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Survey on E-Health Monitoring with Diet and Fitness Recommendation using Machine Learning

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A B S T R A C T

The e-Health system focuses on chronic diseases like Diabetes, High Blood Pressure, and Thyroid issues. It offers personalized diet/exercise advice via Health Monitoring (tracks health, suggests follow-ups) and Diet & Exercise Recommendation. In the Health Monitoring module, it continuously monitors patients' health parameters and suggests follow-up sessions until their reports return to normal. Patients can provide feedback to refine recommendations, and the system continually learns and updates based on user data.

1. INTRODUCTION

In today's fast-paced world, many people overlook their health due to busy schedules, leading to a lack of physical activity. This inactive lifestyle is a significant problem for today's generation. However, maintaining a balanced diet and regular exercise is essential for good health. Dietary and exercise needs vary based on factors such as lifestyle, height, weight, gender, age, and activity level.

For individuals coping with conditions like diabetes, high blood pressure, or thyroid issues, managing their health becomes even more crucial. That's why we've created a Health Monitoring system with tailored Diet and Fitness recommendations for these prevalent diseases. This system aims to assist doctors in providing suitable diet and exercise plans alongside medications during patient follow-ups.

Our system consists of two modules:

1. Health Monitoring System: Keeps track of health metrics.

2. Diet & Exercise Recommendation: Offers personalized plans based on user constraints and needs.

To improve accuracy, we've used the C4.5 classifier for the Diet and Exercise Recommendation module. This classifier incorporates features like pre-pruning, handling continuous attributes and missing values, and rule induction. After comparing various algorithms, we found that C4.5 stands out due to its accuracy and its effectiveness in handling diverse data types. Overall, our system's goal is to simplify health management for individuals dealing with these specific health conditions. Integrating an alert system enhances this setup. It tracks your health metrics, offers personalized advice on food and exercise, and alerts you for timely reminders or critical health updates. Implementing timely alerts based on health status ensures proactive care. If the system detects deteriorating health, it promptly notifies hospitals or doctors for immediate attention, enhancing patient safety and care.

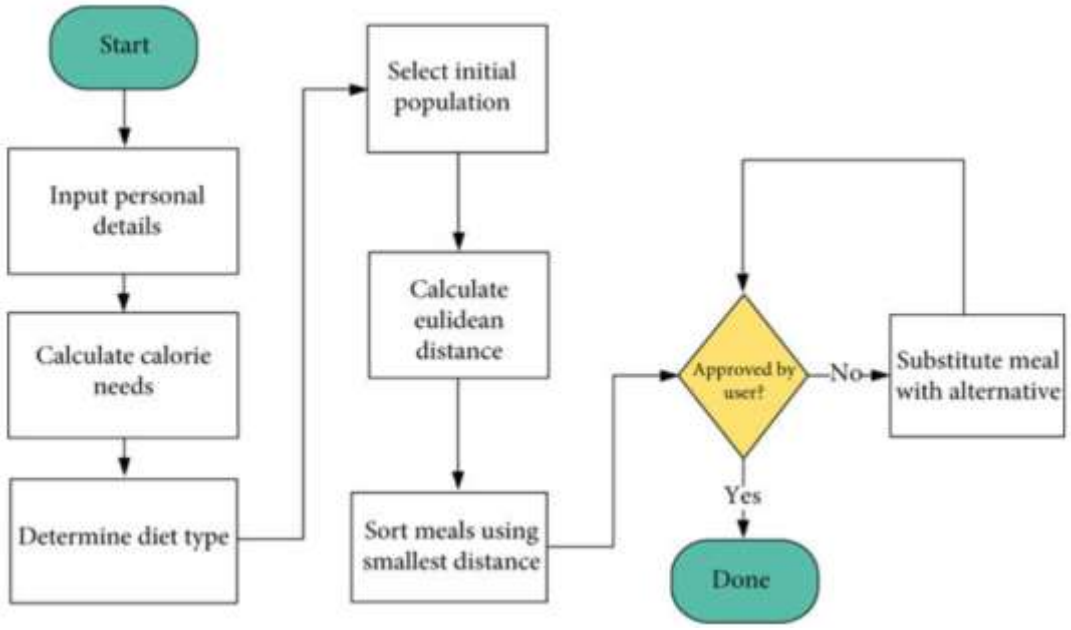
2. METHODOLOGY

a) **Health Monitoring System***:* This module focuses on tracking and managing the patient's health condition, specifically related to diseases like Diabetes, Blood Pressure, or Thyroid. The process involves:

b) **Entering Patient Details**: Initially, the system collects essential information about the patient, including height, weight, age, gender, activity level, and the specific disease they are dealing with (Diabetes, Blood Pressure, or Thyroid).

c) **Submitting Latest Disease-Related Values**: Users are prompted to input the latest values or reports related to their specific disease. This information is crucial for assessing and monitoring their health status.

d) This system uses these inputs to tailor personalized diet and exercise recommendations based on the user's profile and health condition. The diet and exercise suggestions are designed to be adaptable and practical for the users, aiming to assist them in managing their health effectively. The recommended food items are curated considering the specific disease the user is dealing with, ensuring that the suggestions align with their health requirements.



e) **User Health Record Entry**: Collects user details like height, weight, age, gender, activity level, and specific disease. Stores this information in the User Health Record for reference.

f) **Comparison with Fixed Disease Parameters**: Compares user details with fixed parameters related to the specific disease stored in the Doctor's Database. Utilizes this comparison to categorize the disease and personalize recommendations.

g) **Calculations Based on User Details**: Calculates Body Mass Index (BMI) and daily calorie requirements using specific formulas provided in the system's guidelines.

h) **Customized Diet and Exercise Plan**: Recommends a personalized Diet and Exercise Plan based on the calculated BMI, calorie needs, and disease specifics.

i) **Tracking Progress and Improvement Thresholds**: Monitors user progress by comparing reports against normal parameters for the disease. If there's a 90% improvement. Recommends maintaining the current diet/exercise plan and concludes the process.

j) h. **Follow-Up Sessions for Varied Improvements***:* Improvement between 65-89%.Advises a follow-up session after a set interval. During follow-ups Compares current reports with previous ones. Conducts comparisons with fixed disease parameters. Proceeds with reassessment and recommendation steps.

k) I .**Iterative Follow-Up Cycles**: Continues follow-up sessions until the patient's report shows a consistent 90% improvement, signalling the conclusion of the process.

5. CONCLUSION

This work focuses on applying Machine Learning in Health Care, specifically in aiding doctors to recommend personalized diet and exercise plans for patients. Our system is tailored to monitor conditions like Diabetes, Blood Pressure, and Thyroid by analyse the patient's latest reports and striving for enhancements in subsequent follow-up sessions. It refines recommendations based on factors such as height, weight, age, and activity level, utilizing the C4.5 decision tree algorithm. Our findings underscore the superiority of C4.5 over the ID3 algorithm across the datasets we employed. While C4.5 serves as a predictive model and facilitates recommendations, we acknowledge the need for further enhancements to optimize its efficacy for this purpose.

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