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FRUIT GRADE VERIFICATION USING IMAGE PROCESSING TECHNIQUES

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ABSTRACT- Most of the Indian population depend on agriculture. GDP contribution is high by agricultural sector when compared to the other sectors. The agricultural products serve the purpose of economic contribution. The products that are produced by farmers are in good quality and excess I quantity, but the problem here is that the farmer cannot directly communicate with the buyer and fix a satisfactory price for their products. There are number of middle man and sellers are involved between the buyer and the seller which becomes a major cause for reduction in profit for the seller. There are drawbacks in the existing system; it is long and tedious process. The retailers sell the product for high price and get higher profit than the farmer. To overcome this problem a medium is involved to established direct relationship between the farmer and the buyer, by developing a website which involves buyers, sellers, agencies, etc for trading.

Keywords: [Farmer, Buyer, Image Processing, Feature extraction.]

1. INTRODUCTION

Fruits are the very good supplement for healthy life style and providing necessary nutrition for every individual. In order to get this in long run without any hindrance it is necessary to concentrate on agricultural supply. These products when produced have to undergo for the quality assessment in order to maintain and meet the standards in food products. To implement this standard technology is used. But, existing techniques has certain drawbacks were it is necessary to improvise the techniques used. Drawbacks like instability, reliability, and lack in efficiency and compromise in accuracy are the problems faced y the existing methods. Hence, it becomes necessary for the development of new fruit classification system with good accuracy. In the proposed application image processing techniques are planned to identify the fruit and maturity of fruit by taking onto account the features like size, colour, shape and texture of the fruit. The proposed model is implemented by using methods like image pre-processing, image segmentation, colour conversion, feature extraction and fruit identification. To classify the fruit type the classifiers like KNN, SVM, PNN, BPNN and other classifiers are used. In the proposed model new techniques are proposed in the two important stages like fruit assessment and classifying the fruit type.

2. PARAMETERS TO DEFINE FRUIT MATURITY STAGE:

i. colour:

Colour of the fruit is the most variant feature in detecting the fruit maturity stage. The proposed model uses three different classes for measuring the fruit maturity state. The classes are taken as dark, medium and pale green of fruit colour. The classes are assigned based on the colour quality of the fruit such as low for pale green, medium for medium fruit colour, and darker colour for higher fruit quality.

ii. Size:

the size of the fruit is determined by the features like size. The co-ordinated like x and y are taken into account for determining the size of the fruit. The size of the fruit is classified into small, medium and large based on the diameter of the fruit size. The diameter is calculate by marking the centre origin of the fruit.

iii. Shape:

The shape of the fruit is determined by the structure of the fruit. The shape of the fruit is not determined to be only as round in shape. There are fruits that are other shapes too.

iv. Data:

The dataset for fruit classification is collected from various data sources. Data sources include kaggle website. These dataset are used for high quality, medium fruit quality and low quality fruit data type. These fruit images are used for classification of fruit quality. Red, Green, Blue (RGB) colour model is used for pixel identification by using the mean operation.

Dataset for TrainingImages:

