



DETECTION OF BACTERIAL DISEASE IN ALPHONSO MANGO USING IMAGE PROCESSING

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Abstract— This work detects the external bacterial disease in mango using image processing technique. Mangoes are considered as to be the king of the entire world. India is the largest producer of mangoes & also exported all over the world. India has the richest collection of mango cultivars. The detection of fruit diseases is very difficult through our human naked eyes and also it needs more time and cost. The manual detection of bacterial fruit disease is not simple and not accurate. The paper proposes an image processing method for the detection of external bacterial disease in mango. In this work, Alphonso variety of mango is chosen. The sample input of mango is collected from DB_MANGO set which is publicly available in internet. The proposed system has three phases. Firstly acquire the image using digital camera with a specified image size. The input image is preprocessed using histogram stretching method. The color features of mango fruit is extracted using RGB color pattern. The output of the proposed system identifies whether the mango fruit is normal or diseased fruit.

Index Terms—Mango, preprocessing, image processing.

1. INTRODUCTION

Mango is considered as the king of fruit. It is a leading fruit in our country. It is considered as the national fruit of India. It has good flavor and also provide vitamin C. Alphonso is the best in world. It fetches premium in export market [1].

Alphonso is a seasonal mango. It has sweetness, richness and also has good flavor. It also names as "Alfonse de Albuquerque". Portuguese produce a good variety of mango through grafting on mango trees. It is most expensive variety of mango [2].

The defects in the fruits can be identification easily with the difference in the color. Manually diseases detection in mango is costly and time consuming. The defects in the fruits can be identified easily with the difference in the color that appears when compared to the normal fruit. The external defects of mango have to be identified. The main diseases affected in mangoes are like fungal, bacteria diseases etc.

Identification of fruit disease leads to prevent the disease in the earlier state and increasing the productivity of good quality mangoes. In this paper we propose an approach for the detection of diseased mango fruit using digital image processing techniques

[3]. This approach helps to improving the marketing of fruit production.

In this work disease detection is done through digital image processing method. The basic image processing step preprocessing is used in this work. In this work the input samples are collected from internet (DB_MANGO set) and mainly experiments are done in Alphonso mango variety. The proposed work is to identify external defects using preprocessing technique.

2. LITERATURE SURVEY

Pujitha N, Swathi C and Kanchana V, proposed an image processing technique for identifying the fruit disease of mango. The technique uses basic digital image processing technique for identification of the diseased part of the fruit. The work consists of four phases i.e., preprocessing, segmentation, extraction and classification. The work is an attempt to propose an approach for the detection of external disease in mango fruit [3].

Nagle and Marcus introducing new method for identifying the quality parameters. In this work they mainly taken two varieties of Thai mango fruit namely, "Nam Dokmai", "Maha Chanok". CVS is used for evaluating color of the mango. It helps to increasing the economic value of the fruit. [4] discussed about an important work which presents a metal detecting robot using RF communication with wireless audio and video transmission and it is designed and implemented with Atmel 89C51 MCU in embedded system domain. The robot is moved in particular direction using switches and the images are captured along with the audio and images are watched on the television .

Ravindra Nikam and Mahesh Sadavarte introduced an effective way to measure of mango leaf diseases using image processing technique. For segmentation of mango leaf area Laplacian filter technique are used [5].

Suvarna Kanakaraddi and Prashant iligerb proposed the method for identifying the chilly disease. The method is used for increasing the production and reducing the human error. Basic image processing technique is used in this work. Classification is based on the percentage of affected portion [6].

R.Yogamangalam and B.Karthikeyan has presented an outline of most common segmentation techniques. They describes about thresholding, model based, Edge detection clustering etc. It describes merits and demerits of segmentation techniques. Also discussed about the Markov Random Field [7].

3. RELATED WORKS

In existing system, Pujitha N, Swathi C and Kanchana V proposed a method for detection of external defects on mango. The work implemented in mango fruit .They collect the input sample as in video format and again converted into 100 frames. Several methods are used for the detection of defects in mango. This work implemented by digital image processing technique. Digital image processing technique preprocessing is used to identify the diseased mango.

