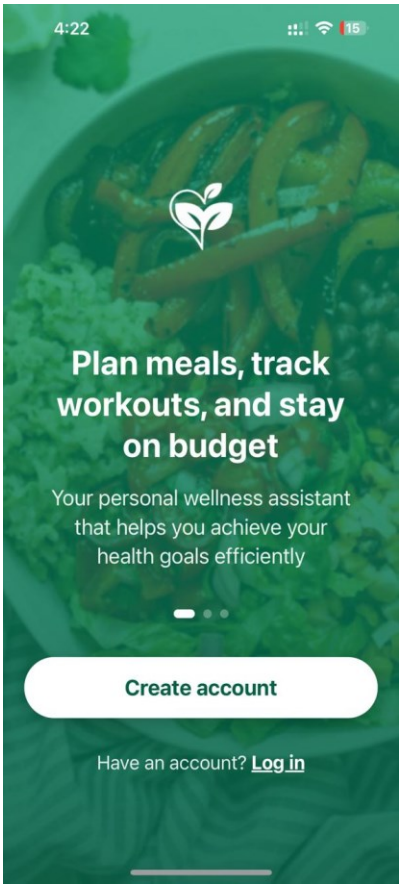


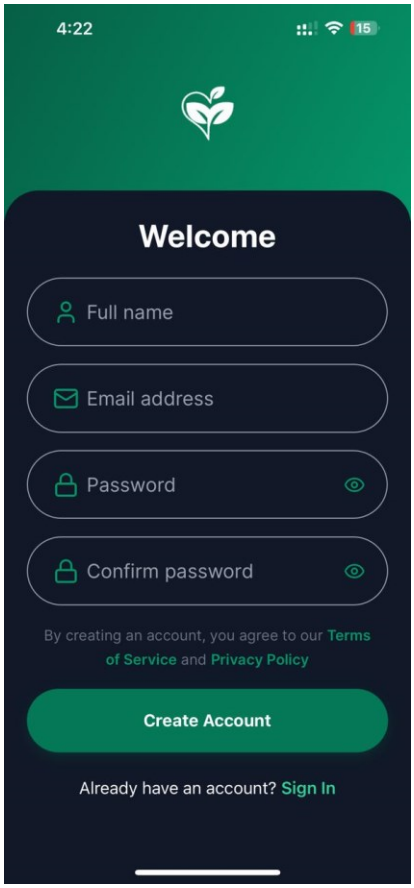
4.9: Class Diagram:

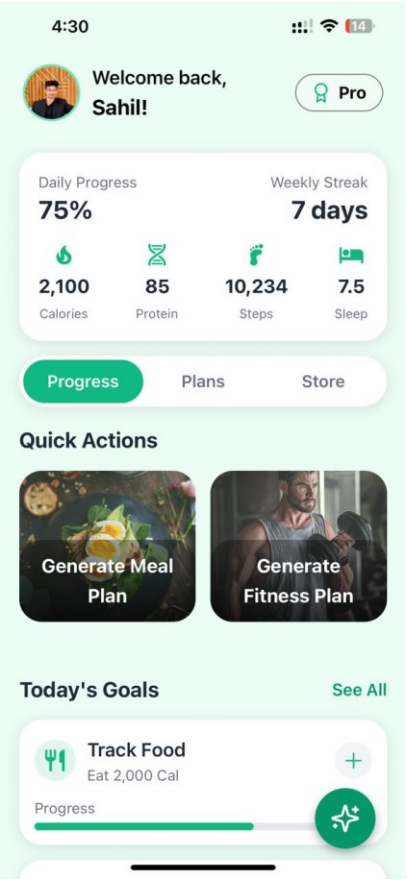


Chapter 5: Prototyping or UI Design

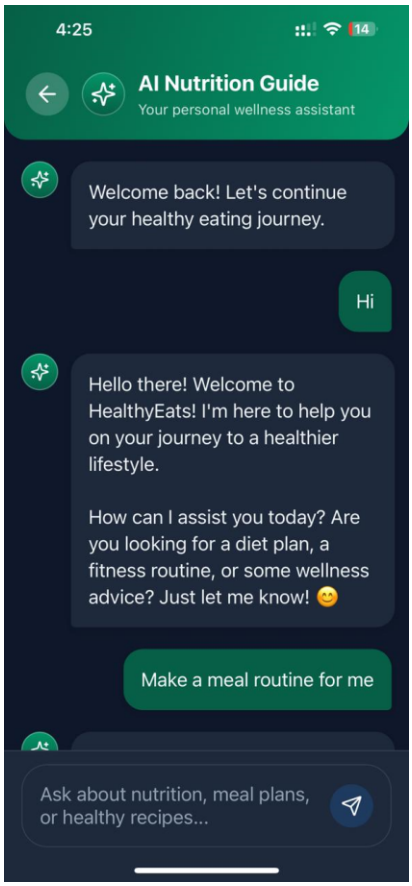
The following UI design screenshots have been created using **Figma** to provide a visual representation of the *Healthy Eats* application. These mockups illustrate the user-friendly and intuitive layout aimed at delivering a seamless experience across all core features, including personalized meal plans, workout tracking, and budget management. The design prioritizes simplicity, accessibility, and engagement, ensuring that users can easily navigate through the platform while staying focused on their health and financial goals.

