



Measuring Calorie from Food Image

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ABSTRACT

Now a day's people are interested in maintaining diet and want to make a count on calories of their food intake and become healthier and to avoid obesity. Our system will measure the calories of their food intake and can be very useful. In this paper, we propose a system which will measure calorie from the food image it will help the people especially patients and dieticians to make a count on their daily food intake. The system to identify the calories of food accurately we used cnn and our system will give the 90% accuracy.

KEYWORDS: Graph Cut Segmentation, Machine Learning, Convolutional neural networks

1. INTRODUCTION

The Calorie estimation from the food image processing is for the people who are health conscious and curious or who are having the health issues mainly this system is developed for who are caring about themselves. The purpose of the system is to help the users to know about their calories of the food that they are consuming. With this system the dieticians can know about the calories of the food that they are consuming. The system also the people who are having obesity problems and help them make a count of calories to not get any health issues.

Around the earth all the people are interested in joining gyms to become fat or skinny. In the gym also they suggest to make diet and keep a count on the food intake so it is better to use our system and to keep a note on the calories of their food intake. Our system will be helpful to measure the calories of their food.

Our system is a semi- automatic system which helps the people to make a count on their calories and to be on a Good diet and get healthy.

2. PROPOSED SYSTEM

In this section we will discuss about the system in detail

A. Graph Cut Segmentation:

The user will capture the food with their thumb on the photo. The thumb will show the direction to the food and the image not only contains the food item but it also have the thumb. The thumb in the photo helps us to measure the size. After taking the photo of the food using thumb we will be moving to the graph cut segmentation part. In graph cut segmentation every pixel is a vertex. The graph that divided into sub graphs is a representation of the image. We should be able to re build the image using sub graphs by using this technique we can extract the food.

B. Convolutional Neural Networks:

The first step in section is to get the pre trained model with the help of cnn network in this we captured the some images of the food item in different light conditions and different angles and keep in a particular folder and give the name and the images are used to train the system and the photo is also re trained with the negative food images after this step the system will load the image that user has given to the system and by using the image recognition process it will know the name of the food after that the system will start calculating the size of the food using the finger in the food image and gets the area of the food item. We used ReLU to refer to a unit in a neural net that use the activation function max.

There is a challenge while calculating the size of the food that is if the image of the food is captured very near to the camera then the size of the food is very big and it looks like a lot of food to rectify this we have two approaches to estimate the food calorie in the image:

1. Finger based calorie measurement.
2. Calorie measuring using distance estimation.

1) From the captured food image the user's finger will be just beside the food item in the plate. By size of a human finger and dimensions of the human finger the system will calculate the dimensions of the food image even the food image is in any direction by taking reference of finger it will get the dimensions of food item helps in calculating the volume of food and after that the system by using the volume of food it will calculate the calories of the food item. We can also use the coin instead of finger.

2) The distance between the food image and the camera is calculated by sensors by using the angle and distance of the food object it will get the volume of the food and further we can know the calories of the food item. It is a time processing approach.

3. EXPERIMENTATION RESULTS:

In this section we will discuss about the experimental results. In the system we have used the graph cut segmentation and convolutional neural networks by using these two methods we can get high accuracy of food recognition. By using graph cut method we can get the size and shape of the food portion. Now, we can calculate the area of food portion. In the process we have initially captured the multiple images of a food item and

kept in a folder with the folder named its name of the food. Similarly we have captured the multiple images of 7 different food items. The images in the folders gets trained and once the folders get trained system will check the with the images which are submitted by the user and compare the food item and trained images which are having accuracy then the system will come confirm which type of the food item. The images we took are of different light conditions and they took a different angles with finger in the image. While performing the graph cut segmentation the image will be changed to the grey colour because of the image can be of different light condition. By, combining graph cut segmentation and Convolutional Neural Networks our system will recognize the food portion from the image accurately in 3 to 5 seconds.

The accuracy of our system compared to real calorie values:

Food Item	Real Calories	Calculated calories	Accuracy
Apple	172	161	93
Beans	480	462	96
Banana	157	140	89
Carrot	28	26	92
Cucumber	10	9.75	97

4. CONCLUSION:

In this paper, we proposed a system which estimates the calories from the food image and measure area of the food using the methods graph cut segmentation and Convolutional Neural Networks to accurately measure the area of the food. In the future by increasing the images in the database the accuracy and recognition rate of the food image will be increased.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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