Identification of Fruits Using Deep Learning Approach

Methodology

This paper deals with the development of the identification system. An image classifier is trained to identify different images of fruits. It can be adopted in the identification of plant disease and species in the agricultural domain.

Algorithm

Convolutional Neural Network (CNN): Exclusively best accomplishment in object recognition; CNN consists of:

1. Convolutional layers
2. Batch normalization layers
3. Pooling layers
4. ReLU layers
5. Fully connected layers

Component Used

- MATLAB software with Neural Network Toolbox is utilized to create this convolutional neural network.
- 'ImageNet', free open dataset: This dataset consists of images of Apple, Banana, Grapes, Litchi and Mango. The RGB images, with three color channels R, G, and B are utilized in the dataset. The dataset is divided into training and validation datasets in which 90% of the images are trained and 10% are validated.

Architecture of the Proposed CNN Model

The model has 41 CNN layers. It comprises feature extraction and classification. The input images are cropped to remove any unwanted information. All the images are resized to 224X224X3 (3 corresponds to three color channels Red, Green, and Blue). The total nuisr of images including all the five classes in the dataset are 4,760.
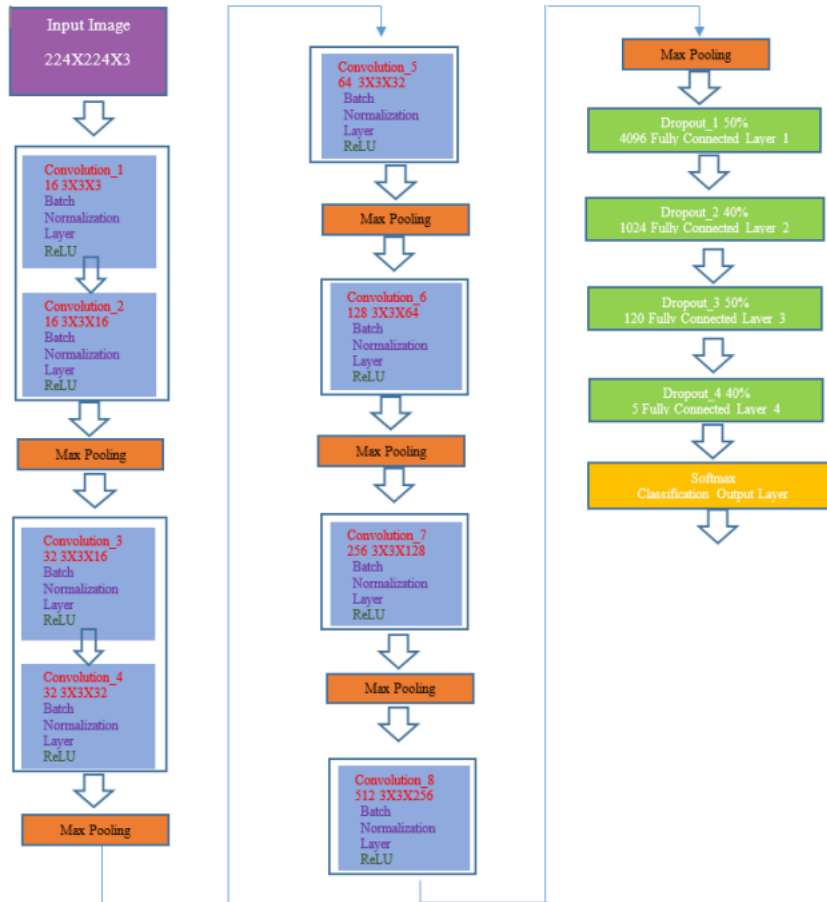
Figure 1: The Architecture of the Proposed CNN Model

Findings

The proposed CNN model is robust and gives very good accuracy.

Analysis

The paper has presented a system that develops an autonomous identification of fruits by the self-service system in the supermarket. The proposed CNN model has achieved classification accuracy of 92.23% on the dataset.

Problem Faced

The dataset is very challenging.

Future Work

As a future scope, the model can be used to train more variety of fruits. It can also examine the impact of various parameters like activation function, pooling function and optimizers.