International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE)

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 6, June 2020||

Plant Leaf Disease Detections & Classification Using Image Processing Technique

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ABSTRACT: For preventing the losses in the yield and quantity of the agricultural product, Classification is performed, if proper analysis is not taken in this approach or classification, then it produce serious effects on plants and due to which respective product quality or productivity is affected. Disease classification on plant is very critical for supportable agriculture. It is very difficult to monitor or
treat the plant diseases manually. It requires huge amount of work, and also need the excessive processing time, therefore image processing is used for the detection of plant diseases.So we can use image processing foridentification for leaf diseases in MATLAB. Plant disease classification involves the steps like Load image, pre-processing, segmentation, feature extraction, svmClassifer

KEYWORDS: RGB Image, Segmentation, Pre-processing, SVM classifier.

I.INTRODUCTION

India is a cultivated country and about 80% of the population depends upon on agriculture. Farmers have large range of difference for selecting various acceptable crops and finding the suitable herbicides and pesticides for plant. Disease on plant leads to theconvincing reduction in both the quality and productivity of agricultural products. The studies of plant disease refer to the studies of visually observable patterns on the plants. Support Vector Machines (SVM) classification approach are proposed and used in this paper. Health of plant leaf and disease on plant leaf plays an important role in successful cultivate of crops in the farm.the cases disease symptoms are seen on the leaves, stem and fruit.Mostly image processing includes regarding images as signals while applying sign alil processing methods, it is among very quickly growing technologies today, its applications in various aspects of a business. Image Processing is cast core research area within engineering.

A product quality control is fundamentally required in order to gain more value added products. Many studies show that quality of agricultural products can be reduced.from many causes. One of the most important factors of such quality is plant diseases.

Consequently, minimizing plant diseases allows substantially improving quality of the products. An abnormal condition that injures the plant or leads it to function improperly is called as a disease. Diseases are readily recognized by their symptoms. There are a lot of Grape leaf disease types which are ,spot disease,fungal disease,Bacterial diseases and many More. Image processing and computer vision technology are very beneficial to the agricultural industry. They are more potential and more important to many areas in agricultural technology
Image processing basically contains the following three steps:

a) Importing the image with ocular scanner or by digital photography.

b) Analyzing and handling the image which includes data condensation and image

enhancement and spotting patterns that are not to human eyes like satellite photographs.

c) Output is the last stage in which result can be changed image or report that is based on image analysis

II.LITERATURE REVIEW

This paper describes an image processing technique that identifies the visual symptoms of Grape plant diseases using an analysis of colored images, Work of software program that recognizes the color and shape of the Grape leaf image, LABVIEW software was used to captured the image of Grape plant in RGB color model and MATLAB software was used to enable a recognition process to determine the Grape plant disease through the leaf images, the input image was enhanced to preserve MATLAB software was used to enable a recognition process to determine the grape

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plant disease through the leaf images, the input image was enhanced to preserve.

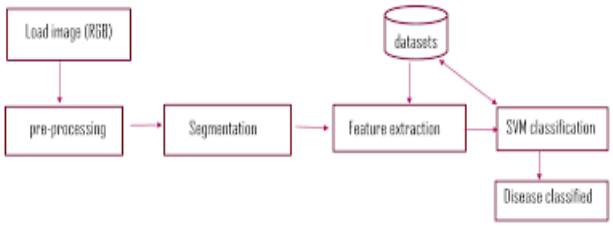
The color model respectively was used to reduce effect of illumination and distinguishbetween Grape and non-Grape leaf color efficiently and the resulting color pixels are clustered to obtain groups of colors in the image is shown belowPlant Disease Classification Using Image Segmentation and SVM Techniques.

The disease was characterized by appearance of small, random and water-soaked spots on fruit. If cracks are passing through the spots then the disease identified would be Bacterial blight.Alternaria Fruit Spot (Alternaria alternata): Small reddish brown circular spots appeared on the fruits, as the disease advances these spots, blend to form larger patches and the fruits start crumbling, the arils get affected which become and become not suited for consumption.
This paper connected to spectroscopic and imaging based, and volatile profiling-based plant disease detection methods, Segmentation of leaf image is important whileextracting the feature from that image, Methods of this spectroscopic and imaging techniques are fluorescence imaging, multispectral or hyper spectral imaging, andinfrared spectroscopy. The fluorescence steady at certain frequencies such as 450, 550,690, and 740 nm and provide difference between the fluorescence at 550 and 690nmwere higher in the diseased portion of the leaves, while it was very low for healthyregions of the leaves. Quadratic discriminant analysis (QDA) used for analysis, QDAclassified healthy and diseased plants with an accuracy of 71% and 96%, respectively.