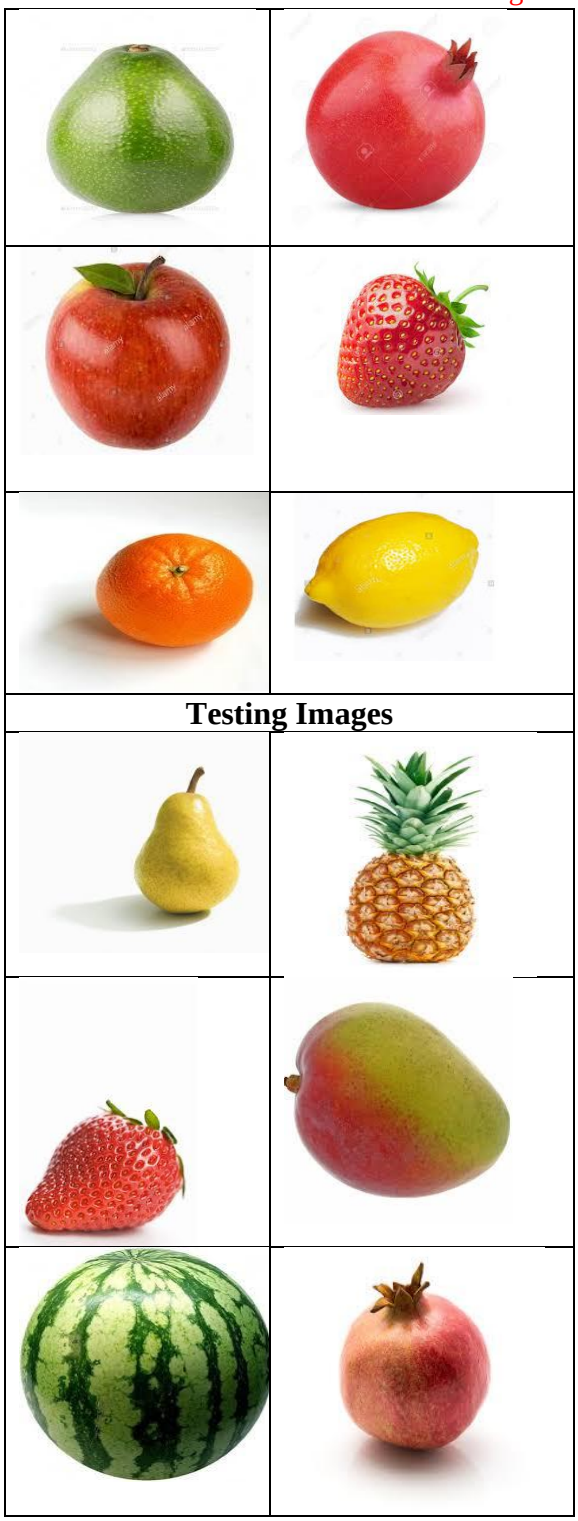


Figure:1Training And Testing Image Dataset

Fruit Name	Min max			Min max		
	R	G	B	R	G	B
Red Apple	138.7	13.8	53.1	220.8	89.1	77.1
Pineapple	199.1	179.1	42.2	187.1	299.1	73.2
Strawberry	167.9	32.46	39.6	247.8	47.2	47.3
Banana	117.8	136.7	64.2	317.3	143.4	67.3
Lemon	1934	167.2	24.7	343.7	127.4	130.4
pomegranate	79.1	78.10	33.1	265.2	283.1	98.7
Watermelon	85.4	210.8	40.9	227.8	278.7	55.6

Table: 1 RGB color Model

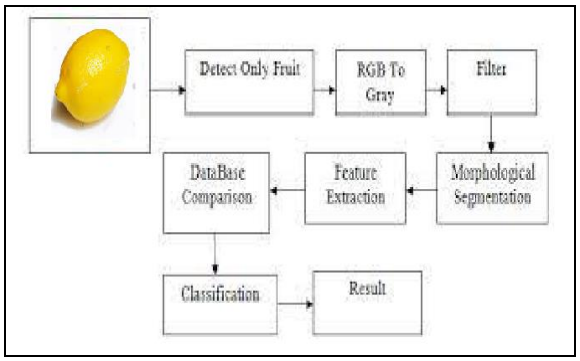
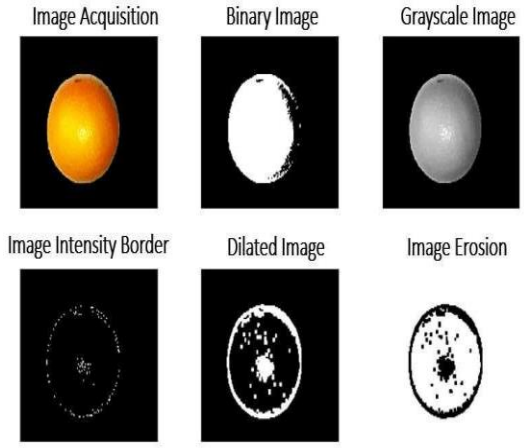


Figure: 2 Proposed model

In this project are implement edmor phological operation s to enhance the image characteristic and achieve a optimum image processing, are implemented techniques such as erosion and dilation. After applying the required filters to improve image quality is come to make the analysis of the photo taken to extract the relevant features to identify maturity in the fruit s taking into account parameters suchas color, shape and size.

In the proposed method morphological operations which are used for detection of features from the images that are used for testing and training of fruits. The process is carried out by applying the image filtering in initial stage in order to preserve the details of images. After image filtering images, the fruit images are converted into RGB color model is calculated for the image and images are further segmented into multiple small segments, these segmented images are analysed for relation among them.



Stage: 1: Image Acquisition and Preprocessing

Images are collected for process from various sources like free database sites and few images were collected in real time using professional cameras and mobile phone cameras too. The resolutions of the images are remarkable. The images that are acquired may contain noises in it. These noises are removed in preprocessing stage by applying efficient filters. This process helps in retaining the fine details of the image.

Morphological Operations

In order to remove the noise from the images the morphological operations are used in the process to retain the images details.

Histograms

In the current project the performance of the model is evaluated based on the histogram of the RGB model. The parameters like color are used for finding the ripeness of the fruit.

Classification

The colors in images are obtained from the fruit image is extracted from the image using histogram. The fruit images are classified based on the features extracted from the images with usage of morphological operations.

CONCLUSION

Hence, the fruit dataset images are classified using the image processing techniques and

morphological operations. The idea of fruit classification is completely a newer idea to be executed. The proposed method shows effective results.

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