Patent Draft

Mobile application for diet recall – Diet Healthmate

Field of Invention

Personalized Nutrition and Community Engagement App" lies at the intersection of health, technology, and social interaction. It addresses the need for effective diet management and healthier lifestyle choices by leveraging mobile app technology, personalized nutrition algorithms, and community-building features. Through its innovative approach, the app aims to empower users to make informed decisions, customize their dietary preferences, and connect with others for support and motivation in their wellness journey.

Motivational Background

"In a world where hectic schedules, fast-food culture, and sedentary lifestyles dominate, the importance of maintaining a healthy diet and lifestyle has never been greater. Every day, millions of individuals struggle to make healthier food choices, manage their weight, and adopt sustainable habits that promote overall well-being. Recognizing these challenges and inspired by the desire to make a positive impact on people's lives, Diet Health Mate was born.

At the heart of Diet Health Mate lies a deep-seated commitment to empowering individuals to take control of their health and wellness journey. Motivated by the belief that everyone deserves access to personalized nutrition guidance, community support, and the tools needed to achieve their wellness goals, our team embarked on a mission to develop a revolutionary mobile application.

Objectives

Our 8 Major Objectives of our project are:-

1. Diet Tracking: Enable users to record and track their daily food intake, including meals, snacks, and beverages, in a user-friendly and efficient manner.

2. Nutrient Analysis: Provide users with detailed information about the nutritional content of their diet, including calories, macronutrients (carbohydrates, proteins, and fats), and micronutrients (vitamins and minerals).

3. Reminder and Notification System: Implement reminders and notifications to encourage users to log their meals regularly, stay on track with their goals, and provide feedback or suggestions based on their recorded data.

4. Goal Setting and Tracking: Allow users to set specific fitness goals (e.g., weight loss, muscle gain, improved cardiovascular endurance) and track their progress over time

5. Workout Planning: Facilitate the creation of customized workout plans by allowing users to schedule exercises, set rest intervals, and design routines tailored to their goals and time constraints.

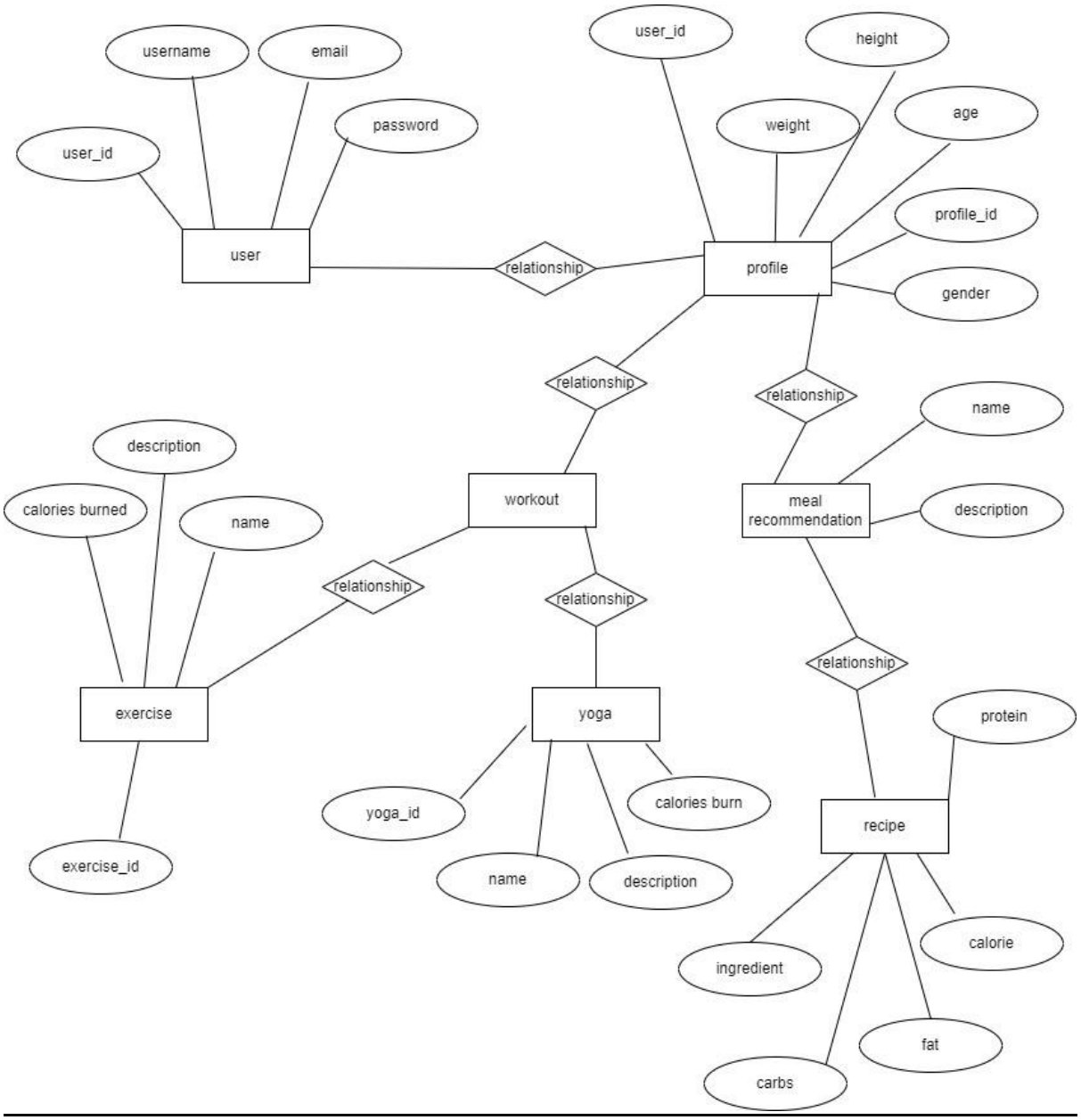
6. User Support and Guidance: Offer access to educational resources, workout tips, and guidance on proper nutrition, recovery, and injury prevention to support users in their fitness journey.