The mango image is taken as the input for the preprocessing phase. It enhances the image clarity and reduces background noise. Thresholding method is used for the preprocessing of image. Preprocessing phase, convert the original image into binary image and perform the individual RGB color bands by computing histograms. Finally displaying the color threshold ranges through histograms.

They proposed the future work includes working with large dataset and detecting using the same methods with other variety fruit.

4. PROPOSED SYSTEM

Mangoes are said to be the king of all fruits the entire world. Mango is the delicious seasonal fruits grown in the tropical areas. Depending upon cultivar, mango comes in different shapes and sizes. Its flavor is rich and good and sweet with a mild tartness. Mango fruit is a source of Vitamin-A. The defects in the fruits can be identified easily with the difference in the color that appears when compared to the normal fruit.

4.1 Motivation of the work:

The work is implemented in Alphonso mango. It is a seasonal fruit. It is also one of the most expensive varieties of mango .The work mainly concentrated on the bacterial disease on Alphonso mango. *XANTHAMONAS CAMPESTRIS* /Bacterial canker is the one of the main bacterial disease affected on Alphonso mango. The objective of the work to detect the “*XANTHAMONAS CAMPESTRIS*” disease in mango (Alphonso).

The proposed work consists of normal image processing concept image preprocessing. In this work the input images are in jpeg format. Input samples are taken from DB_MANGO dataset from internet. The experimental work is done in Alphonso variety.

The bacterial canker disease is rapidly spread during rainy days. The disease is spread through the infected planting parts. When the fruits are in bunches the bacterial disease is spreads through the contact of each other. The disease is found on leaves, stem, branches and fruits. This disease is mainly seen in the form of irregular

necrotic patches (cankrous patches) with brown color. On fruits, they appeared in water soaked, brown color lesions.



Fig.1 XANTHAMONAS CAMPESTRIS affected mango.

The block diagram of the proposed system is shown in Fig. 2

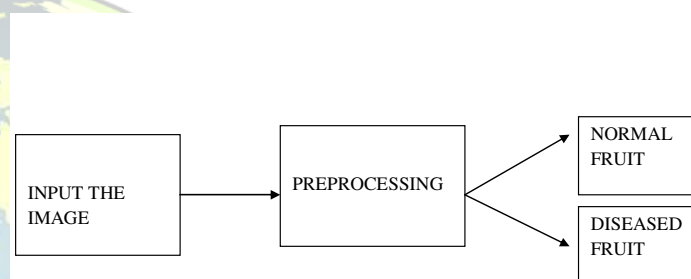


Fig.2 Architecture of proposed system

In the proposed system, preprocessing is done for remove background noise and increasing image quality. The identification of diseased portion is done by segmentation.

4.2 Algorithm

The proposed work uses three algorithms:

- Algorithm for image extraction and preprocessing.
- Algorithm for segmentation.
- Algorithm for feature extraction and classification.

In preprocessing phase, each image is taken to detect the defected fruit so quality of the image is improved and reduces the noise and improve the feature of the image[15]. In this phase to convert the input image into HSV image.

Algorithm

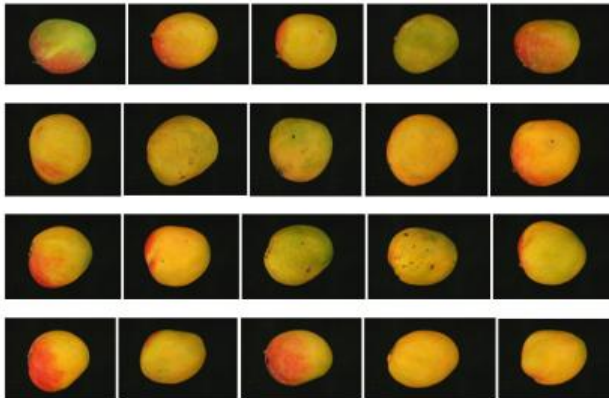
- Step 1: Insert the mango images.
- Step 2: Read the image into the opencv in c sharp language from a specific location.
- Step 3: Convert the input image into hue, saturation and value image (HSV).
- Step 4: Select the color ranges for thresholding and display through histograms.

