

SMART NUTRITION MONITORING SYSTEM USING IOT

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Abstract

Nowadays, people across the universe are becoming more sensitive to their diet. Unbalanced diet can cause many problems like weight gain, obesity, sugar, etc. So different systems were developed to analyse food images to calculate calorie, nutrition level etc. Nutrition plays a vital role in our daily life and many health issues occur due to lack of proper nutrition. Many researchers are working on developing a proper application that could be used by different age category people to monitor the nutrition consumption on a daily basis. This paper gives a brief review of those systems and proposes an effective thanks to measure and manage daily food intake of patients and dietitians. We have proposed an application based on IoT using deep techniques that helps in monitoring proper food plan and nutrition guidance to the user. The user is allowed to log the intake of food that he is consuming regularly. All the information regarding food consumption is stored in a database and processed. The system will take the pictures of food and using image processing and segmentation, it calculates the nutrition and calorie content within the food. The proposed system will certainly improve and facilitate the present calorie measurement techniques. The processing is done using deep neural networks where the network is trained with the consumption of the intake and thus gives the proper nutrition plan according to the person to balance the amount of nutrition taken in a day. The proposed approach is evaluated and the performance of the approach is observed to be better than any other existing nutrition monitoring system.

Keywords—component, formatting, style, styling, insert

I. INTRODUCTION

Body Mass Index (BMI) may be a person's weight in kilograms divided by the square of their height in meters. It is one of the most commonly used ways of estimating whether a person is overweight or not. A person is considered obese when his / her BMI is higher than or equal to 30 kg/m². The rate of obese person is increasing in alarming rate from previous couple of years. Also studies have shown that there are many chances for obese

people to susceptible to serious health problems like hypertension, heart attack, diabetes, etc. So the main cause for obesity is imbalance of the amount of food intake and energy consumed by the individual. So it is necessary to have a healthy meal. Therefore, different systems were developed which might measure the nutrition level of the diet and help the patients and dietitians to regulate their obesity. This paper reviews the different systems which had taken the food images to live the calorie and nutritional level within the food sample.

Section 1 has given the brief introduction which included the necessity of the system, a brief idea about the system. In the next section, review of different systems is presented. The review will tell individuals about the present status within the food measurement field. The III section includes the details of the proposed system. It is followed by the conclusion and references.

II. LITERATURE SURVEY

People have begun to give preference to their health, sort of meal, workout so as to keep them away from health problems. Different researchers have also contributed to scale back the health problem of individuals by developing various systems that might assist patients to stay them fit. Here in this paper, few contributions supported measurement of nutrition level from food images are considered. A Diaware system was proposed which was a content aware wearable food and activity recognition system. It monitored and assisted diabetic patients with regard to their calorie intake after running a food image recognition algorithm on the food image taken from the user's plate. The algorithm also uses the user preferences and environmental context information for the greater effect. Wearable devices were used to monitor patients' calories burnt during the day. The performance of the system was accurate for a special sort of meal and thus there's large scope for the development.

Kitamura et. Al. developed a web based personal food logging system for dietary control. This web based dietary management network analyses image achievements of the user to spot images of meals. It determines the nutritional composition of those meals and stores the info to make a food log. There is a facility for users to look at data in several formats and may edit the info to correct any mistake that might occur during image analysis. With the help of pre classification and personalization, accuracy of food balance estimation is significantly improved. Different systems that were developed for nutritional measurement from food image involved image classification for which different recognition algorithms were developed.

Poulad Zadeh et. At. Also had developed a replacement recognition algorithm which considered the form, size, color and texture characteristics of food image. Using various combinations of these features a better classification is achieved. Thus based on results about 92.6% is the accuracy of a new developed algorithm for food recognition. A semiautomatic system was proposed which measures the caloric from the food intake. System utilizes a nutrition table for better results. System used a camera to record images of food before and after eating it for accurate measurement of calorie valves. After taking the food image, shape, size, color and texture features are extracted and given to support the vector machine for recognition of food then using a nutrition table, calorie value is measured. Disadvantage with the system is that it didn't consider mixed or even liquid food.

A mobile Diet Data Recorder System (DDRS) was developed to address important hypotheses related to diet and health. The DDRS consists of (1) a mobile device integrates a Smartphone and an integrated laser package, (2) software on the Smartphone for data collection and laser control, (3) an algorithm to process acquired data for food volume estimation, which is generally the most important source of error in calculating dietary intake, and (4) database and interface for data storage and management. The estimated food volume, alongside direct entries of food questionnaires and voice recordings, could provide dietitians and nutritional epidemiologists with more complete food description and more accurate food portion sizes. The major problem that many other systems are facing is the identification of meals. So a IMG 2 calorie system was an innovation which uses the mixture of image recognition and comparative analysis to spot meals, fruits from average definition photos. The system determines the depth of every pixel in a picture, matches the leads to the database of nutritional information, and then takes into account portions by gauging the size of the food relative to the plate itself.

