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Calories Estimation Analysis

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***Abstract*: In recent days, we are struggling from corona virus to stop spreading infection of virus our government announced lockdown but only lockdown is not sufficient to avoid infection of virus. Not only due to corona but also many numbers of diseases are spreading day-by-day such as heart diseases, high blood pressures, diabetes, etc. these diseases mostly affected due to lack of nutrients values which are necessary to maintain immune system, so to make sure of intake of calories or nutrient values to fulfil our daily consumption and avoid over consumption of oily food, high sugary contents, junk food, many more which leads to obesity. We proposed system that will keep track of user's intake of food items on daily, monthly and yearly based on their BMI (body mass Index) and which gives instructions to users about their consumptions of nutrients values.**

Keywords: Food Image identification, Find out calories, Food Image processing, Computer Vision, Application programming interface.

I. INTRODUCTION

Today's peoples are incautious about their diet. They don't focus what are they eat and how much calories consumed and they are busy in their work and to get enough fulfillment of tummy they have consume attractive junk foods even though that food dish is not healthy. For this, Peoples need to keep control on their eating habits and make sure to identify how it's going to affect body.so, to understand and identify or to keep a track of eating habits. In this paper, we propose system This will help user to monitor diet / intake of food by showing nutrients values they had consumed as well as they will need to consume. Our system is capable to runs on android smartphones and on web as well as on a desktop. To find or estimate calories present in food, the user needs to capture picture of food item, the system will perform image processing using OpenCV functions as well as some extract calories information from dataset which will gives approximate values of calories of that food. Based on history and food consumption of user it will generate report analysis With required or excess calories indications.

II RELATED WORK

There is facility of automatic calorie estimation of food images on smartphone but there is disadvantage to this is there is less accuracy for multiple food items. To overcome this an image-based calorie estimation system is introduced which detects for multiple food items. It has advantage of multiple image detection is possible but it always requires stereo mode supported device. Then a new model introduces which estimates food portion size for the entire input image by generating food energy distribution map. It also faster in image processing. but only single food portion estimation is done at a time. A new framework for automated image-based food analysis is capable of processing multiple tasks. This improved accuracy for estimating food calorie, but their difficulty in achieving accuracy. So here in this model we are using machine learning techniques to achieve high accuracy. According to classification results will be display.

Koichi Okamoto, Keiji Yanai [1] "An Automatic Calorie Estimation System of Food Images on a Smartphone "Department of Informatics, The University of Electro-Communications, Tokyo, Japan - An image-based calorie estimation system which runs on a consumer smartphone without external recognition servers. [2] An End-to-End Food Image Analysis System Jiangpeng He1 Runyu Mao1 Zeman Shao1, Janine L. Wright2, Deborah A. Kerr2, Carol J. Boushey3, Fengqing Zhu1-2021 Framework for automated image-based food analysis are end-to-end or capable of processing multiple tasks (e.g., recognition and portion estimation) [3] Image-Based Estimation of Real Food Size for Accurate Food Calorie Estimation -2019. An image-based calorie estimation system which detects multiple food items from image. [4] An automatic food energy estimation technique based on learned energy distribution images: Protocol and methodology. It can estimate food portion size for the entire input image by generating a food energy distribution map. [5] "Calorie-estimation-from food images openCV", GitHub repository, May 2016. Here in this system what they have done is that they used SVM (support vector machine) algorithm in other to classify the images. .[6] Yanchao Liang, Jianhua Li , "Deep Learning-Based Food Calorie Estimation Method in Dietary Assessment" This method requires a top view and a side view as input. Faster RCNNs are used for food and calibrating object detection. [7] Food Item Calorie Estimation Using YOLOv4 and Image

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Processing. This model is able to detect and recognize the food item accurately and also predict the calorie value. [8] Measuring Calorie and Nutrition From Food Image. In this paper, they have proposed a measurement method that estimates the amount of calories from a food's image by measuring the volume of the food portions from the image and using nutritional facts tables to measure the amount of calorie and nutrition in the food. [9] M. Chen, Y. Yang, C. Ho, S. Wang, S. Liu, E. ChangC. Yeh, and M. Ouhyoung, "Automatic Chinese food identification and quantity estimation," in Proc. Of SIGGRAPH Asia Technical Briefs, p. 29, 2012. In this paper, they have addressed the issues of feature descriptors in the food identification problem and introduce a preliminary approach for the quantity estimation.

III METHODOLOGY

We are here given steps of our project system how its will be goes on and steps to Identify calories of food items

A. Image Acquisitions:

In the databases, we collected a lot of food photos to make train our model and there are food data sets available in it Kaggle as Food_360 and another Food Database. We assume users will take a picture of them smartphone or give a picture with good light the pressure in it and the background should be
uniform.

B. Segmentations::

In the below image, you can see that item is regional separated from the rest of the image and used separation of extraction methods such as grab cut method of thresholding methods available on the computer vision that makes our work much easier to do. Same go for reference items.