7. Meal Recommendations: Provide users with meal recommendations based on their fitness goals, nutritional needs, and dietary preferences. These recommendations can take into account the user's workout schedule and the specific nutrient requirements for preworkout and post-workout meals.

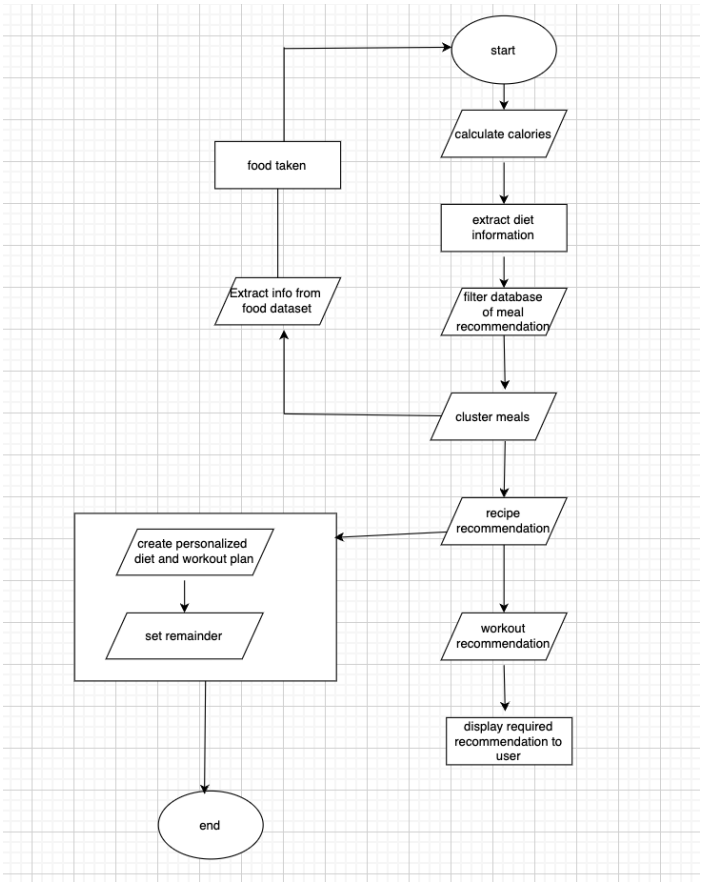
8. Recipe Database: Develop a robust and diverse recipe database that includes healthy meal options suitable for various dietary preferences (e.g., vegetarian, vegan, gluten-free) and fitness goals (e.g., muscle building, weight loss).

Diagram

ER Diagram



Flowchart



1. Data collection - Data is collected by web scraping (projects work on demo data). Consider using libraries like http or web_scraper in Flutter.
2. Data processing - Data is processed and required attributes are added to make demo datasets.
3. User's profile generation - by taking input from them.
4. Initial recommendation - based on user's profile (Content-based, implemented by Knearest neighbors).
5. Recommendation based on similar profiles to users.
6. Recommendation on the basis of user's past/recent activity - (Collaborative Memory based approach, implemented by K-nearest neighbors).

