Diet & Exercise Recommendation system

Sumegh Bansode

Department of Information Technology

Government College of Engineering, Karad.

Prasad Vaydande

Department of Information Technology

Government College of Engineering, karad

Omkar Ghankute

Department of Information  
Technology

Government College of Engineering, Karad

Piyush Raut

Department of Information Technology

Government College of Engineering, karad

**Abstract-** Maintaining a healthy lifestyle requires personalized diet and exercise plans, but manual planning can be complex and inefficient. This project proposes an intelligent **Diet and Exercise Recommendation System** using Machine Learning (ML) integrated with Spring Boot for the UI. The system analyses user data such as age, weight, height, BMI to provide personalized recommendations.

Key components of the system include:

Personalized Diet Plans using Collaborative Filtering (CF) or Content-Based Filtering (CBF) to suggest meals based on user preferences and nutritional needs.

Exercise Recommendations leveraging K-Nearest Neighbors (KNN) or Decision Trees to match users with suitable workouts based on their fitness level and past activity data.

**Introduction –**

In today’s fast-paced lifestyle, maintaining a healthy diet and regular exercise routine is essential yet challenging. With the rise in health issues such as obesity, diabetes, and cardiovascular diseases, people are increasingly looking for personalized fitness guidance. However, generic diet plans and workout routines often fail to meet individual needs. To address this, we propose a **Diet & Exercise Recommendation System** that provides **personalized meal plans and workout schedules** based on an individual’s health data, activity level, and goals.

**Need for the System-**

Many people struggle with **choosing the right diet and exercise plan** for their body type, lifestyle, and fitness goals.

Existing **one-size-fits-all** solutions may not yield effective results, leading to **lack of motivation**.

There is a growing need for a **data-driven, AI-powered** system that can provide **customized fitness recommendations**.

Integration with **wearable devices and fitness apps** can enhance tracking and monitoring for better results.

**Increasing lifestyle diseases** – Obesity, diabetes, and cardiovascular issues are rising due to poor diet and lack of exercise.  
**One-size-fits-all approaches are ineffective** – Generic workout and diet plans do not consider **individual body types, metabolic rates, and activity levels**.  
**Lack of proper guidance** – People often follow **random diet trends** or exercise routines that may not be suitable for them.  
**Need for technology-driven fitness solutions** – With the rise of **wearable fitness devices and AI-driven health applications**, a **data-driven, smart system** is needed to provide personalized recommendations.

**Proposed Solution-**

Our **Diet & Exercise Recommendation System** provides a **data-driven, personalized approach** to health and fitness. The system:

**Collects user health data** – Age, weight, height, BMI, dietary preferences, fitness goals, and medical conditions.  
**Analyses dietary needs** – Recommends **balanced meal plans** considering caloric intake, macronutrients, and dietary restrictions.  
**Generates customized workouts** – Suggests **personalized exercise routines** based on fitness level, workout history, and activity tracking.  
**Tracks user progress** – Monitors **daily steps, calories burned, and workout performance** through manual inputs or wearable integrations.  
**Provides smart recommendations** – Adjusts diet and workout plans **based on user feedback and progress** to optimize results.  
**Offers real-time health insights** – Sends **hydration reminders, meal timing alerts, and fitness tips** for improved health management.

By combining **AI-powered recommendations with real-time tracking and progress monitoring**, our system helps users **achieve their health goals efficiently and sustainably**.

**Literature Review -**

In today’s culture, many people suffer from a range of ailments and illnesses. It’s not always simple to recommend a diet right away. The majority of individuals are frantically trying to reduce weight, gain weight, or keep their health in check. Time has also become a potential stumbling block. The study relies on a database that has the exact amounts of a variety of nutrients. As a result of the circumstance, a program that would encourage individuals to eat healthier has been created. Only three sorts of goods are recommended: weight loss, weight gain, and staying healthy. The Diet Recommendation System leverages user inputs such as medical data and the option of vegetarian or non-vegetarian meals from the two categories above to predict food items. We’ll discuss about food classification, parameters, and machine learning in this post. This study also includes a comparative review of the advantages and disadvantages of machine learning methods. Finally, we’ll discuss future research directions for the diet guidance system [1].

Obesity and sedentary lifestyles have become significant health concerns globally. To solve these issues, this system presents a Diet Plan and Home Exercise Recommendation System (SYP) that utilizes users' smartwatch data and pathological information to generate personalized diet plans and exercise recommendations. The proposed SYP system leverages the capabilities of modern smartwatches, which are equipped with various sensors to collect comprehensive health data. Additionally, it incorporates users' pathological data obtained through medical tests. By integrating these diverse datasets, the system can provide tailored recommendations based on an individual's specific health profile. The SYP system operates in two main phases: data collection and recommendation generation. During the data collection phase, the system collects and analyses data from users' smartwatches and pathological records, such as heart rate, sleep patterns, blood pressure, glucose levels, and body mass index. The collected data is then processed to extract relevant features and construct a comprehensive health profile for each user. In the recommendation generation phase, the SYP system employs machine learning algorithms to analyse the user's health profile and generate personalized diet plans and home exercise recommendations. The generated recommendations are designed to be practical, feasible, and aligned with the user's health objectives.[2]

Hypertension is a leading modifiable risk factor for cardiovascular disease and death worldwide, with a high prevalence in Malaysia. This study develops a web-based diet recommendation system for patients with hypertension patients using an expert system. The system includes a knowledge base on the Dietary Approaches to Stop Hypertension (DASH) diet for hypertension patients, a calorie, body mass index (BMI) calculation tool, a food database, and a dietary assessment to gather information about the user’s salt diet. The study uses the Agile model, which comprises four phases: planning and requirements, design and analysis, development, and testing. The system allows individuals with hypertension to take control of their health and improve their quality of life through better nutrition. Overall, this system is a successful technological tool for assisting individuals with hypertension to maintain a healthy weight and blood pressure levels.[3]

**Reference -**

[1] [M. Shah, S. Degadwala and D. Vyas, "Diet Recommendation System based on Different Machine Learners:4eview," 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), Coimbatore, India, 2022, pp. 290-295](https://ieeexplore.ieee.org/document/9742919),

[2] [S. Gaikwad, P. Awatade, Y. Sirdeshmukh and C. Prasad, "Diet Plan and Home Exercise Recommendation system using Smart Watch," 2023 International Conference on Artificial Intelligence for Innovations in Healthcare Industries (ICAIIHI), Raipur, India, 2023, pp.](https://ieeexplore.ieee.org/document/10489367)

[3] [H. K. Muhd Hafeez Khan, S. Nordin and M. R. A. Hamid, "Diet Recommendation Expert System for Hypertension Patients," 2023 IEEE 8th International Conference on Recent Advances and Innovations in Engineering (ICRAIE), Kuala Lumpur, Malaysia, 2023, pp. 1-6, doi: 10.1109/ICRAIE59459.2023.10468502](https://ieeexplore.ieee.org/document/10468502).