

## ANDROID APPLICATION FOR ACTIVITY BASED NUTRITIONAL NEEDS

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### ABSTRACT

Maintaining a healthy lifestyle is a popular goal but can be challenging to accomplish in today's fast-paced environment. In order to solve this, a new application has been created that makes it easier to get a customized diet plan based on variables like height, weight, gender, and BMI. This software incorporates an advanced algorithm that can create a personalized nutrition plan that guarantees a balanced diet—essential for both illness prevention and optimum bodily performance. A balanced diet, which is made up of foods high in vital nutrients and low in unneeded fats and sweets, gives the body the building blocks it needs to operate effectively. Children's growth, development, and academic achievement are all impacted by proper nutrition, which also lays the groundwork for lifelong healthy eating habits. Because of the application's user-friendly layout, creating and managing accounts is a breeze for users. Users can obtain their customized diet plan with only one click. A professional dietician consultation option is available on the app for users with particular dietary restrictions or allergies. The app also has an educational component where users can look up fascinating nutrition and health-related topics.

By using this software, users can meet their health objectives without physically seeing a dietician, which saves time and increases accessibility to healthy eating. This cutting-edge technology not only encourages a healthy lifestyle but also adjusts to the specific requirements of each user, enabling everyone to achieve personal well-being in the hectic world of today.

**Keyword:** Personalized Nutrition Diet Plan, Well-Balanced Diet, Dietary Algorithm, Nutrient-Rich Foods, Virtual Dietician, User-Friendly Interface, Nutrition Education, and Health Optimization

### 1. INTRODUCTION

Diet Expert is an Android app that offers users individualized diet regimens in a manner akin to that of a real-life dietician. Through an accessible technical platform, this digital solution replicates the interactive experience that a person might have with a qualified dietitian, anywhere and at any time.[1]

**Making User Profiles:** First, personal data that usually affects dietary recommendations must be entered by the user. This includes information about height, weight, gender, and maybe other variables like age, degree of activity, and particular health objectives (such as gaining muscle mass, losing weight, or leading a healthy lifestyle). Diet Expert utilizes the user's personal information to determine the user's unique nutritional needs. In order to predict the user's daily calorie demands based on their activity level, it may be necessary to calculate their basal metabolic rate (BMR).

The application then creates a customized diet plan based on the information it has processed, taking into account the user's dietary requirements. This diet plan balances the macronutrients (proteins, fats, and carbs) and micronutrients (vitamins, minerals) required for optimum health in addition to taking the user's goals into account when calculating calorie intake. Users can update their profiles with fresh information (such as weight or activity level changes) as they make progress with their diet plans, which causes Diet Expert to modify its diet plans appropriately. This feature guarantees that the diet plan will always be applicable and efficient. Diet Expert most likely has a simple, intuitive interface that promotes continuous use. To make diet adherence easier, features might include grocery lists, recipe selections, and meal suggestions. Diet Expert may provide a function that allows users to consult with a licensed dietician in the event that they have complex health concerns, allergies, or specific dietary restrictions. This guarantees that everyone using the diet programs may do so in a safe and efficient manner—even in cases where extra considerations are required. Users are required to register on a registration page in order to use the app for the first time. In order to help personalize their experience, this process requires entering basic information like name, email address, and even health-related data. After registering, users can use the app's features by logging in. Users are asked to enter personal information such as their height, weight, gender, and other relevant health data after logging in. Using this information, the app calculates dietary requirements based on the individual needs of each user. These inputs are processed by an advanced algorithm against pre-established parameters to create a personalized food plan that supports the user's health objectives, whether they weight loss, muscle building, or upholding a balanced lifestyle. Users have the choice to accept or reject a suggested diet plan once it is presented. The system can provide alternate plans if the user's expectations or preferences aren't met by the initial plan. This feature makes sure that the user has a plan that they can easily follow and feel comfortable with.

