Nutrition analyzer based on Artificial Intelligence

Literature Review

The term “artificial intelligence” was first proposed in 1955 by the American compute scientist John McCarthy (1927–2011).Nowadays, standard intake of healthy food is necessary for keeping a balanced diet to avoid obesity in the human body. In this paper, present a novel system based on machine learning that automatically performs accurate classification of food images and estimates its nutrition value. We do this inspired by research paper done by

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On the topic of Diet planning with machine learning: teacher-forced REINFORCE for composition compliance with nutrition enhancement

Diet planning is a basic and regular human activity. Previous studies have considered diet planning a combinatorial optimization problem to generate solutions that satisfy a diet's nutritional requirements. However, this approach does not consider the composition of diets, which is critical for diet recipients to accept and enjoy menus with high nutritional quality. Without this consideration, feasible solutions for diet planning could not be provided in practice. This suggests the necessity of diet planning with machine learning, which extracts implicit composition patterns from real diet data and applies these patterns when generating diets. This work is original research that defines diet planning as a machine learning problem; we describe diets as sequence data and solve a controllable sequence generation problem. Specifically, we develop the Teacher-forced REINFORCE algorithm to connect neural machine translation and reinforcement learning for composition compliance with nutrition enhancement in diet generation. Through a real-world application to diet planning for children, we validated the superiority of our work over the traditional combinatorial optimization and modern machine learning approaches, as well as human (i.e., professional dietitians) performance. In addition, we construct and open the databases of menus and diets to motivate and promote further research and development of diet planning with machine learning. We believe this work with data science will contribute to solving economic and social problems associated with diet planning.

Abstract

We propose an intelligent agent for setting up diet plans based on the inputs provided by the user. The system creates a meal plan in accordance with a person’s lifestyle and health requirements. The online artificial dietician is a system having artificial intelligence about human diets.

Due to the modern lifestyle, carefree attitude and being materialistic, people are taking their health and diet otherwise. These days people tend to suffer from numerous health disorders and fitness problems majorly due to an unbalanced diet. In the present scenario, there is a trade-off

between health, wealth and time. Many a time, they are ignorant about the right nutrient value for a healthy being.

Therefore, to facilitate them with a proper diet chart along with light exercises according to their lifestyle and cope up with their busy schedule, a need for software emerges that can provide diet consultancies to the people at their preferred time and mobile phones without having to visit a dietician.

The prime objective of the software is to list all the possible diet plans along with the nutrient value of the food items for the user in accordance with his/her lifestyle by taking their height, weight, working hours, and eating hours and practices as inputs.

INTRODUCTION

In the US, more than one-third (34.9% or 78.6 millions) of adults are obese and approximately 17% (or 12.7 millions) of children and adolescents aged 2 to 19 years are obese . There were more than 1.9 billion adults, 18 years and older, were overweight on earth in 2014 . 20Documenting dietary intake accurately is crucial to help fight obesity and weight management. Unfortunately, most of the current methods for dietary assessment (for example, 24 hour dietary recall and food frequency questionnaires) must rely on memory to recall foods eaten. One common characteristic of these devices is that many of them have inexpensive, unobtrusive and multimodal sensors. These sensors enable us to collect multimedia data (e.g., video and audio) in natural living environments. Due to the ubiquitous nature of mobile and wearable devices, it is now possible to use these devices to develop pervasive, automated solutions for dietary assessment. One example of such solutions is to use mobile devices as a pervasive food journal collection tool and to employ cloud service as a data analysis platform

Online nutrition analysis

In recent years, web-based nutrition analysis software services have become more popular. Online nutrition analysis allows users to access online databases and draw from certified ingredients to produce instant nutrition information. Our nutrition and calorie calculator gathers nutritional data from several different sources, including the USDA and original product labels, among others. Each ingredient is assigned a nutritional value based on the data collected from these sources. To calculate the nutritional information of a recipe, ingredient quantities are converted into grams and then multiplied by these predefined nutritional values (per 100 grams). y breaking down the ingredients of each recipe, we’re able to calculate key nutritional data for each ingredient, including calories, carbs, protein, fat, sodium, and sugar. Our nutrition calculator then aggregates that data to calculate an overall health score for each ingredient. The overall recipe health score is calculated by combining these individual ingredient scores and the nutrient data for the recipe. The higher the health score, the healthier the recipe. Whisk automatically calculates the nutritional value of a single serving based on the total listed servings of a recipe. If you want to adjust the size of a single serving, you will need to log in and change the total servings of a recipe. our nutrition calculator calculates the health score of each ingredient, you can see how each of the ingredients in your recipe affect its overall health score. By reducing or omitting energy dense

ingredients or using healthier substitutes (for instance, olive oil instead of butter or sour cream instead of mayonnaise), you can improve the overall nutritional value of your recipe.

Nutrition facts label
Menu-labeling

The Patient Protection and Affordable Care Act, signed into law March 23, 2010, includes a provision that creates a national, uniform nutrition-disclosure standard for food service establishmentsThe nutrition-disclosure provision requires chain restaurants, similar retail food establishments and vending machines with 20 or more locations to provide specific nutrition labeling information. Those establishments must post calories on menus, menu boards and drive-thru boards. Buffets, salad bars and other self-service items are also included and will be required to provide caloric information adjacent to the item.

Recently many state and local menu-labeling laws have been passed requiring restaurants to post nutrition information on menus and menu boards, or have it readily available upon customer request. Restaurants have had to perform nutrition analysis in order to generate nutrition information and conform to these laws. More recently national legislation has been introduced that would set a national standard for menu labeling, the most popular of which is the LEAN act.

1.4 Artificial Neural Networks (ANNs)

ANNs as a currently widely used modeling technique in the field of AI were inspired by the structure of natural neurons of the human brain. ANNs are mathematical model designed to process and calculate input signals through rows of processing elements, called artificial neurons, connected to each other by artificial synapses. There are three types of layers forming ANNs. The input layer captures the raw data and passes them to the hidden layer. In this second layer, the learning process takes place. The results of the analysis are collected in the output layer and the output data are created. A neural network may consist of hundreds of single units. An ANN is a parameterized system that has weights as adjustable parameters. Due to the need for estimation of these parameters, ANNs require large training sets. ANNs acquire knowledge by detecting patterns and relationships between data, i.e., through experience, not as a result of programming.

An ANN reveals its particular usefulness in the case of the need for modeling datasets with non-linear dependencies. In solving biomedical problems, raw data can be both literature and experimental data. In the last two decades, ANNs have been used, among others, to create an experimental decision algorithm model open to improvement, aimed a evaluating the results of biochemical tests confronted with both reference values and clinical data. This technique was also used in evaluation of cell culture cross-contamination. Levels based on mass spectrometric fingerprints of intact mammalian cells. The particular usefulness of ANNs has been proven in pharmaceutical analyses. An interesting application of ANNs is the prediction of the relationship between the Mediterranean dietary pattern, clinical characteristics and cognitive functions. The usefulness of ANNs has been proven in body composition analyses, which have clearly non-linear characteristics. Using ANN modeling, significant benefits can be obtained in clinical dietetics.It is

worth noting that the fuzzy logic methodology (FLM) can be combined with neural networks. The idea of this area of AI is to strive for greater accuracy, dimensionality and simplification of the structure. There is a possibility to create fuzzy neural networks and convert FLM-based models into neural networks.

Purpose

The major objective of this software is to provide the customer best service which includes diet plans, feedbacks and many other functionalities that aim towards the satisfaction of the consumer. This software is going to boost up the confidence of the user and make them more physically and mentally fit. Registered users can avail many other functions as well such as personal trainer and light exercises.

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