

AI Based Personalized Diet Planner for Patients

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Abstract - This project aims to develop an AI-powered system that provides personalized diet plans for patients based on their medical conditions, dietary restrictions, and nutritional needs. A goal of this research involves the development of an AI system that generates customized diet plans for patients depending on their medical health conditions and diet limitations and nutritional requirements. The system uses machine learning algorithms to evaluate patient information for creating dietary plans that follow their medical requirements and health objectives. This tool provides healthcare professionals together with dietician's valuable assistance to deliver individualized nutritional care to patients. The specific nutritional treatment requirements persist throughout the duration of the disease's diabetes, hypertension and cardiovascular conditions. Standard dietary approaches do not address unique health specifications and dietary requirements of individual persons. The system produces nutritional suggestions after it examines patients' medical records through evaluation of their dietary selection process together with tracking allergy risks and movement possibilities. The system implements continuous feedback processing to change diets through examination reports and biometric measurements. AI alongside OCR analysis reveals test results that then leads to summary findings and readjustments of nutritional approaches. Instant dietary help through chatbot construction provides quick support for patients to maintain increased use and better adherence to prescribed nutritional plans. Patients benefit from a platform that offers user-friendly personalized dietary plans which implement both medical advice and nutritional advice. Health professionals can better control chronic diseases through this solution by improving nutrition intake while both detecting necessary deficiencies and sending quick monitoring alerts. Through

its conversion of nutrition planning into an interactive system the solution enhances patient outcomes.

Over the years, there hasn't been much study on meal planner programmers based on compliance with macronutrient recommendations. We suggest developing a meal-planning programmed that can provide tailored diet plans depending on users' requirements.

Key Words: AI diet planner, personalized nutrition, patient health data, machine learning, healthcare automation, random forest.

1.INTRODUCTION

The healthcare sector today places growing emphasis on customized care but specifically in the field of nutrition. Diets function as vital components in both preventing and treating diabetes together with hypertension and obesity. Developing an appropriate diet that meets personal health requirements along with individual lifestyle needs and preferences takes a long time and numerous steps for completion. A Conditional intelligence-driven program for customized dietary plans guides patients through tailored eating regimens based on their information data. Diabetes management as well as the prevention and treatment of hypertension and obesity significantly depends on proper nutritional choices. Traditional meal plans do not address specific medical requirements which exist in each individual person. The current dietary applications involve two main problems: they need input from dietitians, or they lack proper medical consideration. We have developed an AI system to create specific dietary plans after examining patient health information together with life-related data and nutrition requirements. Live health updates trigger a two-part system with rule-defined, and machine-learning processed adaptations of suggested meals. The tool can deliver essential

help to healthcare environments along with people dealing with extended health challenges.

A. Problem Identification: In the current world's health care delivery, diet is one of the effective interventions in the management and cure of ailments such as diabetes, hypertension, cardiovascular diseases, and obesity. However, most of the diets available in the market are universal diets that were not designed with specific health state, tastes, or restrictions in mind. This creates a situation where few people adhere to their health treatment regime and hence will not enjoy the best of health.

2.EXISTING SYSTEM:

1. Challenges with the existing system:

Absence of Personalization: Most diets introduced in the market are general and do not change with the current state of development of the patient.

Manual Dependency: In the traditional approach of diet planning, it is quite dependent on the dieticians' inputs which is then a laborious and an unsuitable process for large number of patients.

Lack of Connection with The Clinical Information: Most diet applications or tools fail to include specific medical data such as diabetes, food allergies, or any medications that the person might be having.

Lack of realism: The existing systems are not capable of responding to changes in real and current metrics concerning an individual's health status.

2.The Gap in technology:

While there are applications that recommend meals or count calories most of them do not take into consideration the medical condition of the user, nutritional requirements, and doctor's suggestion. This leads to a lack of completely individualized, AI-based diet therapy that develops in accordance with the patient's condition.

3. Need for a smart solution:

There is a need to develop a patient-adaptive living-being AS/VSM that will automatically create meal plans for

patients. The above solution needs to be intelligent enough to interpret medical terms, dietary limitations and nutritional Guidelines yet very simple to operate.

3.PROPOSED SYSTEM

The proposed system is an intelligent system that would analyze the information acquired from a patient and provide a recommendation on the necessary diet for the said patient. It involves utilization of supervised machine learning approaches used on datasets encompassing clinical and foods' nutrient content information to provide time-sensitive meal recommendations.

