POMEGRANATE QUALITY GRADING USING DEEP LEARNING.

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Abstract

In India, economically agricultural fields are very important. Pomegranate is one of the commercial fruits in India. Nowadays, the conditions become worse because of bacterial diseases and insect infestation. Detection of fruit quality and grading them is much more needed, for that modern agriculture techniques and systems are designed. In this system, wegrade the pomegranate into three different categories based on their external feature like colour, shape, texture, spots, etc. The proposed system consists of image pre-processing, segmentation, extraction of features (such as shape, colour and texture) and classification. For deep learning, a training model is developed using CNN algorithm and python programming language, which is based on artificial neural networks and detect the quality of pomegranate.

Keywords – Pomegranate, CNN, Deep Learning, algorithm, quality, preprocessing, grading.

I. Introduction

Pomegranate is a fruit which grows with a very high yield in many states of India and is one of themost profitable fruits in the market. But due to various conditions, the plants are infected by variousdiseases which destroy the entire crop, leaving very little product yield. So, the work proposes image processing and neural network methods to deal with the main issues of quality detection. The Pomegranate fruit as well as the leaves are affected by various diseases caused by fungus, bacteria, and climatic conditions. These diseases are like Bacterial Blight, Fruit Spot, Fruit rot andLeaf spot. The system uses some images for training purposes and so on. The colour images will be pre-processed and undergo segmentation. The texture features will be extracted and given to the convolutional neural network (CNN).

II. Literature Survey

Fatima Marougui in the paper" A Deep CNN Approach for Plant Disease Detection" a methodology for early and accurate plant disease detection, using convolution neural network (CNN) and diverse image processing techniques. The proposed approach is based on CNN modelwhich fulfills its role by classifying images into two categories (disease-free) and (diseased). According to the results obtained, the developed system achieves better detection performances than those proposed in the state of the art. Their system shows. Its reliability and speed with a satisfactory accuracy of 98.96%[1].

In the paper "Diagnosis of Pomegranate Plant Diseases Using Neural Network" by Mrunmayee Dhakate, diseases like Bacterial Blight, Fruit Spot, Fruit Rot and Leaf Spot are diagnosed using image processing and neural network methods and are further classified. The proposed methodology uses k-means clustering segmentation and for extraction of texture features of pomegranate uses GLCM method. This method of using neural networks achieves an accuracy of90% [2].

In the paper "Using Deep Learning for Image-Based Plant Disease Detection" by Sharada Prasanna Mohanty, they proposed an approach of smartphone assisted disease diagnosis which was made possible by deep learning. In this system publicly available dataset of healthy and diseased leaves were used. For deep learning architecture AlexNet and GoogLeNet are used. Theoverall accuracy of the trained model is 99.35% [3].

Malvika Ranjan in the paper —"Detection and Classification of leaf disease using Artificial NeuralNetwork" proposed an approach to detect diseases in plants utilizing the captured image of the diseased leaf. Artificial Neural Network (ANN) is trained by properly choosing feature values to distinguish diseased plants and healthy samples. The ANN model achieves an accuracy of 80%[4].

According to the paper "Quality Evaluation of Pomegranate Fruit using Image ProcessingTechniques" By Chanki Pandey is an approach towards the proper quality of essential food whichhas been used widely. The proposed methodology successfully evaluated the quality according toa flaw mark appearing on the outermost skin of pomegranate fruit. This work may be further improved by machine learning and deep learning approach. It gives an accuracy of 79.736% [5].

III. Problem Statement

Pomegranate quality grading is a model which examines the image of the pomegranate which hasbeen given by the user and compares it with the database in which we have provided 1080 imagesof the pomegranate.

It compares the pomegranate based on colour, texture, edges of fruit, image intensity, features extraction and this is nothing but image processing. Image processing works on four main functions which are preprocessing, Image enhancement, image transformation, image classification and analysis.

So, by using image processing our model detects the grade of pomegranate. We use CNN in addition to image processing as a classifier for testing the input test images with the database imageso that proper functions will take place on the image.

The main objective of the proposed work is to find the grade of pomegranate. This helps us to verify if pomegranate is edible or not. This whole process is done by CNN.
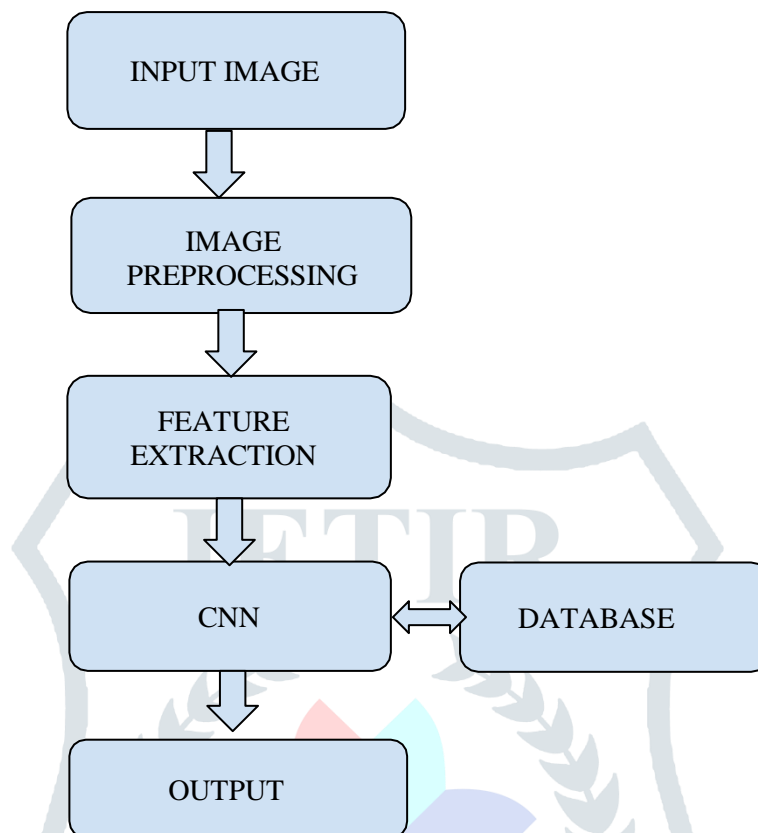
IV. Proposed System

Fig. Block Diagram of Proposed System

V. Results and Discussion

Techniques Used	Accuracy
CNN	98.96%
ANN	80%
Image Processing	79.73%
Neural Network	90%

So, we have studied the above table carefully and we get that the CNN technique gives quite goodaccuracy in comparison with ANN, Image Processing and Neural Network. Therefore, in this project we have used CNN.

VI. Conclusion

Thus, we successfully developed a system for grading the quality of pomegranate using Deep learning. The dataset was collected from an online site (Kaggle) and the python programming language was used. This project will be helpful for farmers for early detection whether the quality is up to the mark or not and in turn it will save further efforts and money of farmers.

VII. Acknowledgment

VIII. References

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