## 2. LITERATURE SURVEY

With current fast-paced lifestyles often having an adverse effect on people's health across all age groups, digital medicine is quickly becoming recognized as an essential answer to these problems. This strategy ensures prompt and effective access to medical treatments by fusing technology with healthcare delivery. Online video conferencing, e-prescriptions, safe uploading of medical reports, emergency notifications for critical situations, simple appointment scheduling, and real-time information about local healthcare institutions are some of the key features. It also provides reminders for taking medications on time. These apps, which are mostly made for Android smartphones, link to servers run by hospitals and make use of GPS and GSM networks to provide easy communication between medical staff and patients. This technology not only expedites the medical treatment procedure but also improves transparency and removes geographic barriers in healthcare access. [1]

This study used a mix of sensor technologies and a tablet application to evaluate the viability and user opinions of a home-based fitness program created especially for frail older persons. The goal of the program was to increase physical activity among this population, with an emphasis on improving their general health and well-being by offering a practical and easy-to-use means of getting regular exercise that is catered to their requirements and skills. It was anticipated that the combination of sensors and an app would provide individualized coaching and progress monitoring, promoting ongoing engagement and maximizing the program's advantages. [2]

A web-based expert system for menu management and nutrition advising was created as a result of this work. This cutting-edge system makes data searching and processing easier with its extensive database that contains food items, dishes, and menus. It lets customers select from therapeutic and general cuisines that are catered to their dietary requirements. The Korean Recommended Dietary Allowances can be compared with the nutritional composition of various menu items via the system. Users can arrange menus, assess the nutritional value of foods, and search for items based on particular nutrients and quantities. This platform, which offers tools for nutrition education, counselling, and complex menu management, is made to be user-friendly for both the general public and experts like dietitians and nutritionists. Fast and precise nutritional analysis is provided by the system, making it a valuable tool in the field of nutrition and dietetics.[5]

In specifically, real-time object detection and measurement using machine learning approaches is explored in this research article. It starts with a review of the literature, mentioning important works like the object identification technique YOLO and the real-time uses of LiDAR and OpenCV sensors. During the discussion of real-time object identification techniques, accuracy and speed in dynamic situations are emphasised. The study describes a comprehensive algorithm that combines OpenCV, LiDAR sensors, cameras, and machine learning techniques to recognise and measure object sizes. In order to offer accurate measurements of things, it describes procedures for gathering data, training models, and putting them into practice in real time. Recognising limitations such sensor precision and data accessibility, it is concluded that the suggested method provides a complete answer for real-time object measurement.[6]

## 3. RELATED WORK

To gain a deeper understanding of the present state of digital health treatments and personalized dietary advice systems, the team behind Diet Expert undertook a thorough study of previous academic research as part of the project's Literature Survey component. The main sources for this review were academic papers and articles using Bayes-based techniques that were published in respectable publications such those that are included in the IEEE index. Principal Results of the Literature Review: Present Healthcare Issues The requirement for in-person interactions between healthcare practitioners and patients has been noted as a major drawback of traditional healthcare approaches. This need frequently leads to greater time and resource investment, which can be difficult for people who live in rural locations or have mobility impairments. Significant progress has been achieved in personalized healthcare solutions, especially those that make use of artificial intelligence (AI) and machine learning, according to the analysis. Large volumes of individual health data can be processed by these technologies to deliver individualized health recommendations and interventions.

Advantages of Digital Solutions: Research has shown that digital health apps can greatly improve healthcare services' accessibility. They offer the ease of having access to health-related advice from any location, which may boost user participation and adherence to advice.

Integration of Bayesian Approaches: A number of publications have emphasized how Bayesian algorithms can be used to improve the individualization of dietary advice. Thanks to these algorithms, predictions and modifications based on shifting health parameters and user feedback may be made with greater accuracy. AI integration refers to using AI to

manage complicated data analytic tasks and alter diet programs in real time in response to new user input or updated health recommendations.

Remote Accessibility: Making sure the app can be accessed without in-person interactions, which will save time and facilitate users' ability to receive dietary advice that is consistent. Educational Content: Consisting of instructional resources based on current research, which give people the information they need to make wise decisions regarding their health.

#### 4. METHODOLOGY

Utilizing USDA data, the proposed nutrition diet recommendation system customizes dietary recommendations to meet the needs and dietary choices of each individual. First, the system determines the user's nutritional status based on their BMI and amount of food consumed each day. After that, it uses the USDA database to extract precise food nutrition information in order to examine the user's regular grocery choices. Based on this information, the system uses content-based and collaborative filtering approaches to identify nutrient deficits and deliver customized dietary suggestions. While content-based filtering proposes things that nearly match the nutrient profile that the user's current diet lacks, collaborative filtering uses user data to compare profiles to anticipate appropriate foods. With the goal of supporting the user's general health and well-being, this dual approach guarantees that dietary suggestions are both individualized and nutritionally comprehensive.