In one test IMG 2 calories was ready to calculate the accurate caloric total of two eggs, two pancakes, three strips of bacon, and accompanying condiments but much of the work went in vain. This system was developed to identify if the food image is good or rotten. If it is found to be good then it's taken for calorie measurement analysis and classified supported standard calorific tables using Self- Adaptive Resource Allocation Network [SARAN]. Then, based on the BMI of a person, the result alarms about whether the food under analysis is suitable to the person or not. The results show that the accuracy of the system is suitable and it'll greatly improve and facilitate current manual calorie measurement techniques.

A food image recognition system for measuring the calorie and nutrition values was developed. In this system the food area, size and volume is employed to calculate the calorie and nutrition in an accurate way. The user needs to take the pictures of the food image, this system will classify the image to detect the sort of food and portion size and therefore the recognition information will estimate the amount of calories in the food .All of the

above developed systems aren't so accurate as to believe them. Some were good in measuring the calorie and nutrition level of some specific food type with predefined size. Some use high definition cameras to take pictures of sample food. So keeping these disadvantages in mind there is scope for an efficient, low cost, simple system to assist the patients to control their calorie value and nutrition level.

III. PROPOSE SYSTEM

Reviewing the various systems, it's possible to develop another low cost simple system so as to accurately measure the calorie and nutritional level within the food. The diagram of the proposed system is as shown within the fig1. Users got to take the image of the food before and after the meal for the accurate measurement of calories. The subsequent step of the system is segmentation, each image is going to be analyzed to extract various segments of the food image portion. Out of varied tools available for segmentation, color and texture segmentation tools are used for the effective measurement. Various food features including size, shape, color and texture are going to be extracted and sent to the classification step where, using the Support Vector Machine. Thus using the above steps, a portion of food is recognised. Finally, by estimating the world of the food portion and using some nutritional tables, the calorie value of the food is going to be extracted.

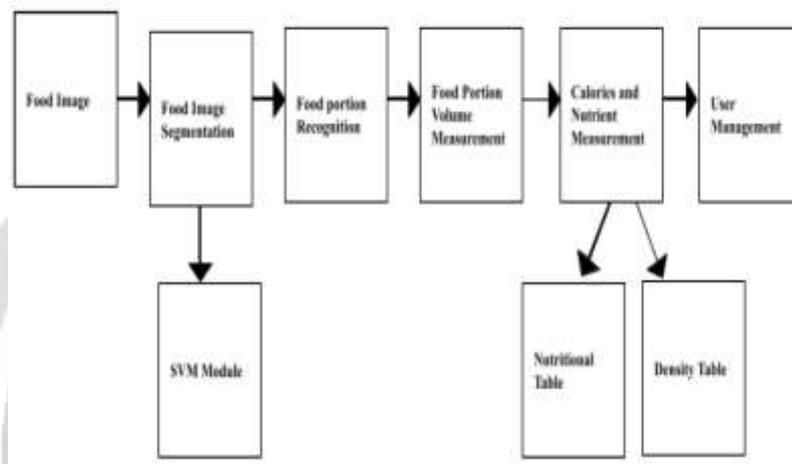


Fig.: Block diagram of system

Nutrition may be a major requirement for the nice health of a population and it's the tip results of the operation of a posh set of things cutting across a variety of economic sectors. The terms monitoring and surveillance are usually used as synonyms in nutrition assessment. However, it's vital to know the distinction between these 2 terms. "Monitoring" refers to the gathering, analysis and feedback of quantitatively precise measures from a comparatively giant sample of a population – at the national and state levels – basically for the needs of following time trends and understanding population sub-group variations in diet, biological process standing and nutrition connected unhealthy risks.

The neural Network consists of numerous layers and the output of a layer is the input of the next layer. The main objective of the entire application is to make the director manual input from the user and make use of accurate data collections with inexpensive IoT devices. To depict the feasibility and viability of the proposed approach to make it useful in real time a system prototype of the model is designed.

IV. CONCLUSION

People across the universe are getting more attentive towards their health. They are adopting various ways to stay themselves fit. One way is to live the calorie and nutrition level within the meal. This paper has given a quick review of various calorie and nutrition measurement systems. After discussing various systems, it's found that there's scope for an additional system which will develop so as to assist the patients and dieticians. A system is proposed which uses segmentation and classification using a Support Vector Machine to live the calorie and nutrition level within the meal. System is cost effective and straightforward. Practical results of the system might boast the research in the field of food processing.

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