



Pomegranate Disease Detection Using Image Processing Techniques

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ABSTRACT: In India, economically agricultural field is very much important. The crops are affected by uneven climatic conditions, Because of that diseases on plant is increased and agriculture yield is decreased. Now days, the conditions become worst because of bacterial diseases. Detection of diseases and prevention is much more needed for that modern agriculture techniques and systems are designed. In this system, we detect pomegranate diseases and also suggest the solution on diseases. The proposed system, consist of image pre-processing, segmentation, extraction of feature and classification. In image pre-processing, images are resized. In segmentation, color segmentation is carried out. Color, morphology and texture features (Gabor filter) are used for the feature extraction. Minimum distance classifier is used for classification purpose.

KEYWORD: Minimum distance classifier, Gabor filter, HSV, RGB, YCbCr.

I. INTRODUCTION

Pomegranate is one of the commercial fruit in India. Pomegranate is known as drought tolerant crop. There is no other fruit crop that has high medicinal value compared to that in pomegranate. Normally, farmer observes symptoms of diseases on fruit and leaf but they cannot diagnose it. Expert can easily diagnose the diseases on fruit and leaf but the disease detection is done manually. It may take time for detection of diseases on crop, because of this huge loss of crop is done. Hence, automatic fruit disease detection system is needed.

We have selected pomegranate fruit for automatic disease detection. This fruit mainly affected by bacterial blight, anthracnose, Alternaria and causes the major loss to the farmer. Bacterial blight of pomegranate affects leaves, twigs, and fruits. Initially, spots are black and round and surrounded by bacterial ooze. Under favourable conditions, spots enlarge to become raised and dark brown lesions with indefinite margins that cause the fruit to crack. The disease causes up to 90% yield reduction. Alternaria is also called black rot and causes damage to the fruit in the form of small reddish, brown circular spots appear on the fruits. It occurs after heavy rains just when fruit is beginning to form. In anthracnose, mature fruits develop spots which are initially circular later becoming irregular, brown to dark brown covering the fruit partly or fully with sunken centres.

The aim of this paper is to find out diseases on pomegranate fruit. This system take input as image of pomegranate fruit and identify the diseased or non-diseased fruit. If diseased fruit then which type of disease on it.

II. BLOCK DIAGRAM DESCRIPTION

Pre-processing:-

In pre-processing system use various techniques like image resize, filtering, segmentation, morphological operation etc. Size of the given image is very large, since they are captured by digital camera. Therefore, resize the given captured image using image pre-processing.

Segmentation:-

Image segmentation is the processes of dividing on image into multiple parts. This is typically used to identify objects or other relevant information in digital images. In our project we use color based segmentation such as clustering, RGB, HSV, La*b, YCbCr etc. The best performance in terms of segmentation error is achieved by the HSV and YCbCr.

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Feature Extraction:-

The fruit are identified by the human being mainly by color, shape, and texture of the fruit. In the purposed system, for the extraction of feature we have used color, morphology, texture feature.

Color:-

A color is mostly used to compare images and is one of the most widely used visual features. For the representation of color of an image, we are used HSI (hue, saturation and intensity) color model. And for representation of the distribution of a color image, we are used color histogram. Here, we compute the color histogram for all image in dataset and save in database which will be used for comparison of query image with dataset image.

Morphology:-

For extracting image components, morphology tool is used. Description and representation of region shape such as boundary extraction can be done using extracted image component. Here, we used erosion dilation operation of morphology for obtaining the boundaries of images. After applying these operations, we subtract the eroded image from original image. Finally, we will extract shape vector from healthy fruit, by using morphology.

Texture:-

For texture feature extraction Gabor filter is used. The equation of Gabor filter is,

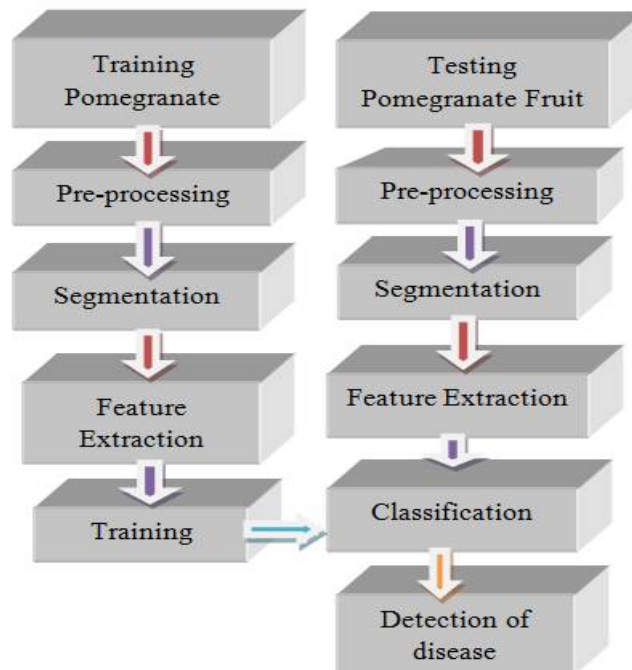
$$g(x, y, \theta, \phi) = \exp\left(-\frac{x^2 + y^2}{\sigma^2}\right) \exp(2\pi\theta_i(x\cos\phi + y\sin\phi))$$

In this equation, σ is standard deviation, θ is spatial frequency and ϕ is orientation.

Training and classification:-

Once the features are extracted, next step is to classify the trained image and testing image using minimum distance classifier (MDC). After applying MDC, clusters will classify into two classes that is diseased and non-diseased.

III. BLOCK DIAGRAM



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IV. RESULTS

1. Image acquisition:



In this we are taking an image from camera.

2. Pre-processing:



Pre-processing the image like resizing, rgb2gray conversion is done here.

3. Segmentation:



Segmentation of diseased part is done.

4. Quality of Fruit:



The system tells about the quality of fruit.



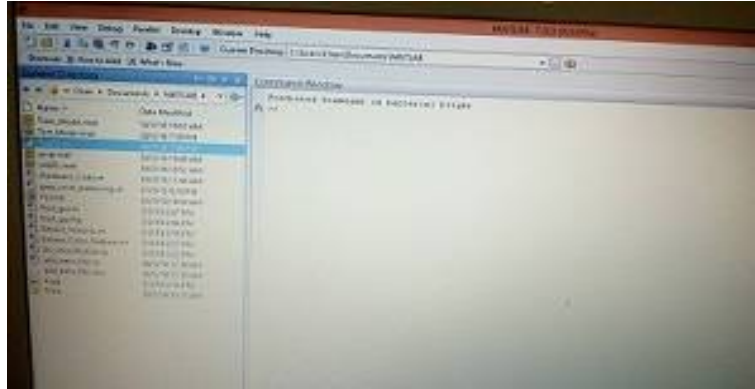
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5. DISEASE DETECTED :



Disease on fruit is displayed.

V. CONCLUSION

In this paper, a real time image processing based approach for the disease on pomegranate is proposed. First image acquisition is takes place then pre-processing, segmentation, feature extraction techniques are used for detection of diseases. This system is useful for farmers to earlier detection of diseases on pomegranate. It is also useful for increasing the yield.

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