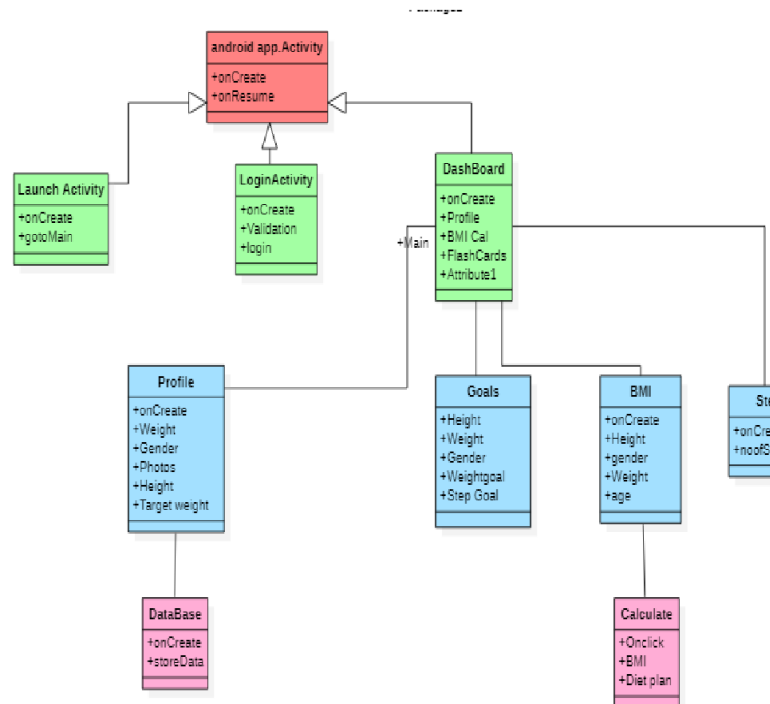


Fig 1: Class Diagram of Application

You seem to be describing the essential elements and implementation specifics of a health management application that makes use of Google Firebase for backend operations and Android's platform features. Let's dissect the main components of your project as you have described it: Overview of the Project and its Implementation Plan Your project's description looks to place a lot of emphasis on data management and user engagement, with a particular emphasis on customizing health-related information like exercise regimens and diet plans. Using Google Firebase, which offers reliable services for authentication and data storage, is part of your deployment plan. This decision guarantees the scalability, security, and dependability of your app. Initially, a flowchart was used to outline the app's functionality. This is a critical stage in the creation of an app since it aids in the visualization of the user experience and the architecture required to support functionality. You can securely and effectively manage user sessions when you utilize Firebase for user authentication. Numerous authentication techniques are supported by Firebase, such as phone numbers, email addresses and passwords, and well-known third-party providers like Facebook, Google, and Twitter. Vital information including age, height, weight, and gender are gathered at registration. With this data, precise health measures and recommendations can be calculated, thereby tailoring the user experience. Users have the ability to examine and modify their personal data, guaranteeing that the information is current for proper health management. Enables profile customisation, increasing user interaction. This feature tracks physical activity and integrates with device sensors or external fitness devices.

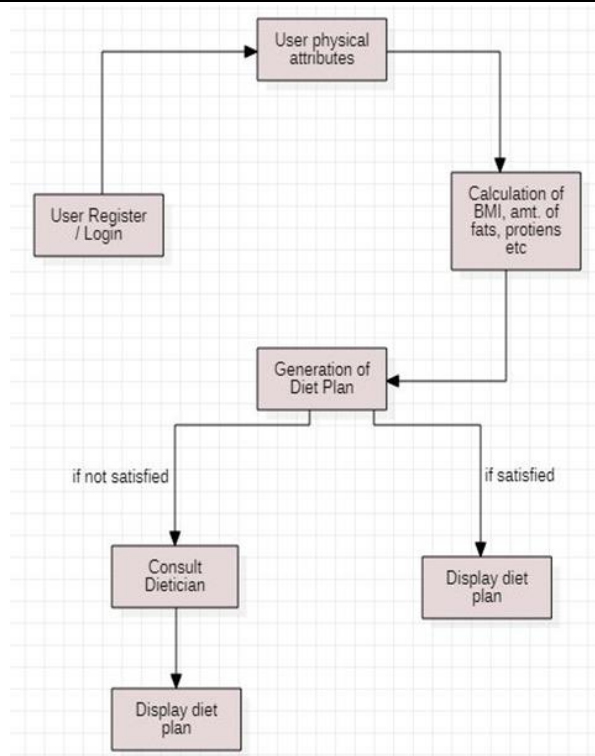


Fig 2: Flow Diagram of Application

#### IMPLEMENTATION:

According to the description, the implementation phase of your health management app entails a combination of applying functional research data, employing well-established development tools, and getting access to useful resources. These elements are broken down as follows: Tools and Development Environment Google's official integrated development environment (IDE) for creating Android apps is called Android Studio. It provides an extensive toolkit for effectively designing, creating, testing, and debugging Android applications.