Step 5: The filtered mask is applied to the original image (RGB image).

Step 6: Finally, Displaying the masked image in specific color..

5. EXPERIMENTAL RESULTS

The input images are collecting from DB_MANGO dataset available in internet (fig.3).



The following images show the results of the proposed phase method.



The fig.4 shows to select the input image from the dataset.

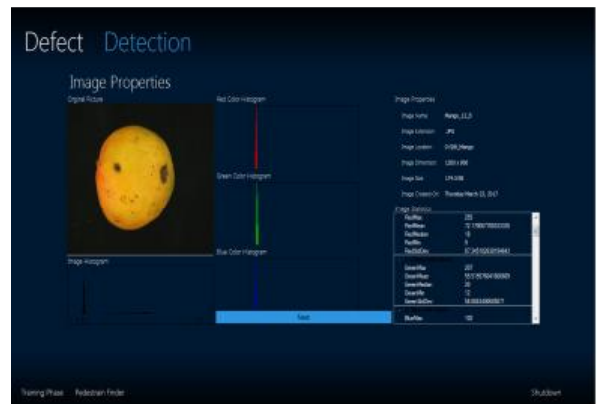


Fig.5 Histogram representation.

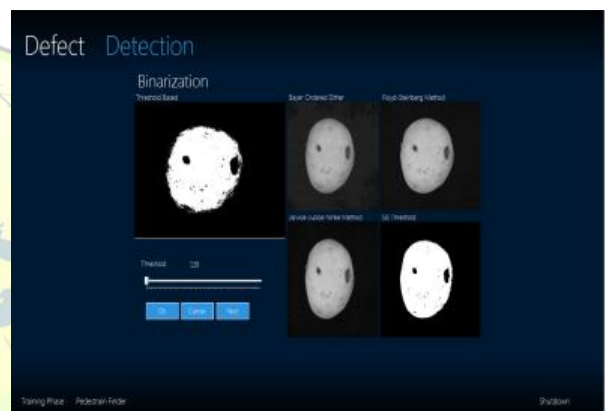


Fig.6 Image representation after thresholding.



Fig.7 input normal fruit image

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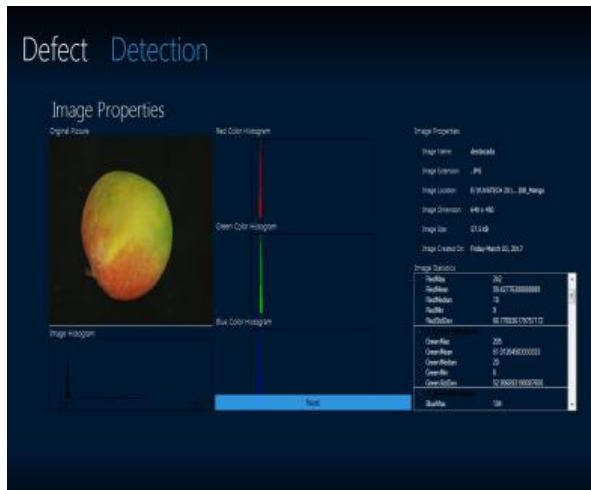


Fig.8 Histogram representation of image



Fig 9. Binarization of input image

6. CONCLUSION

In this paper the defect identification in Alphonso mango is described by applying the digital image processing technique. The implemented technique is beginning from image acquisition, preprocessing and histogram representation of the input image.

The proposed work focuses on external bacterial disease identification on mango. Based on the image color the intensity of the defect area is predicted. This work helps to reduce the production of bacterial affected mango and also improve the production rate of alphonso mango. The identification of bacterial diseases on mango which help mango cultivators to prevent the fruit from the disease. But some times the intensity of the disease affected portion of mangos are not predicted in accurately. The work simply tells if the given mango is normal or diseased. The future scope of the work, this method is implemented in all other vegetables and fruits. That improves the marketing and exporting.

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