Project Team #: 20CSM_B17

21BQ5A4206 – Sk. Esub
21BQ5A4204 – P. Sattar Khan
21BQ5A4205 – P. Sandeep
21BQ5A4201 – A. Sai Srija

Project Name: Mobile Application for Diet Recall

Abstract:

The " Mobile Application for Diet Recall **AKA** Deep Learning-Powered Dietary Management and Food Analysis Application " is an innovative and comprehensive project that aims to revolutionize dietary management through the use of Deep Learning and Natural Language Processing (NLP) techniques. The application functions as an AI-based smart food analyser and dietary tracking tool, allowing users to accurately record and monitor their food intake using a user-friendly diet recall approach. The app's advanced Deep Learning algorithms delve into a vast food database to provide users with detailed nutritional information, including calories, carbohydrates, fats and proteins. Additionally, the application utilizes NLP to enhance user interaction, allowing for seamless logging of food names. With personalized dietary recommendations, meal suggestions, and advanced analytics, the project empowers users to make informed choices about their dietary habits and health.

The existing system faces several key problems. First, traditional calorie trackers rely on manual food recording, which can be time-consuming and tedious for users. Second, the lack of ease-of-use in entering food names or recording unnamed foods hinders the accuracy of data input. Additionally, the existing system lacks crucial alerts related to dietary tracking and allergens, compromising user safety and awareness.

The proposed solution addresses these issues comprehensively. By employing Deep Learning and image recognition, users can record their meals effortlessly by simply taking a picture, eliminating the need for manual data entry. The app's auto-suggestion feature streamlines food recording with optimized text input. Moreover, the integration of NLP enables the app to understand food names pronounced in regional languages and even without using the name of food, ensuring inclusivity and ease of use. The proposed solution also implements diet tracking alerts and allergen alerts, promoting user safety and health-conscious decision-making. Additionally, the app also tailors dietary recommendations based on individual body constitutions, offering users personalized and well-balanced diet plans. Overall, the project's proposed solution promises to provide a seamless and comprehensive dietary management experience, fostering healthier eating habits and improved well-being for users.

Title	FoodSnap: An AI-Powered Nutritional Companion
Client	Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy (AYUSH)
Objective	1. Develop a mobile application that enables users to accurately track and record the quantity, quality, and type of food they consume through a structured diet recall approach. 2. Implement an intuitive user interface that allows seamless data entry, incorporating pictorial images to enhance accuracy and ease of use. 3. Utilize artificial intelligence techniques to analyze food intake data and provide personalized dietary recommendations based on the user's vat, pitta, and kapha states in accordance with Ayurvedic principles. 4. Incorporate nutritional analysis capabilities into the application, providing users with information on the carbohydrate, fat, protein content, and other relevant nutritional values of their food choices. 5. Generate comprehensive monthly and weekly reports for users, offering insights into their dietary habits and progress towards their goals. 6. Integrate gamification features such as badges, points, and rewards to motivate users and foster adherence to their recommended diet charts. 7. Collaborate with dietitians to validate and authenticate the application's questions and ensure the reliability of the diet recall process. 8. Ensure data privacy and security by implementing robust measures to protect users' personal and dietary information. 9. Conduct usability testing and gather user feedback to continuously to improve and refine the mobile application. 10. Provide regular updates and maintenance to address bugs, optimize performance, and introduce new features based on user needs and industry advancements.
Users	1. Health-conscious individuals 2. Individuals following Ayurvedic principles 3. Individuals with Dietary Restrictions 4. Fitness Enthusiasts 5. Health Consultants and Dietitians

Functional Requirements	**F1: User Registration and Profile:** 1. Allow users to create accounts using email or social media accounts. 2. Implement password recovery and account verification processes. 3. Provide options for users to customize their profiles with personal information and dietary preferences. 4. Enable users to set their dietary goals and fitness objectives in their profiles. **F2: Nutritional Analysis:** 1. Utilize a vast food database to accurately analyze the nutritional content of food items. 2. Display detailed information about calories, carbohydrates, fats, proteins, vitamins, and minerals for each food entry. 3. Calculate and display the daily recommended intake of nutrients based on the user's profile and goals. 4. Provide a breakdown of nutritional information in charts and graphs for better visualization. **F3: Meal History and Tracking:** 1. Maintain a comprehensive meal history, allowing users to review their past food entries. 2. Implement a search and filter functionality to easily find specific meals within the history. 3. Enable users to add notes or comments toindividual meal entries for better context. 4. Provide a timeline view for users to track theireating patterns and habits over time. **F4: Goals Setting and Tracking:** 1. Allow users to set specific health and dietary goals, such as weight loss, muscle gain, or nutrient intake targets. 2. Provide progress tracking for each goal withvisual indicators of achievements. 3. Send periodic progress updates to users and congratulate them on reaching milestones. 4. Allow users to modify or update their goals asneeded based on their progress. **F5: Offline Functionality:** 1. Implement offline access to the application, allowing users to record meals and view previous entries without an internet connection. 2. Sync data with the cloud once the internet connection is restored. 3. Provide real-time feedback on nutritional analysisand dietary recommendations even when offline. 4. Store user settings and preferences locally to ensurea seamless experience when offline.