Claim

1. Personalized Nutrition Guidance: Diet Health Mate claims to provide personalized meal recommendations tailored to individual preferences, dietary restrictions, and wellness goals. Through advanced algorithms and user input, the app aims to offer customized nutrition guidance to help users make informed decisions about their diet.

2. Community Engagement: The app claims to foster a vibrant community where users can connect, share meal plans, exchange healthy recipes, and provide mutual support. By facilitating social interaction and collaboration, Diet Health Mate aims to enhance user motivation, accountability, and overall engagement in their wellness journey.

3. Gamification Elements: Diet Health Mate incorporates gamification elements such as challenges, achievements, badges, and rewards to incentivize users to adhere to their dietary goals and maintain consistency. The app claims to make the experience of managing one's diet more enjoyable, interactive, and motivating through these gamified features.

4. Trending Recipes and Curated Content: The app claims to offer a curated selection of trending recipes and content to keep users inspired and informed about the latest culinary trends and healthy eating practices. By providing fresh and relevant content, Diet Health Mate aims to enrich the user experience and encourage exploration of new culinary ideas.

5. User-Centered Design: Diet Health Mate is designed with a user-centered approach, prioritizing ease of use, intuitive navigation, and accessibility for all users. The app claims to provide a seamless and enjoyable user experience, empowering individuals of all backgrounds and skill levels to take control of their health and wellness journey.

6. Continuous Improvement: The project claims a commitment to continuous improvement and innovation, with regular updates and enhancements to ensure that Diet Health Mate remains a valuable resource for users seeking to improve their health and well-being. The team aims to incorporate user feedback, latest research, and emerging technologies to evolve and refine the app over time.

Technology Used

The technology stack for the "Diet Health Mate: Personalized Nutrition and Community Engagement App" includes:

- Frontend Development: Flutter framework with Dart programming language is utilized for building the frontend of the mobile application. Flutter provides a rich set of UI components and allows for cross-platform development, ensuring a consistent user experience across different devices and platforms.
- Backend Development: Node.js and Express.js are employed for backend development, providing a robust and scalable server-side infrastructure. These technologies enable efficient handling of user requests, data processing, and integration with external services.

- Database Management: Firebase is utilized as the backend database management system. Firebase offers real-time database capabilities, user authentication, and cloud storage solutions, ensuring secure and reliable data storage and retrieval for the application.
- Analytics and Reporting: Microsoft Power BI is integrated into the project for analytics and reporting purposes. Power BI provides powerful data visualization tools, allowing for the creation of interactive dashboards and reports to gain insights into user behaviour, engagement metrics, and performance indicators.

Proposed Methodology

The machine learning algorithm which we will use in our project is - **K nearest neighbor**

Content-based diet recommendation by K nearest neighbor-

1. User Profile Creation: Collect user preferences, dietary restrictions, and goals. Consider factors like age, gender, activity level, and any specific health conditions.

2. Food Item Representation: Represent each food item in a feature vector. Features can include nutritional content (calories, proteins, fats, carbohydrates, vitamins, etc.). Normalize the features to ensure equal weightage.

3. User Profile Representation: Create a user profile vector based on their preferences and dietary requirements.

4. Similarity Calculation: Use a similarity metric (cosine similarity, Euclidean distance) to measure the similarity between the user profile vector and the vectors of different food items.

5. K-Nearest Neighbors: Identify the k-nearest neighbors with the highest similarity scores. These neighbors represent food Items that are most similar to the user's preferences.

6. Recommendation Generation: Aggregate the recommendations from the k-nearest neighbors. Rank the recommendations based on similarity scores.

Content-based recommendation system

In a content-based recommendation system for a diet app, the idea is to recommend food items to users based on the characteristics or "content" of the foods and the user's preferences.

1. Food Information: Each food item is described by its nutritional content, such as calories, proteins, fats, and carbohydrates.

2. User Preferences: Users provide information about their dietary preferences, restrictions, and goals. For example, they might indicate if they want low-calorie meals or are avoiding certain ingredients.

3. Matching Preferences: The system compares the nutritional content of each food item with the user's preferences.

4. **Similarity Calculation:** A similarity score is calculated to determine how closely the nutritional content of a food item aligns with the user's preferences.

