

Grading The Quality of Apple Fruits Using Machine Learning Technique

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Abstract:- This project introduces fruit quality identification system. The system design considers certain features including the color and shape of the fruit, which increases the accuracy for pixel detection of the fruit, using a color classification support vector machine (SVM). Image processing provides solutions for automated fruit size grading to provide accurate, reliable, consistent and quantitative information in addition to handling large quantities.

Computer vision is a consistent and advanced technology for image processing with favorable results and immense potential. A computer vision has been strongly adopted in the heterogeneous sector including agriculture. Fruit grading is a very important function as it gives higher value to the grower and improves packaging, management and overdevelopment in the marketing system.

Keywords:- GPU P100, GEFORCE10, Tensor flow, MATPLOTLIB, keras

I. INTRODUCTION

India is a developing country. It is the sixth largest economy in the world. The US ranks first in the world with a GDP of 19.39 trillion, followed by China with a GDP of 12.24 trillion, Germany, Japan, the UK with a GDP of 12.24 trillion, India ranks sixth worldwide. Agriculture is the backbone of the Indian economy. Apple is emerging as a super crop all over the world. The development of agriculture is essential to meet the demand. India is a major country which exports many agricultural products. Agricultural produce is important for the quality of agricultural products until it reaches the customer. Computer vision is the process of applying a variety of technologies to provide imaging based automated inspection, process control and robotic guidance in industrial applications.

II. OBJECTIVES

- To detect and classify apple fruits disease.
- To extract the images of apple fruits using image processing based on colour, Shape and texture.
- To analyse the performance of CNN, ANN, SVM algorithms using different Data sets.
- To recognize the major diseases in different categories of apple fruits and Identify quality graded apple fruits.

III. METHODOLOGY

Detection and classification of apple fruit disease. Disease infection in agricultural products such as apple fruit resulting in deterioration in the quality and quantity of agricultural products. It directly affects the financial resources of the farmer and human health. Detection of diseases in apple fruit crop leads to reduction in yield and quality at an early stage of development.

To extract images of apple fruits using image processing based on color, size and texture. Automated apple fruit identification or recognition using image processing is a key element in preposition agriculture for object detection in large crop plots. Image analysis demonstrated difficulty in processing an image captured in the natural environment and with a textured object of non-ideal geometric shape. To analyze the performance of CNN, ANN, SVM algorithms using different data sets.

ANN (Artificial Neural Network): ANN consists of three layers, an input layer, hidden layer and output layer. The bias function and the load are all parameters associated with neurons. ANN is used which has high adaptability and allows to work with very Large set of input data. The neural network was described in a MATLAB simulation environment using the program return.

CNN (Convolution Neural Network): The training process of the algorithm in the architecture of the convolutional neural network consists of several stages. CNN is a power full algorithm for image processing. These images contain RGB (red, green and blue) data, MATLAB can be used to import an image from a file into memory. Color images are stored in a 3D array.

SVM (Support Vector Machine): The working of Support Vector Machine is based on supervised learning algorithm. SVM is a linear model for classification and regression problems. The algorithm creates a line or hyperplan that separates the data into classes.

Identification of major diseases in different categories of apple fruits and identification of quality apple fruits. Conventional approaches to disease detection require observation of the form for continuous monitoring, either by formers or by specialists. But it is very expensive and time consuming. Existing techniques for disease detection have used machine learning, image processing and classification based approaches to identify and detect diseases in agricultural products.

➤ *Work Flow:*

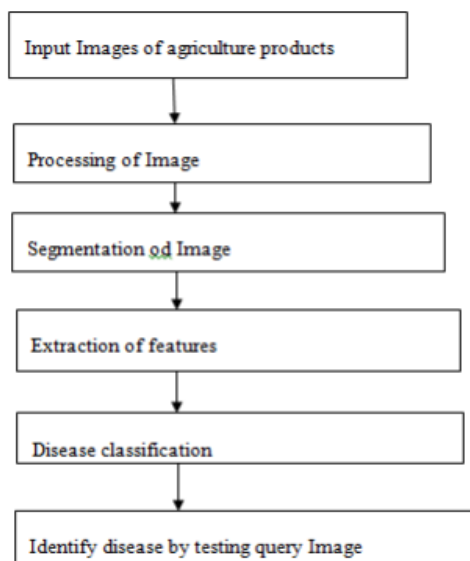


Fig 1

IV. EXPECTED OUTCOME OF THE PROJECT

- Detection and classification of apple fruits in terms of quality.
- Extraction of apple fruit images and image processing for quality gradation.
- Performance analysis of different machine learning algorithms.
- Recognition of different diseases of apple fruits and identifying graded of apple fruits.

V. CONCLUSION

Machine learning algorithms such as artificial neural networks (ANNs), support vector machines (SVMs), and convolutional neural networks (CNNs) will use the characteristics of the apple fruit to detect and sort that apple fruit. The accuracy of the features is based on the image processing operation that enhances the quality of the data set images and the images captured by the camera.

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