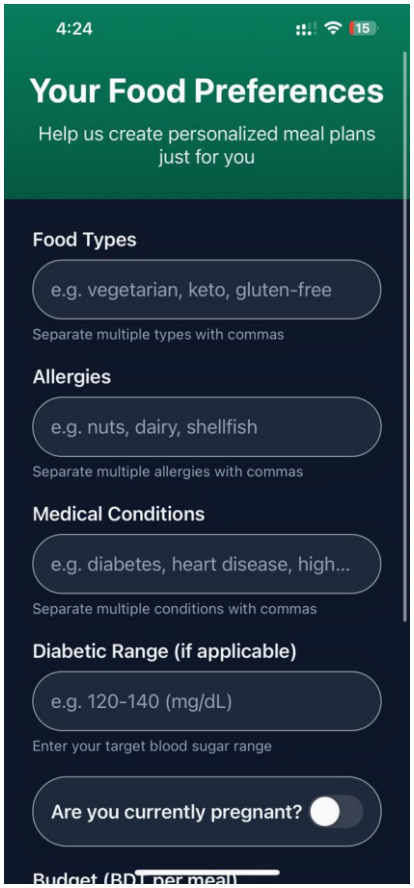


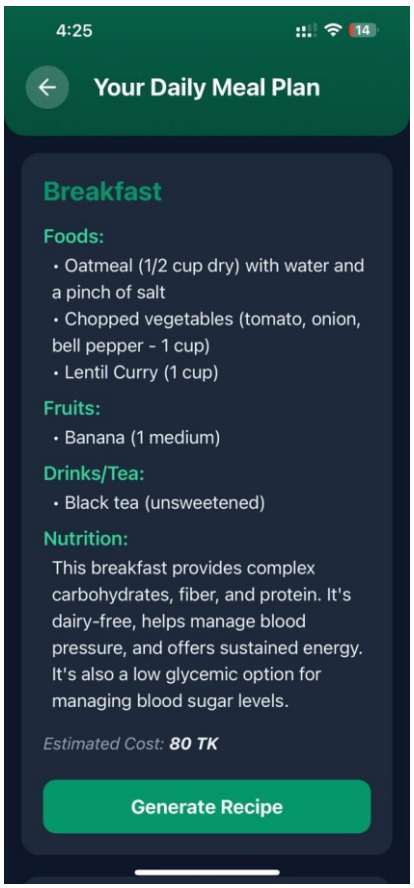


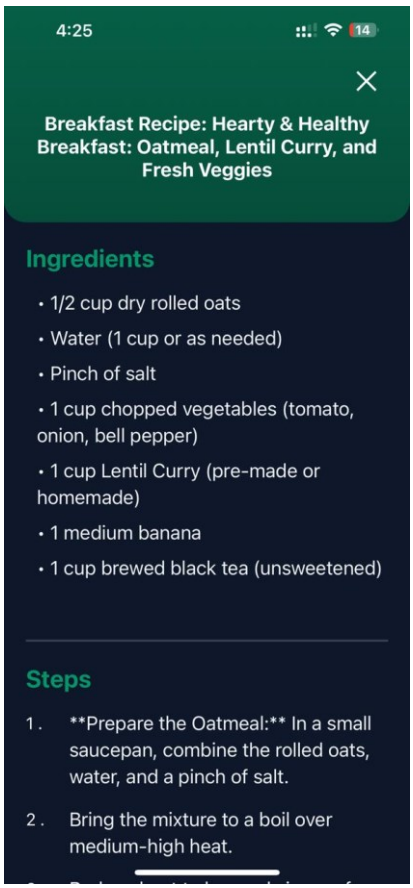



4:29
Sahil Al Farib
Wellness Journey • 2 Years
Pro Member
120
Workouts
8.4k
Calories
3.7k
Miles
98%
Consistency
My Account
My Goals
Health Metrics
Preferences
Settings
Privacy Policy


4:25
AI Nutrition Guide
Your personal wellness assistant
Welcome back! Let's continue your healthy eating journey.
Hi
Hello there! Welcome to HealthyEats! I'm here to help you on your journey to a healthier lifestyle.
How can I assist you today? Are you looking for a diet plan, a fitness routine, or some wellness advice? Just let me know!
Make a meal routine for me
Ask about nutrition, meal plans, or healthy recipes...


