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AN APPROACH FOR IDENTIFICATION OF FOOD ITEMS USING ALEX NET IN DEEP LEARNING

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ABSTRACT

Because of the wide diversity of types of food, image recognition of food items is generally very difficult. In this paper, food detection aims to facilitate payment at restaurants, and automatic food price estimation is by using the network. We applied Alex Net to the tasks of food detection and recognition through image processing techniques. We constructed a dataset of the most frequent food items in Kaggle and used it to evaluate recognition performance. The network classifies the train data and test data and gives the results of classified output. However, deep learning has been shown recently to be a very powerful image recognition technique, and it is a state-of-the-art approach to deep learning. This network obtained of accuracy more than existing methods.

Keywords: Alex Net, dataset, Kaggle, deep learning.

1. INTRODUCTION

In recent years, food habit recording services for smartphones such as iPhone and Android phones have become popular. They can awake users food habit problems such as bad food balance and unhealthy food trend, which is useful for disease prevention and diet. However, most of such services require selecting eaten food items from hierarchical menus by hand, which is too time-consuming and troublesome for most of the people to continue using such services for a long period.

In this work, we propose a novel method that unifies the problems of food detection, localization, recognition and segmentation into a new framework that we call Semantic Food Detection. We integrate the information extracted by two main approaches, a) food segmentation and b) object detection trained for food detection, by taking advantage of the benefits provided by both algorithms in a CNN framework. The first one allows us to determine where the food is in terms of pixel and bounding boxes. The second one allows us to locate and recognize the foods present

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in the images. The Semantic Food Detection framework combines the information that both algorithms provide in order to prevent false food detections and thus provide a better performance.

2. LITERATURE REVIEW

This paper provides a comparison of the performance of the Support Vector Machine (SVM) and the Artificial Neural Network (ANN) for food intake detection. A combination of time domain (TD) and frequency domain (FD) features, extracted from signals captured using a jaw motion sensor, were used to train both types of classifiers. Data were collected from 12 subjects in free-living for a period of 24-hrs under unrestricted conditions. ANN with a different number of hidden layer neurons and SVMs with different kernels were trained using a leave one out cross validation scheme. ANN achieved an average accuracy of 86.86 ± 6.5 % whereas SVM (with linear kernel) achieved an average classification accuracy of 81.93 ± 9.22 %. Data collected from an independent subject in a separate study were used to evaluate the performance of these classifiers in-terms of the number of meals detected per day resulting in an accuracy of 72.72% for ANN and 63.63% for SVM. The results suggest that ANN may perform better than SVM for this specific problem. Classifiers trained with combination of time and frequency domain features were able to detect episodes of food intake but does not provide any information on what was consumed. Additional sensors such as a camera with computer vision algorithms can be used to estimate portion size and the contents of the meals. An important factor for any pattern recognition system is the feature set used.

3. EXISTING METHOD

In existing application food with similar ingredient will be placed in the same segment. So dividing the food in separate parts, aid the classifier to find the correct result [9]. Although taking picture and using segmentation looks simple, the model needs to be robust, and leads to satisfactory results in segmentation and classification phases. So images as an input part of the system should follow some specific rules such as:

Robust Handling of Different Lighting Conditions:

Photographs taken in the home, restaurant, and outdoor may have different shades of ambient color depending on the lighting. The algorithm needs to be able to handle different lighting conditions so as to not affect the color it perceives as the ingredient's color.

Robust Segmentation of the Image:

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In order to separate the ingredients on the plate, an effective segmentation process needs to distinguish between the boundaries of food in a dish. Because of differing textures and the nature of food appearance, we have foreseen potential problems in accurately segmenting the boundaries of ingredients.

4. PROPOSED METHOD

To improve the detection of by training a greater number of images and estimation of total price of the food is implemented in this paper. The dataset is trained by Alex Net and classification is performed. The below shows the block diagram of the proposed method.

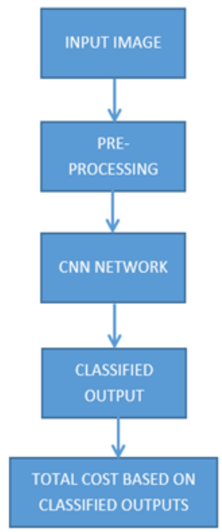

Fig 1: Block Diagram of Proposed Method

The techniques used in this project are Binarization, Bounding box, Alex Net, Loading Alex Net, Substitution of the Final Layers, Training Network, Image processing, Image Classification, Image Input Layer, Convolution layer, Filters and Stride, Fully Connected Layer, SoftMax.

5. RESULT

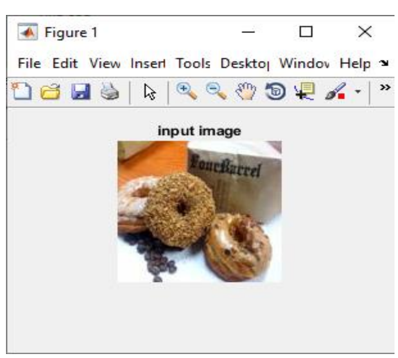

Fig 2: input image

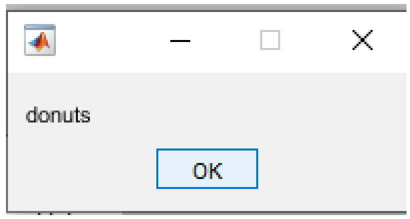

Fig 3: Classified Output

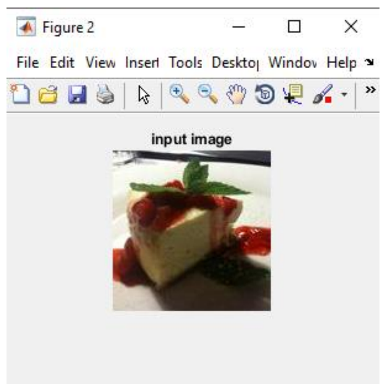

Fig 4: Input Image

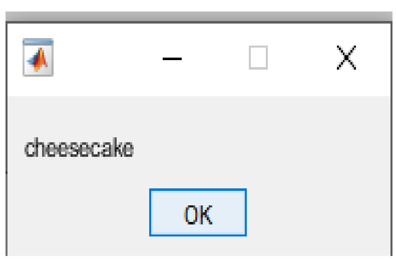

Fig 5: Classified output

```
=======================SVCE CANTEEN BILL=========================
food iteams selected
    'donuts'    'cheesecake'

Individual Cost
    [130]    [20]

Total Cost
   150
```

Fig 5: Total output

ADVANTAGES

1. It gives more accuracy.
2. Precise and accurate recognition of food.

APPLICATIONS

1. Mobile applications.
2. Restaurants.

6.CONCLUSION

This paper concluded that, we can detect the food by using image processing and deep learning techniques. The network is trained by taking the dataset from kaggle. Existing methods can process, analyze and recognize fruits and foods based on color, and texture features. We have improved the functionality and flexibility of the recognition system by using the AlexNet. Much of data augmentation must be performed as well as learn the generalized pattern required to identify and detect the food items. The network classifies the results between the train data and test data. The accuracy is comparatively a lot higher than all other traditional models.

FUTURE SCOPE

In future work, 'webcam' is used to capture the image and classification is performed.

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