[4] Image processing and disease detection is general term of this paper and color space, color histogram, grey level co-occurrence matrix (CCM), Gabor filter, Canny and Sobel edge detector are feature extraction techniques of this paper.

III.RELATED WORK

A. Architecture:



B. Algorithm:

Step 1: Load leaf image as RGB format

Step 2: Contrast image gives accuracy of affected image

Step 3: pre-processing

Step 4: segmentation of Otsu is considered as binary image from grey image

Otsu process:

Separate pixels into two clusters

i) Then find the mean of each cluster.

ii) Square the difference between the means.

iii) Multiply the number of pixels in one cluster times the number in the other

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Step 5: Feature extraction is identify the disease and morphological method provide
better result

Step 6: simplicity is built in method that can provide classified result

The svmtrain function uses an optimization method to identify support vectors si, weights αi, and bias b that are used to classify vectors x according to the following equation

c=sumiαik (si, x) +b, where k is a kernel function. In the case of a linear kernel, k is the dot product

C. Modules:

A) Image Acquisition:

The RGB colour images of Grape Leaf are captured using a Canon PowerShot G2 digital camera, with pixel resolution 768x1024. The digitized images are about 225 KB size each. Those images are cropped into a smaller image with dimension of 109 x 310 pixels. There have collected about 94 data samples. It consists of three types of paddy diseases as shown in Fig. 2.5. Images are stored in BMP format. The prototype uses Matlab image

b) Pre-processing:

To remove noise in image or other object removal, pre-processing techniques is considered. Image clipping i.e. cropping of the leaf image to get the interested image region. Image smoothing is done using the smoothing filter. Image enhancement is carried out for increasing the contrast. The RGB images into the grey images using color conversion using equation(x) =0.2989*R + 0.5870*G + 0.114*B
Then the histogram equalization which distributes the intensities of the images is
applied on the image to enhance the plant disease images. The cumulative distribution
function is used to distribute intensity values

c) Segmentation:

Segmentation of leaf image is important while processing image from that Segmentation means partitioning of image into various part of same features or having some similarity. The segmentation can be done using various methods like Otsu 'method, k-means clustering.

d) Feature extraction:

Feature extraction plays an important role for classification of an image. In many application feature extraction of image is used. Color, texture, morphology, edges etc. are the features which can be used in plant disease classification, texture means how the color is distributed in the image, the roughness, hardness of the image. In this paper considers color, texture and morphology as a feature for disease detection. They have found that morphological result gives better result than the other features. It can use for identify the infected plant leaf of classification plant image

E) Method:

There are several steps must be achieve of this system which are grape leaf color segmentations, grape leaf disease segmentation and analysis and classification
of the disease.

A) Grape leaf color segmentation:

The grape leaf color segmentation is pre-processing module which segments out of any irrelevant background information. A self-organizing features map together with a back-propagation neural network is deployed to recognize colors of grape leaf. This information is used to segment grape leaf pixels within the image. The input is enhanced by using anisotropic diffusion technique to preserve information of the affected pixels before extracting grape color from the background.

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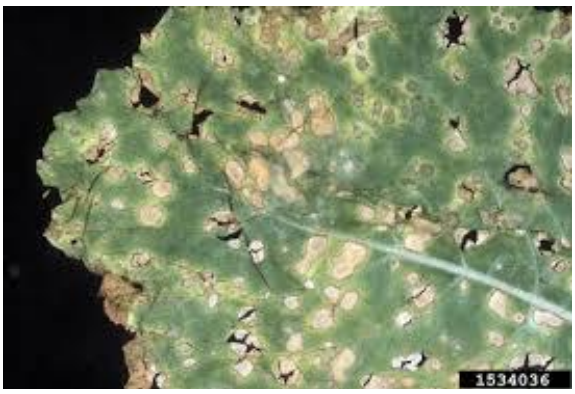
B)Grape leaf disease segmentation:

The grape leaf disease segmentation is performed using modified selforganizing features map with genetic algorithms for optimization and support vector machines for classification. Using modified self-organizing feature map (MSOFM) , the clustering process does not require any training nor predefined number of color groups.

C) Analysis and Classification of Disease

The resulting segmented image is filtered by Gabor wavelet which allows the system to analyze leaf disease color features more efficient. The support vector machines are then again applied to classify types of grape leaf diseases. The image Gcan be able to categorize the image of grape leaf into three classes.



V. EXPERIMENTAL RESULTS

A. Performance Evaluation:

a) User can load jpeg/png/gif image as rgb format

b) Then system produce segment process image (rgbtogrey then greytobinar process)

c) Then user select appropriate image segmented part (using k-means cluster algorithm)

d) Then the classified result should be appeared and simply and easily to detect leaf disease.

