# Recipe Detection using Food Images

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**Abstract** –

Classification has become easier with deep learning and machine learning and availability of larger datasets and computational resources. The Convolutional neural network is the most popular and widely used for image classification in the these days. In this paper image classification is performed on Indian food image dataset using. The food plays vital role in human's life as it provides us different nutrients and hence it is necessary for every individual to keep a watch on their eating habits. Therefore, food classification is importantfor a healthier life style. Pre trained models are used in this project which saves the computational time and cost and also has given better results. The Indian food dataset of 20 classes with 450-500 images in each class is used for training and validating. After experimentation it was found that Google InceptionV3 outperformed other models with an accuracy of 87.9.

## I. INTRODUCTION:

1.1 The PURPOSE AND MOTIVATION :-
The main purpose of project is to find out food Recipe by using Image Processing. We take input as an image and give output as name, ingredients as well as process of recipe.

1.2 PROJECT OVERVIEW :-
In SaaS, based on the single instance multi-tenancy mode, tenants' data is stored and processed at the remote service providers. Meanwhile, for data reliability in cloud tenants may customize multiple duplications and pay for use. However, service provider's maybe un-trust and they may tamper or delete or forge tenants' data. On the other hands, plain-text data duplication is vulnerable to conspired attacks of the service providers, since all the replicas look the same, the un-trusted service provider may store only one data copy rather than the customized number to cheat tenants. For the upper problems, tenants need to ensure that the service provider process their data duplication honestly which should not being tampered or partially deleted. At the same time, because tenants no longer possess their data locally, tenant should be equipped with certain security means so that they can verify the correctness of the remote data even without the existence of local copies. For secure data storage, existing researches major in the scenario that users own the independent data storage mode rather than shared one. But in SaaS, most multitenant applications take the single instance multi-tenancy strategy to make full use of the resource, which leads to the situation that multiple tenants' data is stored into one data table such as universal table [8]. For this scenario, traditional approach that needed to get file partitions[1,4,10] could not work well on the shared physical storage mode in SaaS. Because there may be several tenants' data in one data block partition, and this partition not only breaks the data isolation requirement of different tenants but also increases the complexity of integrity verification.

## II. LITERATURE SURVEY:

1. Paper Name: The Indian Food Classification application is the application will be hosted. So a user or visitor can visit the application check for the recipes by using image processing
Author: David J. Attokaren, Ian G. Fernandes, A. Sriram, Y.V. Srinivasa Murthy, and Shashidhar G. Koolagudi
Abstract: In this paper, the process of identifying food items from an image is quite an interesting field with various applications. Advantage-Easy Identify food Classification.

2. Paper Name: In this paper, the process of identifying food items from an image is quite an interesting field with various applications.
Author: Bappaditya Mandal, N. B. Puhan and Avijit Verma .
Abstract: In recent works, convolutional neural networks (CNN) have been applied to this task with better results than all previously reported methods. Infrastructures.

3. Paper Name: Few-shot and Many-shot Fusion Learning in Mobile Visual Food Recognition (2018) .
Author: Heng Zhao, Kim-Hui Yap, Alex C. Kot, Lingyu Duan, Ngai-Man Cheung
Abstract: As a Result they are not amenable for deployment on mobile devices. It has a compact framework and is able to learn from existing dataset categories, and also new food categories given only a few sample images.

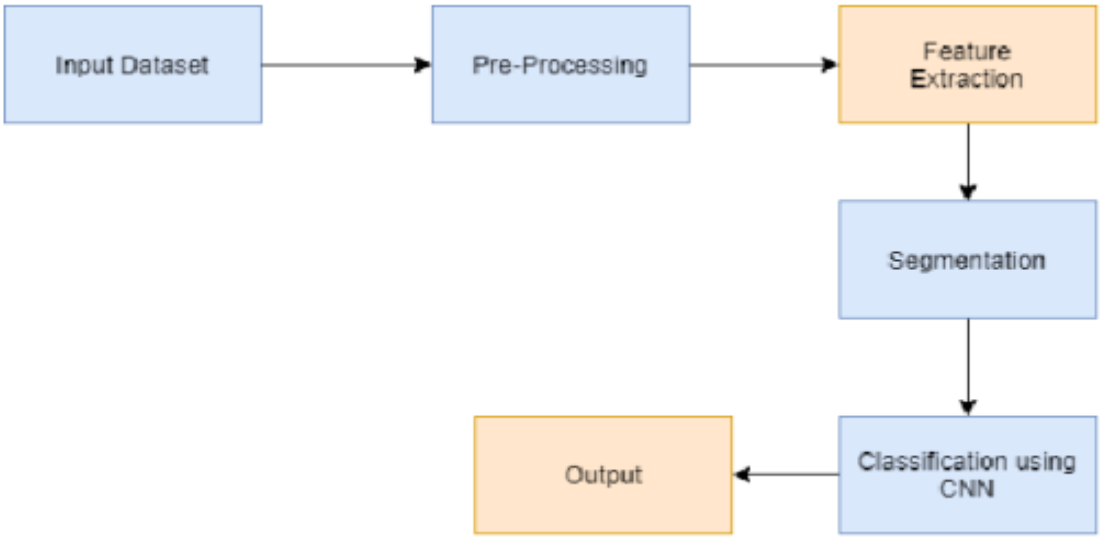
## III. PROPOSED SYSTEM:

