

Abstract

Public health has become a significant focus in the modern era due to the increasing number of people suffering from various diseases. Unhealthy eating habits and lack of physical activity are often linked to health issues, including obesity. Several studies have developed food recommendation systems for individuals with obesity using K-Means and Random Forest algorithms to provide recommendations based on specific user aspects. However, these studies do not offer physical activity recommendations to address a lack of fitness or exercise. This research develops a diet and physical exercise recommendation system for individuals with obesity using a combination of K-Means and Random Forest. The system categorizes and classifies foods and physical activities, providing personalized recommendations based on user data input. These recommendations consider body mass index (BMI), age, weight, and food preferences like vegan or non-vegan. The system provides diet and exercise plans tailored to the individual needs of each user. The system's accuracy is evaluated using the Mean Absolute Percentage Error (MAPE) metric, with the highest accuracy for food recommendations being 99.03% for non-vegan lunch and the lowest being 70.74% for vegan breakfast. The MAPE for exercise recommendations is consistently at 26.35%, indicating a stable accuracy of 73.65%. The testing results show that the system accurately recommends diet and physical exercise plans for each user.

Keywords: Public Health, Obesity, Unhealthy Diet, Lack of Physical Activity, BMI, Diet Recommendation System, Physical Exercise, K-Means, Random Forest, Mean Absolute Percentage Error