B. Parameter attributes: Detect_data.mat and Accuracy_data.mat files are used for svmclassification.

Plant Disease Classification Using Image Segmentation and SVM Techniques

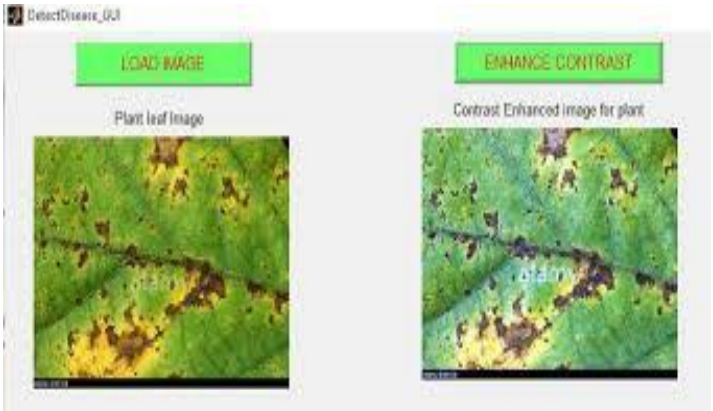


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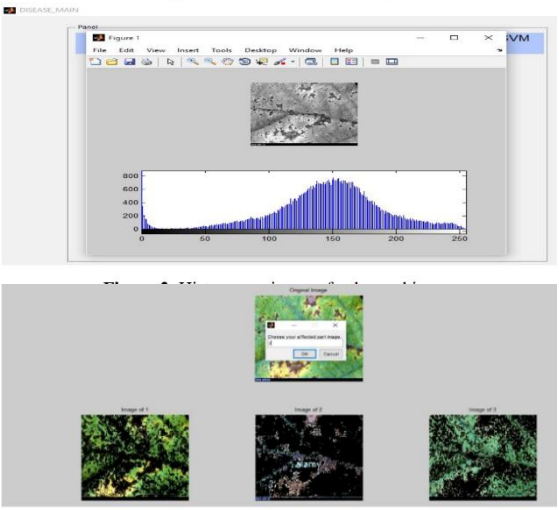
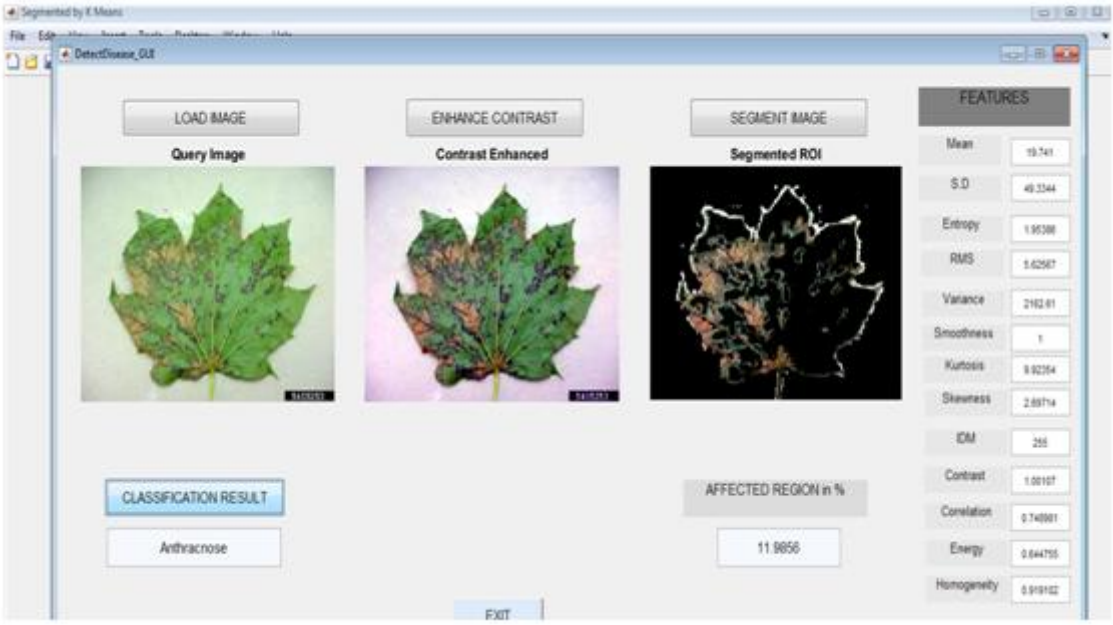
Figure 1. Enhancement of image





VI. CONCLUSIONS

The accurate Disease detection and classification of the plant leaf image is very important for the successful cultivation of cropping and this can be done using image processing. This paper discussed various techniques to segment the disease part of the plant. This paper discussed classification techniques to extract the features of infected leaf and the classification of plant diseases throw svmclassifier.

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