# IBM Team 02

## Literature Survey AI-Powered Nutrition Analyzer For Fitness Enthusiasts


**Team members:**
Dhivyaa K S
Monisha P S
Mohanavel K
Rajavel A

**Guided by:**
Mr.M.Thangavel
Professor / ECE

# LITERATURE SURVEY

## Paper 1 : Fruit Detection Using Convolution Neural Network

**Authors :** Prashant Kumar,Tamal Datta,Sujata Chakravarty

**Published Year** : 2020

Fruit classification is done by an algorithm based on convolution neural network has been applied for fruit detection. In this we use high-quality, fruit-containing image dataset for training a neural network to detect fruits. The image regions are retrieved using a selective search algorithm. Computer vision is one of the most popular technologies in this era of innovation. The experimental results show that deep neural networks provide more accurate results compared with other machine learning algorithms. This model works efficiently with this architecture for fruit recognition. And also we use various hidden layer combinations to compare them.As a part of artificial intelligence and machine learning algorithm, deep neural network is used for fruit identification from images. Efficiency of DNN is better than other machine learning algorithms.

Convolutional neural network is the most commonly used algorithm in DNN which also performs efficiently for visual recognition including photo and video,face recognition, handwritten digit recognition. The efficiency of CNN can match human level perfection. CNN has a similar architecture like another deep learning algorithm i.e., ANN. In ANN, several neurons are there in each layer and also the fact is that all the neurons are not fully connected; instead they are connected locally as a part of the receptive field. After that the cost function is also generated for training purposes.

## Paper 2 : Fast algorithms for texture analysis using co-occurrence matrices

**Author :** F. Argenti, L.Alparone, G. Benelli

**Published Year** : 1990

Texture analysis may be of great importance for the problem of image classification and recognition. Co-occurrence matrices are quite effective for discriminating different textures but have the disadvantage of a high computational cost. In the paper a fast algorithm for calculating parameters of co-occurrence matrices is presented. This method has been applied to the problem of classification and segmentation of artificial and natural scenes: the classification, based on cooccurrence matrix parameters, is implemented pixel-by-pixel by using supervised learning and maximum likelihood estimates. The problem of texture boundary recognition has also been considered and a classification scheme based on more than one window for each pixel is presented. Experimental results show the improvements of classification rates that can be achieved by using this method when compared to a single-window classification.

## Paper 3 :Fruit Recognition using Color and Texture Features

**Authors :** S.Arivazhagan, R.Newlin Shebiah, S.Selva Nidhyanandhan, L.Ganesan

**Published Year** : 2010

Fruit recognition system need a change in the color space of the images, in order to obtain one channel containing the luminance information and two other channels containing chrominance information. The HSV representation is often selected for its invariant properties. The hue is invariant under the orientation of an object with respect to the illumination and camera direction and hence more suited for object retrieval. Discrete Wavelet Transform and the co-occurrence matrix is constructed from the approximation sub-band by estimating the pair wise statistics of pixel intensity. The use of the co-occurrence matrix is based on the hypotheses that the same grey-level configuration is repeated in a texture. There exist 5 co-occurrence features i.e., texture features for an image.

Statistical features such as Mean, Standard Deviation, Skewness and Kurtosis are derived from *H* and *S* components. Hence there will be 8 chrominance or color statistical features for an image. Thus a total of 13 features characterize one fruit image. In the classification phase, for the test fruit image, color and texture features are derived as that of the training phase and compared with corresponding feature values, stored in the feature library. The classification is done using the Minimum Distance Criterion. The image from the training set which has the minimum distance when compared with the test image says that the test image belongs to the category of that training image.

## Paper 4 : A New Method for Fruits Recognition System

**Author :** Woo Chaw Seng, Seyed Hadi Mirisaee

**Published Year** : 2009

A new Fruit recognition system has been proposed, which combines three features analysis methods: colour-based, shape based and size-based in order to increase accuracy of recognition. Proposed method classifies and recognizes fruit images based on obtained features values by using nearest neighbours classification. Consequently, system shows the fruit name and a short description to user. Proposed fruit recognition system analyses, classifies and identifies fruits successfully up to 90% accuracy.

A recognition approach for 2D fruit images is proposed, which combines color-based, shape-based, and size-based methods in order to increase the accuracy of the recognition result. The k-Nearest Neighbors algorithm is the methodology that has been used to develop the Fruit Recognition System. The Fruit Recognition System using the KNN algorithm as a classifier to classify fruit based on mean color values, shape roundness value, area and perimeter values of the fruit.

## Paper 5 :Food Calorie and Nutrition Analysis System based on MaskR-CNN

**Author :** Meng-Lin Chiang,Chia-An Wu,Jian-Kai Feng,Chiung-Yao Fang,Sei-Wang Chen

**Published Year** : 2019

This study develops a food calorie and nutrition system that can analyze the composition of a food based on a provided image. Further, we introduce a newly collected dataset, The system is based on a Mask Region-based Convolutional Neural Network(R-CNN) with a union postprocessing, which modifies the extracted bounding boxes and masks, without the non-maximum suppression (NMS), to provide a better result in both analytics and visualization. Once the food image is input into the system, the system scales the image to appropriate size. The resized image is then fed into Mask R-CNN to capture the food features and perform food detection and classification. At this step, Mask R-CNN detects and recognizes the food class and the box regression of the food based on the captured features. The system then estimates the weight of the object through the image of the recognized food. After obtaining the weight of the food, the food calorie and nutrition analysis system is estimated according to the Ministry of Health and Welfare and the US Department of Agriculture's Food Nutrition Database.

## Paper 6 : Color ,Shape and Texture based Fruit Recognition System

**Author :** Ruaa Adeeb Abdulmunem Al-falluji

**Published Year** : 2016

An automated system is used for classification of fruits. A dataset containing five different fruits was constructed using an ordinary camera. All the fruits were analyzed on the basis of their color (RGB space), shape and texture and then classified using different classifiers to find the classifier that gives the best accuracy. GLCM is used to calculate texture features. Best accuracy was achieved by support vector machine .All the processing was carried out in Matlab. Advancement in the field of cameras and sensors, in recent years, has led to an increase in intelligent systems. The main objective of these systems is to understand and perceive an image as done by humans i.e. understanding the symbolic meaning of images by the help of statistics, models, geometry. The main goal of this work is to automatically recognize fruit image by classifying it according to its features using machine learning techniques.