AI-POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

Introduction:

Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food.

The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).

Because people are very keen on measuring weight, healthy diets, and staying away from obesity, there is an increasing demand for food calorie measurement. Adult obesity is increasing at an alarming rate. The main source of obesity is the difference between dietary intake and the energy people get from the diet. High-calorie intake may be injurious and lead to various diseases. Breast, colon and prostate cancers are caused by high calorie intake. High calorie intake is the second leading cause of cancer. Dietitians have determined that the standard intake of a number of calories is required to keep the right balance of calories in the human body. As reported by the world health organization, more than 110th of the adult population in the world is obese. Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health

Literature Review:

[1]. If the amount of food a person takes daily is higher than the amount of energy he utilized then we can say that the respective person is becoming obese. Obesity and being overweight are interconnected to many dangerous and chronic diseases. In 2013, the American Medical Association officially declared obesity as the disease that has serious consequences on patients health and therefore requires medical treatment

[2]. Therefore, daily intake measurements are important for losing weight and maintaining a healthy diet and weight for normal people. Only a timely measurement of daily food consumption can make obese people lose weight in a healthier way, and can also make healthy people better healthy. The traditional method is mainly based on the analysis of the user's record of food intake in the past 24 hours, and the clinical display has certain effects, but these methods often cause the patient's uneasiness to be forgotten by the user or the broadcast that the user does not want to use these programs

[3]. We propose a dietary assessment system based on artificial intelligence (AI) The system can estimate the calorie and macronutrient content of a meal, on the sole basis of food images captured by a smartphone. Go FOOD™ requires an input of two meal images or a short video. For conventional single-camera smartphones, the images must be captured from two different viewing angles; smartphones equipped with two rear cameras require only a single press of the shutter button. The deep neural networks are used to process the two images and implement.

[4]. Three stages are normally involved in such systems: (1) food item segmentation; (2) food item recognition and (3) volume estimation. Thus, the nutrient content can be retrieved using the food nutrient database in a straightforward manner.

[5]. Following this concept, many algorithms have been proposed for dietary assessment, but most of these only focus on the first two steps using the associated image segmentation and recognition algorithms. Even though these algorithms achieve good accuracy on the publicly available databases, we observed that it is still difficult for them to provide satisfactory performance on real life images, especially in the case of blurred images or poor lighting conditions. Thus, for a practical system a human-interaction module must be implemented to enable the end users to manually correct the automatically generated food segmentation and recognition results.

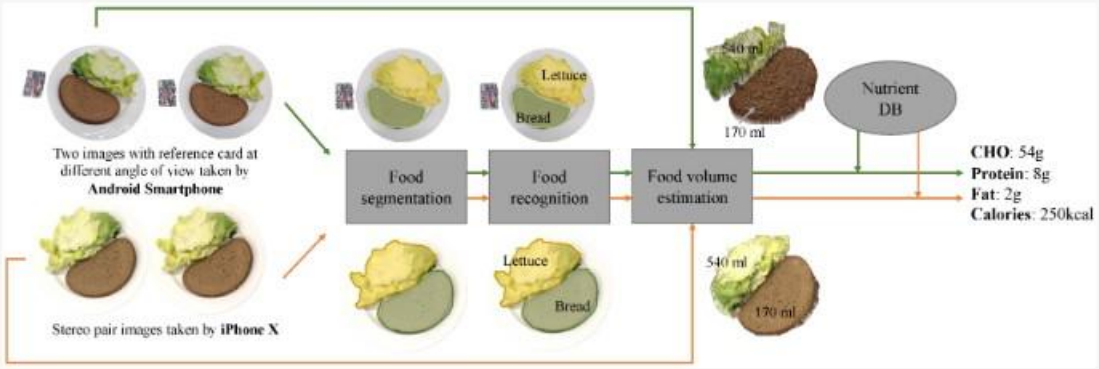
[6] The calories and macronutrient content of each food category (per 100 ml) is retrieved from the “Nutritionix Database” an online nutritional database, which includes the nutrient content of almost 885 K food types. With this database and the estimated food volume, a straightforward calculation gives the nutrient content of the meal. As can be seen in **Appendix C**, the definition of the categories is based not only on the visual characteristics of the food, but also its nutritional content. Salient differences are therefore distinguished between the recognised foods, such as different pasta dishes using the same type of pasta but different sauce, which could substantially affect the final nutrient content.

Moreover the categories cover a large range of dishes and cuisines, constituting the nutrient estimation appropriate for usage in different locations.

System Outline

The system requires the input of two meal images. The input images can be acquired either by conventionally capturing photos. For conventional single-camera smartphones, the images must be captured from two different viewing angles; however, smartphones equipped with two rear cameras require only one press of the shutter button. The deep neural networks are applied to process the two images, and this performs food segmentation and recognition, while a 3D reconstruction-based algorithm estimates food volume. Each meal's calorie and macronutrient content are calculated on the basis of each food category, volume and the a food composition database.

Figure 1. Overview of goFOOD™.



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