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Machine Learning Based Food Calorie Identification Using R-CNN

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ABSTRACT: Machine learning (ML) is a cutting-edge technology that has the potential to significantly impact society. The suggested system utilizes ML modules to implement several suitable algorithms including the Faster RCNN algorithm and the crafty edge detection technique. Calorie and nutrient counting is at the heart of this methodology. Experiments on a real-world dataset demonstrate that our approach enhances performance with efficient accuracy, and the paper discusses the connection between identifying nutritious elements in food and checking calories using Machine Learning models to do the data analysis. Our research is able to determine which age groups' recovery may be aided by consuming a diet higher in certain nutrients, and we provide recommendations on how to do this. The employment of closer R-CNN to sense for each food and standardized item is only one example of the additional operations that may be automated rapidly. The specific food volumes are then calculated using volume valuation algorithms. The suggested estimating strategy works well.

Key words: Computer science techniques for object identification, volumetric measurements, machine learning methods, and image segmentation

1. INTRODUCTION

According to the World Health Organization (WHO), unhealthy diets are directly responsible for about 20% of all deaths globally. In 2016, 39% of adults aged 18 and above were overweight, with 13% classified as obese. Most of the world's population lives in places where being overweight is a leading cause of death [1]. Obesity stems from a mismatch between calorie intake and energy expenditure. Diseases like cardiovascular disease and many others become more likely when BMI rises. Obesity is commonly diagnosed in those with a body mass index (BMI) of 30 or above [2].

The calorie is the basic energy unit of nutrition. This fast-paced society has made maintaining good health an absolute need. Manually entering data like food platter weight, food platter volume, etc. into the present caloric measuring method is faulty. A completely automated calorie counting system is presented as a means to this end.

In this system, the relative size of foodstuffs is determined using a number of different ML modules. The last step involves selecting a picture of the dish from a variety of potential angles (mostly front and top). This means the user has to interact with two images. The gadget takes the pictures as input and calculates serving size and calories based on what it sees.

volume can be measured using variousalgorithms. The numerous ML techniquescan be used to do this. However, after the image is given as an input, it is possible to define and segment simultaneously. The whole thing will likewise be automated and a final result will be derived from the whole summary of dietary items containing calories and other nutrients.

2. LITERATURE SURVEY

The modern world healthy body depends on the number of calories consumed, hence monitoring calorie intake is necessary to maintain good health. At the point when your Body Mass Index is somewhere in between from 25 to 29. It implies that you are conveying overabundance weight. Assuming your BMI is more than 30, it implies you have obesity. To get in shape or keep up the solid weight individuals needs to monitor the calorie they take. The existing system calorie estimation is to be happened manually. The proposed model is to provide unique solution for measuring calorie by using deep learning algorithm. The food calorie calculation is very important in medical field. Because this food calorie is provide good health condition. This measurement is taken from food image in different objects that is fruits and vegetables. This measurement is taken with the help of neural network. The tensor flow is one of the best methods to classify the machine learning method. This method is implementing to calculate the food calorie with the help of Convolutional Neural Network. The input of this calculated model is taken an image of food. The food calorie value is calculated the proposed CNN model with the help of food object detection. The

primary parameter of the result is taken by volume error estimation and secondary parameter is calorie error estimation. Thevolume error estimation is gradually reducedby 20%. That indicates the proposed CNN model is providing higher accuracy level compare to existing model.

3. EXISTING SYSTEM

The whole thing will be automated as opposed to existing systems where the user needs to manually deliver the values. However, users will only need to click onthe food image and provide it as an input to the system. Further processes can be automated quickly, such as the use of nearer R-CNN to perceive for each food and standardization item. The Grab Cut algorithm is used to get the outline of each food. Then the volume of individually food is determined by formulas for volume valuation.

DRAWBACKS

- High complexities.
- Time Consuming compared to othertechniques.

4. PROPOSED SYSTEM

Proposed that we can identify the Nutrition information that may get effected due to lack of ingredients thus we recommend Calories according to the body's intake on type of food consumption, minerals, and amount in grams. we propose a model which detects a given food image and displays the amount of calories in it. Further,it also displays a statistic analysis of the amount of calories consumed by user. There have been several number of models proposed for detection of food images,measuring the amount of calories present in food items and analyzing the calorie intake

of a person by determining their daily dietary information as well.

We have retained the breadth of the system for only fruit and some uncooked foods, including donuts and bread, in our proposed system. Quick food and other cooked food products cannot be measured. The explanation is that the ingredients in the food item cannot be defined only by a picture containing food. All of the ingredients and the sum of them in the food have to be known. By incorporating fast food and more cooked food, we can developour system further.

5. ARCHITECTURE

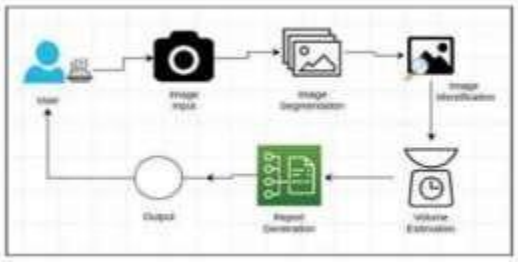

Fig 5: Architecture

6. IMPLEMENTATION

Data Collection: Collect sufficient data samples and legitimate software samples.

Data Preprocessing: Data augmented techniques will be used for better performance

Train and Test Modeling: Split the data into train and test data Train will be used fortraining the model and Test data to check theperformance

Modeling: model build and model is saved Predict select an single image and do basicimage processing and predict using model

7. METHODOLOGY

OBJECT DETECTION

The next step is to detect the edges of thefood in the image shown in Fig after object detection and classification are made. A very popular algorithm is used for the detection of the edges of the food. Algorithm for Canny edge detection

Fig 7.1: Object detection using canny

At first, the user takes two images: one of them is shown at the front and the other at the top. It is sent as an input for object detection and classification after recording these images. Quick region-based Convolutionary Neural networks (Faster R- CNN) for object detection and classification are used before estimating volume; wechoose to segment each bounding box first. Image processing approach based on optimization. Practicing and such boxes can be provided by Faster R-CNN. Although asking user to label the foreground/background color can get better result, we refuse it so that our system.

VOLUME ESTIMATION AND CALORIE CALCULATION

we know actual size of a pixel in the side view. Then we use different formulas to estimate volume of each food. After getting volume, food's calorie is obtained by searching related tables. We use mean error to evaluate volume estimation results. Mean error *ME* is defined as

$$ME_i = \frac{\mathbf{v}_j - V_j}{\sum_{j=1}^{n_i} V_j}$$

so the number of estimation volumes for ith type is ni. vj is the estimation volume forthe j_{th} pair of images with the food type i; and Vj is corresponding estimation volumefor the same pair of images

8. RESULT

9. CONCLUSION

This article offers a novel calorie calculationusing algorithms for machine learning. Withmachine learning and image processing we measured the calories of the food object. To do this, three modules have been introduced,firstly the object is identified by Faster R- CNN and, secondly, the grab algorithm segmentation. We measure the volume ofthe food product after segmentation. In the end, we measure the food item's calories. It was introduced successfully with the results of our method. Our device will measure a description of the calories in the food. In the future, more of a different model or design will be acceptable to estimate the amount of calorie in food with deep learning

algorithms. This method would benefit bothexercise enthusiasts and average people.

FUTURE SCOPE

The paper plans a model frameworkdependent on the customer worker model.The customer sends a picture locationsolicitation and cycles it on the worker side.Support Vector Machine (SVM), ArtificialNeural Network (ANN) are the two classifiers that have been modified toanalyze the framework's enhanced precision

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