4:24
Your Food Preferences
Help us create personalized meal plans just for you
Food Types
e.g. vegetarian, keto, gluten-free
Separate multiple types with commas
Allergies
e.g. nuts, dairy, shellfish
Separate multiple allergies with commas
Medical Conditions
e.g. diabetes, heart disease, high...
Separate multiple conditions with commas
Diabetic Range (if applicable)
e.g. 120-140 (mg/dL)
Enter your target blood sugar range
Are you currently pregnant?


4:25
Your Daily Meal Plan
Breakfast
Foods:
• Oatmeal (1/2 cup dry) with water and a pinch of salt
• Chopped vegetables (tomato, onion, bell pepper - 1 cup)
• Lentil Curry (1 cup)
Fruits:
• Banana (1 medium)
Drinks/Tea:
• Black tea (unsweetened)
Nutrition:
This breakfast provides complex carbohydrates, fiber, and protein. It's dairy-free, helps manage blood pressure, and offers sustained energy. It's also a low glycemic option for managing blood sugar levels.
Estimated Cost: 80 TK
Generate Recipe


4:25
Breakfast Recipe: Hearty & Healthy Breakfast: Oatmeal, Lentil Curry, and Fresh Veggies
Ingredients
• 1/2 cup dry rolled oats
• Water (1 cup or as needed)
• Pinch of salt
• 1 cup chopped vegetables (tomato, onion, bell pepper)
• 1 cup Lentil Curry (pre-made or homemade)
• 1 medium banana
• 1 cup brewed black tea (unsweetened)
Steps
1. **Prepare the Oatmeal:** In a small saucepan, combine the rolled oats, water, and a pinch of salt.
2. Bring the mixture to a boil over medium-high heat.

Compliance with Shneiderman's 8 Golden Rules of UI Design

The *Healthy Eats* application interface has been carefully designed to align with Shneiderman's 8 Golden Rules, ensuring a seamless, user-centered experience. Here's how each principle is reflected in our UI design:

1. **Strive for Consistency**
   We maintain visual and functional consistency across all screens—uniform color schemes, typography, icons, and layout patterns are used to create a predictable and familiar environment throughout the app.

2. **Enable Frequent Users to Use Shortcuts**
   Keyboard shortcuts and quick-access buttons (e.g., for logging meals, workouts, or expenses) are included to speed up repetitive tasks for power users, improving efficiency without overwhelming beginners.

3. **Offer Informative Feedback**
   Our interface provides real-time visual and textual feedback—such as confirmation messages after saving data, error prompts during invalid inputs, and loading indicators during processing—to keep users informed at every step.

4. **Design Dialogs to Yield Closure**
   Each user interaction—such as completing a meal plan, generating a budget report, or updating a profile—ends with a confirmation dialog or a summary screen, reinforcing task completion and user confidence.

5. **Offer Error Prevention and Simple Error Handling**
   Input fields include constraints, dropdowns, and auto-suggestions to prevent errors. If errors occur, the system provides clear messages with guidance for correction (e.g., "Please enter a valid calorie amount").

6. **Permit Easy Reversal of Actions**
   Features like undo for food entry, edit/delete options for budget logs, and cancel buttons in forms ensure that users can reverse actions with minimal effort and no fear of permanent mistakes.

7. **Support Internal Locus of Control**
   Users maintain control over their navigation and data—nothing is auto-submitted without explicit consent, and they can freely explore features without being forced into

specific workflows.

8. **Reduce Short-Term Memory Load**
   We minimize cognitive load by displaying essential information contextually—such as nutritional breakdowns next to recipes, past entries pre-filled in forms, and persistent navigation tabs for key modules.

Conclusion:

The *Healthy Eats* application is designed as a socially impactful, AI-powered digital health companion that specifically caters to the needs of urban working individuals in developing countries. This Software Requirements Specification (SRS) outlines a clear roadmap for developing a platform that not only addresses the physical aspects of health—diet and exercise—but also the equally important challenges of affordability, time, cultural alignment, and technological accessibility.

Through its integration of AI-driven personalization, culturally contextualized dietary recommendations, and smart financial tracking, *Healthy Eats* differentiates itself in a saturated market of health and wellness apps. It goes beyond generic fitness advice by offering localized solutions that are tailored to the realities of its target users. These include using locally available ingredients, providing no-equipment workout plans, offering interfaces in native languages like Bangla, and embedding cost-consciousness into every aspect of the user journey.

The functional and non-functional requirements outlined in this SRS ensure that the platform will be user-friendly, scalable, secure, and high-performing. The application's features are purpose-built to tackle real-world barriers such as economic limitations, misinformation, lack of time, and the absence of culturally relevant guidance—issues that are often overlooked by mainstream health solutions.

In summary, *Healthy Eats* aspires not just to be a fitness or meal planning app, but a comprehensive lifestyle tool that empowers users to make sustainable, informed, and affordable health choices. By bridging the gap between awareness and action, the application has the potential to create long-term behavioral change and contribute positively to public health outcomes, particularly in underrepresented and underserved urban communities.