FIG 2: SEGMENTATION OF FOOD IMAGE

C. Object Detection::

Fig.3.Example of Object detection

here is an example Here suppose this is the input Image that the user supplied then the system will detect the object out of it considering basic edge detection methods are used.

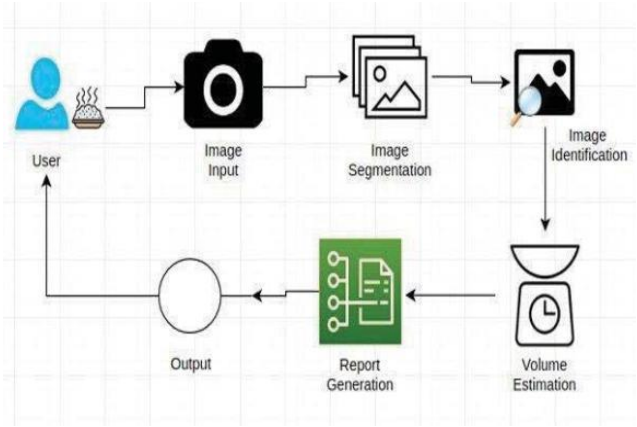

Fig 1. System Architecture

D. Portion size calculation:

List 3 factors from Image Segmentation
1. Foods pixel-based area
2. Skin pixel-based area
3. Real skin-based area (skin multiplier)

These factors of food portion area is given below:
Food portion Area = Foods Pixel-based Area $*$ real Skin Area of Skin Pixel-based Area

Consider shapes of food items as below
1. Sphere - like apple, orange, tomato, onion
2. Cylinder – like banana, cucumber, carrot

Portion size for Sphere:

Estimated Radius =ER

$$ER = \sqrt{(\text{Estimated Food Area} / \Pi)}$$

And estimated = EV

$$EV = 4/3 * \Pi * ER^3$$

E. Calories Identification::

For calorie measurement, we will use
of a predefined table with the number of labels as well normal congestion, and even with that respect, we have calorie values.

Estimated Weight = Actual Density of food$*$ Estimated portion size

Estimated Calories = Estimated Weight $*$ Calories Per 100 gm / 100

IV RESULT AND DISCUSSION

We are analyzed and prepare results which found in our experiments and as well as identification of object has been done while performing execution of system, we get results as

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follows steps gives below:

Step1.user take Food item Image from mobile phone or upload from Personal system

Step2.Take reference object as thumb which actual size of it is predefined. this will easy for our system for identification of calories that food item contains as well as nutrient values. Step3.Our system will detect the objects which are present in image and upon that system had done some image processing thing to identify and separate objects if that collides with each other.

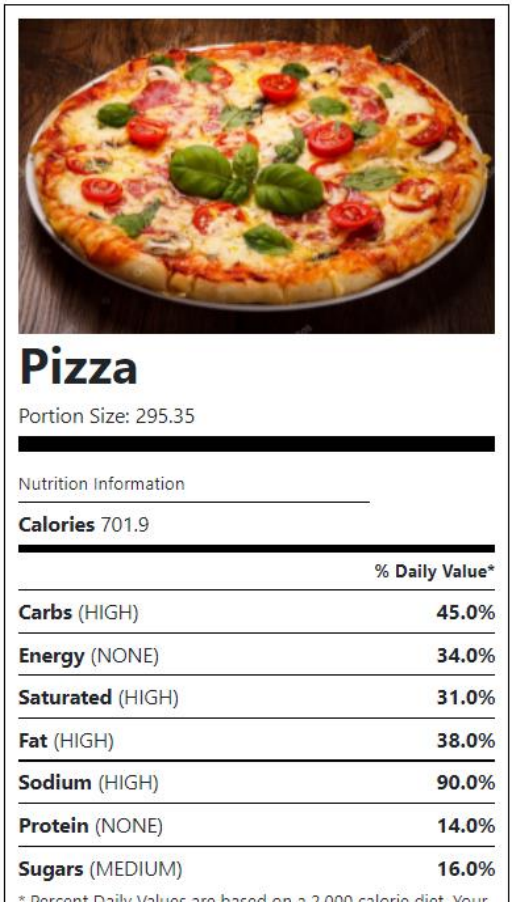
Our system will identify calories of food items and based on that generate results

Fig: Identification of Object

In our system user have access to his history and check requirement of his calories and monitor his activity through dashboard. there user can search previous history and system will generate report as daily, weekly and as well as yearly basis.

Food Name	Portion Size	Estimated Calories
Pizza	295.35	701.9
Meat Hamburger	263.41	551.47
Minced Meat	100.0	264.5
Baguette	130.58	417.65

Table- I: Resulted Calories Values of Food Items



V CONCLUSION

In this paper, it appears that we can use An image-based calorie-based measurement system that works for a user a smartphone without the need for external recognition servers just by taking a picture of the food before using a pre-registered reference item, the system balances food calories automatically. Through this process, we can conclude that computer vision Divide and subtraction algorithms Also solid CNN algorithms are very suitable for food identification and measuring calories of food present in the picture

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