**Design Features:** Android Studio offers an intuitive user interface that makes it simple to incorporate complex design components. Layout editors, performance measurement and debugging tools, and an extensive collection of customizable pre-built templates and components are all included. Firebase Authentication offers backend services, such as third-party providers and basic pass-through authentication, to assist with user authentication. This makes creating a safe authentication process easier. Teaching Materials: For the purpose of introducing new features and resolving certain technical issues, tutorials and documentation are indispensable. For developers to fully comprehend the features of Firebase and Android Studio, these resources are essential. Available in Android Studio. Logic Applications and Formulas for calculations: A person's height and weight are used to calculate their BMI, which is an easy computation. Usually, the formula is  $BMI = \text{weight (kg)} / (\text{height (m)})^2$ . An overview of health categories like underweight, normal weight, overweight, and obesity is given by this index. Calculating the overall calorie intake requires more intricate calculations that take into account a number of variables, such as height, weight, age, gender, and degree of physical activity. Public health standards or nutritional studies are frequently the source of these formulations. Investigation and Confirmation Making certain that the procedures and formulas used are dependable entails  $\text{Weight (kg)} / (\text{Height (m)})^2$  is the formula for BMI. The goal of this measurement is to assist in the classification of users into several health groups (underweight, normal, overweight, and obese), which is essential for customizing exercise and food regimens.  $\text{Calories} = (\text{Weight} * 22) * \text{Activity Multiplier}$  Variables. This factor, which ranges from 1.2 (sedentary) to 2.0 (extremely active), modifies calorie requirements according to the user's level of daily activity.

#### Interface User:

User engagement and frequent app use are likely to be encouraged by intuitive and simple-to-use interfaces. The user experience is improved by having BMI, calorie demands, and diet regimens displayed clearly.

**Data Management:** Data management using Firebase guarantees that user information is safely stored and always available on various devices. This is especially helpful for customers who need to update their information while on the go or who may access the app on many platforms.

