A Nutrient Based Diet Plan Recommendation System using Machine Learning

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At present obesity is a key health issue as everyone is busy with their day-to-day lives. Existing diet recommendation systems suggest a common diet plan instead of considering the person's lifestyle and diseases and hence it leads to health issues. This research develops a system to recommend an appropriate diet plan for each person based on their personal profiles. The proposed system collects the personal information from users such as age, height, weight, gender, chronic diseases, and physical activities, and then it recommends the diet plans for the breakfast, lunch, tea time and dinner with appropriate calorie levels (carbohydrate, protein, lipid, calcium, phosphorous, fiber and iron) that helps to maintain the healthy weight of the body. The data was collected from the hospitals using a questionnaire. A Linear Regression models and a Neural Network model are trained to predict the required amount of calories per day based on the users' profile. Based on the error rate comparison of both model, the Neural Network model is the best fit for calorie prediction. The diet plan is defined by a rule-based system based on the predicted calorie level. The predicted diet plan for a given user is compared with the diet plan recommended by a nutritionist to measure the accuracy of the proposed system. Accordingly, the prediction accuracy of the system is 95%, which is decent enough when compared to the existing models in the literature. A limited number of parameters of users are considered to predict the calorie level and the diet food combinations. However, considering more parameters would further enhance the diet plan suggestions.

Keywords: Machine Learning; Obesity; Linear Regression; Neural Network; Diet Plan