5. **Recommendation:** Food items with the highest similarity scores are recommended to the user. These are considered the closest match to what the user is looking for in terms of nutrition and dietary goals. For example, if a user prefers low-calorie meals and avoids high-fat foods, the system recommends foods that are low in calories and have lower fat content based on the nutritional information. This approach focuses on the "content" or characteristics of the food items and tailors recommendations to match the user's individual preferences.

Abstract

In today's modern world people all around the globe are becoming more interested in their health and lifestyle. But just avoiding junk food and doing an exercise is not enough, we require a balanced diet. A balanced diet based on our height, weight and age can lead a healthy life. Combined with physical activity, your diet can help you to reach and maintain a healthy weight, reduce your risk of chronic diseases (like heart disease and cancer), and promote your overall health. A balanced diet is one that gives your body the nutrients it needs to function correctly.' Our aim is to make a system that helps users to make personalized diet plan and recall them for their meal time to time and help them to create a balance in overall calorie intake throughout the day. The system would remind the user on a

daily basis to have their meal and with many options to choose from for a personalize meal plan for a day. Also, the user will be able to choose any type of healthy food they want as per their convenience out of the options that will be there to them by the system. Our body use calories for basically everything like breathing, walking, running etc. On average a person needs 2000 calories per day but specifically intake of calories depends upon persons physical aspects like weight, height, age and gender. So, your food choices each day affect your health — how you feel today, tomorrow, and in the future. Thus, a proposed system gives required calories for a diet plan based on your physical aspects and your end goal.

End users

Individuals Seeking Healthier Eating Habits: People looking to improve their diet, make healthier food choices, and adopt sustainable eating habits can benefit from personalized nutrition guidance, meal recommendations, and community support offered by the app.

Fitness Enthusiasts: Athletes, bodybuilders, and fitness enthusiasts aiming to optimize their nutrition for performance, muscle gain, or weight management can utilize the app to track their food intake, receive tailored meal plans, and connect with like-minded individuals for support and motivation.

Weight Management Participants: Individuals participating in weight loss programs or seeking to maintain a healthy weight can use the app to track their calorie intake, set dietary goals, and receive guidance on portion control and healthy eating habits.

Health-Conscious Individuals: People with specific dietary requirements, food allergies, or health conditions (such as diabetes, hypertension, or celiac disease) can benefit from personalized nutrition recommendations and access to curated content tailored to their unique needs.

Advantage

- Personalized Nutrition Guidance: Users receive tailored meal recommendations based on their individual preferences, dietary restrictions, and wellness goals, enabling them to make informed choices about their diet.
- Community Support: The app fosters a supportive community where users can connect, share meal plans, exchange healthy recipes, and provide mutual encouragement, enhancing motivation and accountability in their wellness journey.
- Gamification Elements: Incorporating gamification elements such as challenges, rewards, and achievements makes the process of managing one's diet more engaging and enjoyable, encouraging users to stay consistent and achieve their dietary goals.
- Trending Recipes and Curated Content: Users have access to a curated selection of trending recipes and content, keeping them inspired and informed about the latest culinary trends and healthy eating practices.

Conclusion

In conclusion, "Diet Health Mate: Personalized Nutrition and Community Engagement App" represents a transformative solution in the realm of health and wellness management. By combining personalized nutrition guidance, community building features, and gamification elements, the app offers users a comprehensive tool to support their journey towards better health and wellness.

Throughout the development process, our team has remained dedicated to our mission of empowering individuals to make informed decisions about their diet and lifestyle. We have leveraged cutting-edge technology, innovative algorithms, and user-centered design principles to create an intuitive and effective platform that meets the diverse needs of our users.

As we move forward, we are committed to continually enhancing and refining Diet Health Mate to ensure it remains a valuable resource for individuals seeking to improve their health and well-being. With a focus on user feedback, ongoing innovation, and a steadfast commitment to our core values, we are confident that Diet Health Mate will continue to make a positive impact on the lives of users worldwide.

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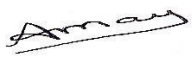
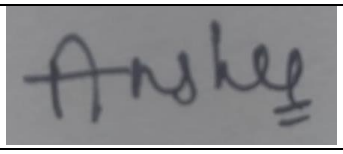
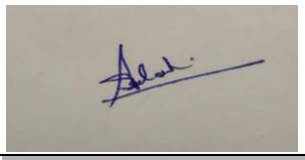
Amay Jaiswal	amay.2125cs1048@kiet.edu	
Anshu Tomar	anshu.2125cs1002@kiet.edu	
Abhay Solanki	abhay.2125cs1052@kiet.edu	
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