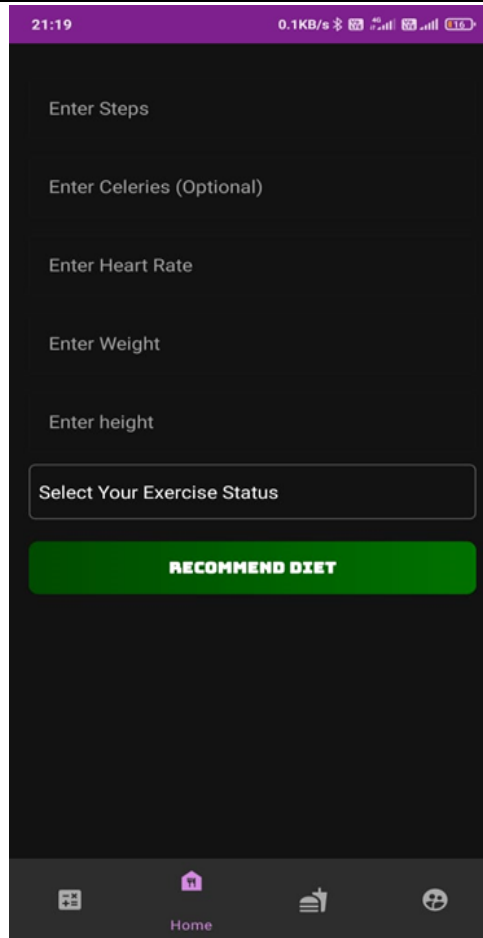


Fig 3 : Dashboard Screenshot

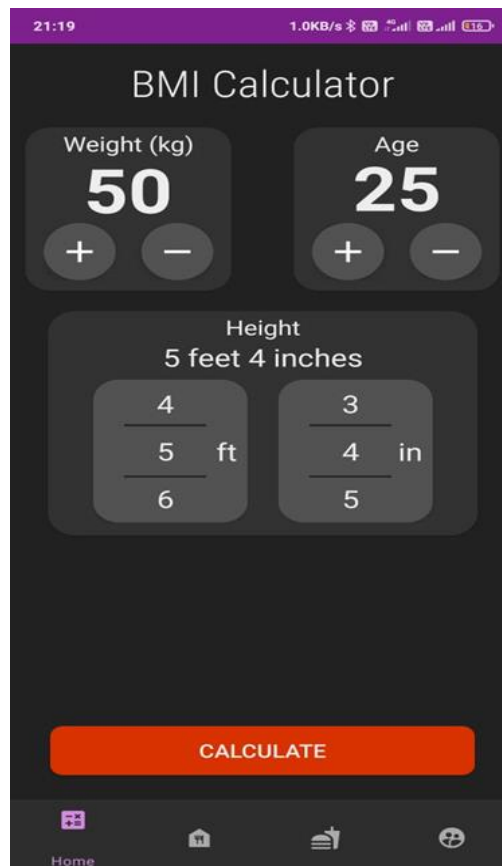


Fig 4 : BMI Calculator

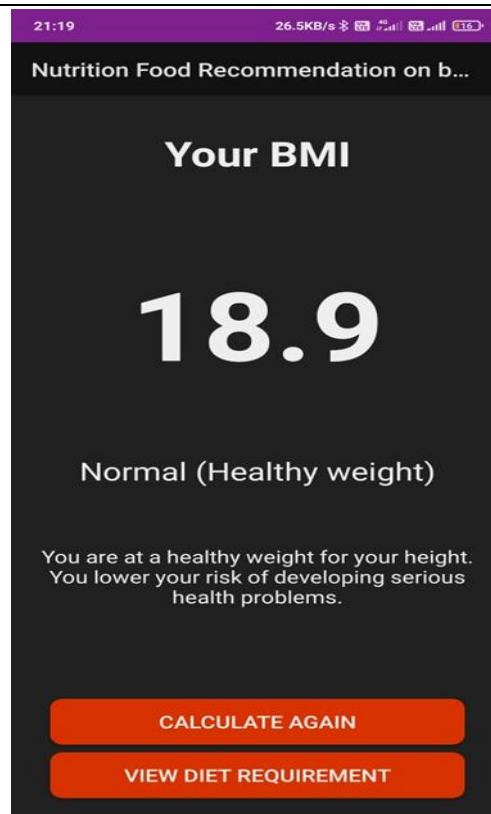


Fig 5 : BMI

## 5. CONCLUSION

By putting a virtual dietitian's services right in the palm of each user's hand, The Dietitian App, a mobile application, aims to transform access to dietary and health management. Targeting individuals with hectic schedules or restricted availability to conventional medical care, this application provides a practical resolution by enabling users to generate profiles, enter personal health information, and obtain customized exercise and nutrition plans. Based on the data entered, the app determines the user's BMI and modifies recommendations accordingly. The admin functionalities encompass the capacity to oversee and administer user accounts, guaranteeing the accuracy and security of user information. Subsequent iterations of the application intend to leverage cloud integration, augmenting data administration and app scalability throughout various devices. Additionally, as the app's features and usability develop, user feedback will be vital in helping to make it even more user-friendly in the long run.

## 6. FUTURE SCOPE

Your proposed enhancements to the Dietitian App clearly focus on refining functionality, extending its capabilities, and improving user engagement through expert collaboration and technological advancements. Here are some ideas elaborated based on your suggestions:

**Incorporating Expert Nutritionists:** These experts can help develop diversified diet plans catering to various health conditions and lifestyle choices, such as vegan, ketogenic, or diets specific for medical conditions like diabetes or hypertension.

**Incremental Releases for Continuous Improvement:** Adopting an agile approach to software development, where the app is updated regularly with new features and improvements, can help keep the app relevant and efficient.

**Enhancing System Performance:** Focus on optimizing the application's performance to handle more users, larger data sets, and complex algorithms without slowing down. Improved performance can lead to faster load times and smoother interactions, enhancing user satisfaction.

**Video Calling and Secure Prescription Features:** Integrating video calling within the app can simulate a real-life interaction between users and dietitians. This feature would be particularly beneficial for users needing more personalized guidance.

**Expanding Access to Dietitian Services:** Beyond video calls, other communication tools such as chatbots powered by AI, forums for community support, and scheduled live Q&A sessions can enhance user interaction with dietitians.

**Monitoring and Analytics Tools:** Implementing advanced analytics and monitoring tools that allow users to track their progress over time can be motivational and informative. Features could include graphical representations of weight loss, nutritional intake, and activity levels, helping users visualize their journey and stay motivated.

**User-Centric Design and Accessibility:** Continue to refine the UI/UX to ensure that the app is easy to use for a diverse range of users, including those with disabilities. Accessibility features could include voice commands, screen readers, and adjustable text sizes to cater to users with visual or physical impairments.

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