	F6: Personalized Recommendations: 1. Analyze user data, dietary habits, and nutritional intake togenerate personalized dietary recommendations. 2. Offer meal suggestions and recipe ideas based on the user's dietary preferences and restrictions. 3. Provide tailored nutritional advice to address specifichealth concerns or conditions. 4. Offer personalized goal-setting based on the user's current health status and future objectives. **F7: Visual Analytics:** 1. Generate comprehensive analytics on theuser's overall nutritional intake and eating patterns. 2. Display data in interactive charts and graphs for easy understanding and analysis. 3. Offer insights and trends based on the user's eating habits over time. 4. Provide comparisons between actual intake and recommended dietary guidelines. **F8: Reports and Reminders:** 1. Send timely reports & notifications to remind users to log their mealsand snacks. 2. Provide alerts for missed or delayed meal tracking to maintain consistency. 3. Offer personalized reminders for upcoming goal deadlines and tracking milestones. 4. Allow users to customize notification preferences, such as timing and frequency.
Non-Functional Requirements	**NF1: High Performance and Scalability:** 1. Optimize the application's code and database queries for fast response times. 2. Implement caching mechanisms to reduce the load on the server and enhance performance. 3. Design the application to handle many concurrent users without significant performance degradation. 4. Ensure scalability by using cloud-based infrastructure that can adapt to varying user demands. **NF2: Usability:** 1. Create a user-friendly and intuitive interface for easy navigation and interaction. 2. Conduct usability testing and gather feedback from users to improve the application's design. 3. Implement consistent and recognizable icons and symbols for common actions. 4. Ensure that users can accomplish tasks efficiently with minimal learning curve.

	NF3: Security: 1. Utilize encryption for data transmission and storage to protect user information. 2. Implement secure user authentication and authorization mechanisms. 3. Regularly update and patch the application to address potential security vulnerabilities. 4. Conduct regular security audits and penetration testing to identify and address security weaknesses. **NF4: Reliability:** 1. Minimize system downtime by employing redundant servers and backup mechanisms. 2. Conduct rigorous testing to identify and fix potential bugs and errors before deployment. 3. Implement failover mechanisms to ensurecontinuous operation even in case of server failures. 4. Monitor application performance and proactively address any issues that may arise. **NF5: Compatibility:** 1. Ensure that the application is compatible with various mobile devices, operating systems, and web browsers. 2. Test the application on different screen sizes and resolutions to ensure responsive design. 3. Verify compatibility with different versions of the device's camera and barcode scanner functionality. 4. Consider accessibility features to make the application usable by people with disabilities. **NF6: Integration Capability:** 1. Design the application with API integration inmind, allowing easy connection with third-party services. 2. Implement OAuth or similar protocols to enable secure integration with social media platforms for registration and login. 3. Provide an API for experts or dietitians to access user data securely for personalized recommendations. 4. Consider integrating with fitness tracking devices and wearables for a holistic health tracking experience. **NF7: Error Handling and Logging:** 1. Implement robust error handling mechanisms togracefully handle unexpected scenarios. 2. Log errors and exceptions to aid in debuggingand troubleshooting. 3. Use descriptive error messages to guide users in resolving issues effectively. 4. Monitor error logs and proactively address recurring or critical errors.

	NF8: User Feedback and Support: 1. Provide an in-app feedback system for users toreport issues or suggest improvements. 2. Offer multiple channels for user support, such as email, chat, or a support forum. 3. Respond promptly to user queries and feedbackto maintain a positive user experience. 4. Use user feedback to continuously improve the application's features and usability.
Software & Hardware Requirements	**Software Requirements:** 1. UI Design: Figma 2. Visual Studio Code 3. Programming Languages: React Native, Node JS,Python 4. XML 5. JSON 6. RoboFlow 7. AWS Sage maker Notebooks 8. Alerts, Notifications, Weekly and Monthly Reports: AWS Lambda Functions 9. Tracking User Activity: Google Analytics 10. Communication & Support: Twilio 11. Social media sharing API (WhatsApp Sharing API, Facebook Sharing API) 12. Database: MongoDB 13. API Testing: Postman Application **Hardware Requirements:** 1. OS: Android 5.0 or above 2. RAM: 2Gb 3. HDD: 1Tb 4. Graphic-Card: 1Gb 5. Net-Bandwidth: 5Mbps (fetching data from Cloud, API Requests, Application Internet Usage)

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