"AI-Based Personalized Diet Planner for Patients," the suggested approach, provides a clever and effective way to get around the shortcomings of the current manual system. This system uses an interactive platform with two primary components to digitally connect doctors and patients. The technology allows patients to simply compute their Body Mass Index (BMI) after logging in and entering their health information, including height, weight, gender, and medical history. The AI-driven system automatically creates individualized food recommendations based on the patient's BMI and other inputs, whether the patient's goal is to control a health condition or manage weight. Patients can also contact the doctor who updated their profile directly to arrange a consultation. These requests can be viewed, approved, or denied by doctors. If approved, patients can schedule an in-person appointment or have a video consultation online. Because the approach guarantees digital record-keeping, it is simpler to monitor patient progress and modify diet regimens as needed. The suggested system offers a practical, precise, and individualized solution for improved healthcare and diet management by offering automated food recommendations, secure communication between doctors and patients, and online and offline consultation possibilities.

A. SYSTEM DESIGN:

- i. Input Module: Gathers patient data like age, weight, BMI, allergies, health conditions (e.g., diabetes).
- ii. Data Processing Module: Cleans and preprocesses inputs.

iii. AI Recommendation Engine: Through its AI Recommendation Engine the application uses classification algorithms together with dietary guidelines for suggesting meals.

iv. Rule Filter: The Rule Filter function identifies and removes food items that are incompatible with existing health limitations.

v. User Interface: The system allows both patients and doctors to check diet charts and modify them and record their feedback through a dedicated user interface.



Fig No: A.1 Diet Plan

B. UNIQUE FEATURES:

- i. Each patient automatically receives individualized meal plans that account for their health issues.
- ii. Food selection system eliminates allergens while removing food that medical standards prohibit.
- iii. Healthcare institutions can integrate this system with their existing hospital technology infrastructure.

C. ADVANTAGES OVER PROPOSED SYSTEM:

- i. The system receives updates through changes in patient advancement and specific inputs from doctors.
- ii. AI technology allows this system to understand patient needs and build improved meal suggestions through experience accumulation.
- iii. Timesaving: Reduces dietician workload The interface has been designed with simplicity in mind to suit patients seamlessly.

4. TECHNOLOGY STACK:

The system was developed by using:

- 1. Programming Language: Java
- 2. Frameworks/Libraries: Spring Boot (Backend), Pandas, Scikit-learn (AI – Model), HTML/CSS (Frontend)
- 3. Datasets: Kaggle, Clinical dietary sets.
- 4. Platform: Application-Based Interface

5. METHODOLOGY:

A. DIET RECOMMENDATION LOGIC:

- i. BMI and health Condition – Calorie and nutrient range
- ii. Food database filtering - Safe Food Options
- iii. AI model – Matches patient profile with meal plans
- iv. Output – Daily/Weekly Chart in tabular format

B. FLOWCHART:

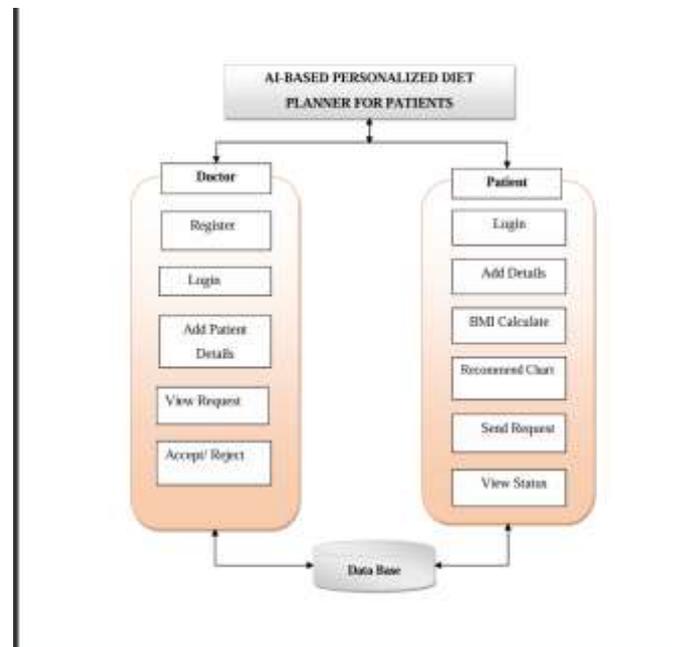


Fig No: B.1 Flowchart for AI Based Personalized Diet Planner

C. MODULES:

1). DOCTOR

- Register
- Login
- Add Patient Details
- View Request
- Accept/ Reject

2.) PATIENT

- Login
- Add Details
- BMI Calculate
- Recommend Chat
- Send Request
- View Status

D. MODULES:**DOCTOR**

- **Register**

This module allows doctors to create their account in the system by providing details such as name, specialization, contact information, and login credentials. Once registered, doctors can securely log in to manage patient records.

- **Login**

In this module allows registered doctors to securely access the system using their email/username and password. Upon successful login, doctors can manage their patients' details and view consultation requests. This module ensures authorized access to sensitive patient records and system features.

- **Add Patient Details**

This module enables doctors to add and register new patient profiles into the system. Doctors can enter important patient information such as name, age, gender, contact details, and medical history.