### 3.1. Proposed Methodology :-

Training of CNN for image classification can be done mainly in 2 ways: training the CNN from the scratch or using the concept of transfer learning. Transfer learning is a deep learning technique where a model is trained to learn and store the knowledge from one problem and use the same model to other similar problems. i.e., fine tuning already trained CNN models from the huge dataset to food image classification task. Through this research an effort has been put to classify Indian food images into their respective classes using transfer learning. Image Classification with deep learning techniques such as Convolution neural network are getting incredible consideration because of their efficiency in learning and classifying complex features. A comparison has been made between the models with respect to accuracy and validation loss. Statistics show that 95 of the people do not follow any nutritional plan as these are very strict and restricts people from consuming their day-to-day food. Old aged who want to monitor their food intake, patients who want to monitor their health through food due to different dietary restrictions and mainly youth who want to track the calories and nutrition intake to maintain fitness, the importance of food classification has increased. Over the past couple of years, image based dietary and calories extraction has been a challenging task and a lot of research is going on the same.

### 3.2. Architecture :-

In this system, first input as Image dataset provide machine then next step is preprocessing. Pre-processing Phase is remove the noise from the data, rescale, resize image dataset. Then Feature Extraction is to extract features like edges, size etc. from dataset. After Feature Extraction next step is segmentation. In segmentation we divide image multiple parts. Then after the all steps done we used classifier for the classification. We used CNN algorithm for the classification. Classification is process of categorizing and labelling groups of pixels or vectors within an image based on specific rules. After All The Training Phase Done Machine create model Then Model Goes To testing Phase and Then Output Provide To user. Output is to Classify the Food and its recipes and in details .




## IV.ALGORITHM:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm that can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training.

### 4.1. Convolutional Layer:

The input data for a CNN is typically an image represented as a grid of pixel values. The first layer in a CNN is the convolutional layer. It applies a set of learnable filters (also called kernels or feature detectors) to the input image. Each filter performs a convolution operation by sliding across the input, multiplying its values with the corresponding input values, and summing them up. This operation helps in capturing local patterns and features in the image.

### 4.2. Non-Linear Activation:

After the convolution operation, a non-linear activation function such as ReLU (Rectified Linear Unit) is applied element-wise to introduce non-linearity into the network. This allows the CNN to learn complex patterns and relationships.

### 4.3. Pooling Layer:

The pooling layer is typically inserted after one or more convolutional layers. It reduces the spatial dimensions of the input while retaining the most important features. The most common pooling operation is max pooling, where the maximum value within a certain window (often 2x2) is selected and downsamples the input. Pooling helps in reducing the computational complexity of the network and makes the learned features more robust to small translations and distortions.

### 4.4. Fully Connected Layers:

After several convolutional and pooling layers, the output is flattened into a 1-dimensional vector and passed to fully connected layers. These layers are similar to those in traditional neural networks, where each neuron is connected to every neuron in the previous layer. Fully connected layers help in making predictions or classifications based on the learned features.

### 4.5. Output Layer:

The final layer of the CNN is the output layer, which depends on the specific task at hand. For example, in image classification tasks, the output layer might consist of a set of neurons representing different classes, and the network's predictions are obtained using a softmax activation function.

## V. CONCLUSION:

In this proposed system, the Convolutional Neural Network, a Deep learning technique is used to classify the food images in to their respective classes. The dataset considered is the Indian food dataset and train dataset using CNN algorithm. Indian food image classification system, classify the which type of food and recipe and also to automatically analyse the dietary and calorie information.

## VI.FUTURE SCOPE:

As far as the future enhancement is concerned, the task of classification can be improved by removing noise from the dataset. The same research can be carried out on larger dataset with more number of classes and more number of images in each class, as larger dataset improves the accuracy by learning more features and reduces the loss rate. The weights of the model can be saved and used to design a web app or mobile app for image classification and further calories extraction of the classified food.

## VII. REFERENCES:

7.1. David J. Attokaren, Ian G. Fernandes, A. Sriram, Y.V. Srinivasa Murthy, and Shashidhar G. Koolagudi, “Food Classification from Images Using Convolutional Neural Networks”, 2017.

7.2. Bappaditya Mandal , N. B. Puhan and Avijit Verma, “Deep Convolutional Generative Adversarial Network Based Food Recognition Using Partially Labeled Data”, 2018.

7.3. Heng Zhao , Kim-Hui Yap , Alex C. Kot , Lingyu Duan , Ngai-Man Cheung, “Few-shot and Many-shot Fusion Learning in Mobile Visual Food Recognition”, 2018. ..