- **View Request**

This module allows doctors to see consultation requests sent by their registered patients. Through this module, doctors can review patient details and decide whether to accept or reject each request. It provides a clear list of pending, accepted, and rejected requests for easy management.

- **Accept/ Reject**

This module enables doctors to respond to consultation requests sent by patients. Doctors can view each request and choose to either accept or reject it based on availability or patient need. Accepted requests allow patients to proceed with online video consultation or schedule an offline visit. Rejected requests notify the patient with the doctor's response.

PATIENT

- **Login**

This module allows patients to securely access the system using their registered username or email and password.

- **Add Details**

In this module allows patients to enter their personal and health-related information, such as height, weight, gender, and age. This data is stored securely and used for BMI calculation and generating personalized diet plans.

- **BMI Calculate**

This module enables patients to compute their Body Mass Index (BMI) by using the height and weight details they provide. The module applies standard BMI formulas to determine whether the patient is underweight, normal, overweight, or obese.

- **Recommend Chart**

This module provides patients with a personalized diet chart based on their BMI calculation and health details. It uses AI logic to suggest suitable meals and nutrition plans tailored to the patient's body status (underweight, normal, overweight, or obese). The chart helps guide patients on what to eat for healthier living. Patients can view and follow these recommendations directly in the system.

▪ **Send Request**

This module allows patients to send consultation requests to the doctor who added their profile. Patients can request either an online video consultation or an offline physical visit. The module securely forwards the request to the doctor for review and response. It helps patients easily seek expert advice based on their current diet plan or health concerns.

▪ **View Status**

This module allows patients to check the status of their consultation requests, including whether they have been accepted or rejected by the doctor. It provides real time updates on the status of online or offline consultation appointments.

D. ER DIAGRAM:

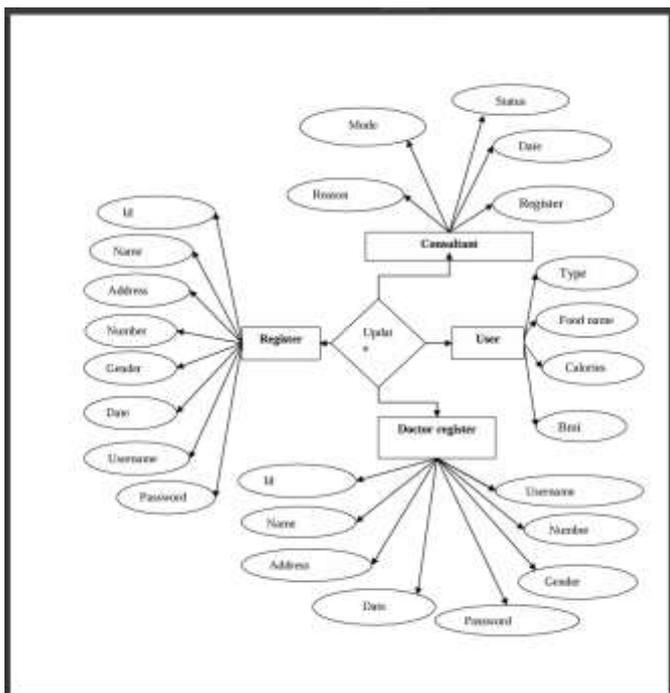


Fig No: D.1 Entity – Relationship Diagram

E. TESTING & VALIDATION:

Testing involved synthetic patient data to determine both the logic functionality and adaptability of the system. The system demonstrated success in creating nutritionally balanced suggestions without generating contradictory food options for the patient.

6. CONCLUSION:

AI-based personalized dietary planning tools offer a groundbreaking opportunity to enhance the way we approach nutrition and health management. By leveraging advanced machine learning algorithms and integrating data from diverse sources such as wearable devices, medical records, and genetic information, these systems can generate personalized, dynamic meal plans that reflect an individual’s unique health profile, goals, and preferences. As a result, users benefit from more effective dietary interventions that not only help in managing chronic diseases but also promote overall well-being. The advantages of AI in dietary planning are clear, particularly in the realm of chronic disease management. For instance, AI can optimize the dietary needs of diabetic patients by tracking blood glucose levels and adjusting meal plan accordingly. Similarly, those seeking to manage their weight or improve physical performance can rely on AI to create customized dietary strategies that support their goals. Moreover, AI systems enhance user engagement by providing real-time feedback and adapting to changing health conditions. However, the widespread adoption of AI-based dietary planning tools is not without its challenges. Issues such as data privacy, algorithmic bias, and user acceptance need to be carefully addressed to ensure the ethical and equitable use of these technologies. As AI continues to evolve, its integration with precision medicine, the improvement of machine learning models, and the expansion of multimodal data inputs will further enhance the capabilities of these systems. Moving forward, AI-based dietary tools will not only revolutionize nutrition but also pave the way for a more individualized, patient-centered approach to healthcare.

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