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A NOVEL MACHINE LEARNING BASED APPROACH FOR DETECTION AND CLASSIFICATION OF SUGARCANE PLANT DISEASE BY USING DWT

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Abstract - The main wealth of the India is farming. But damaging rate of that agricultural product is mainly through the natural disasters like floods and storm and second factor is the virus or bacteria affect the plant. For detecting the disease in the plants there are some experts even though its not easy to approach every time. It may be expensive for knowing the disease of the plant. Finding of the affected once is not enough but the reason for the disease also will be useful to give the pesticides and some of the useful organic materials like fertilizers to increase the resistance of the plants to yield better quality results .As the result the total accuracy of the area effected. This paper presents detection of sugarcane plant diseases by using DWT (Discrete wave length transform) algorithm. By using some popular methods like automatic detection techniques the disease are detected fast.

***Key Words*: Image segmentation, Discrete wave length transform, Image processing, Pixel**

1. INTRODUCTION:

The production of crops is normally gets affected by the diseases. Hence, it is vital to use advanced techniques to increase the productivity of agriculture products and thereby increase financial income of farmers. Mostly plant related diseases infect due to pathogens, fungi, bacteria and viruses. In recent years, most of the crop disease detection systems were developed based on image processing.

For such systems, input has to be the set of affected plant images that are saved in the database. These images are captured by the camera by continuously monitoring the field. In this paper we are taking already captured images .The images are given to the system after that using image processing techniques the quality of the image is increased. And by increasing the accuracy for finding the disease is the task to be improved. The techniques we are using are classification, feature extraction, segmentation. The symptoms of the diseases will vary with respect to size, color, shape based on the virus affected. Here in this paper we are solving the problem of feature extraction and preprocessing by enhancing the image quality. System takes lots of infected part images from crops are else downloaded from the Flickr and Google and those images are going through the image processing techniques .In the recent times improving the accuracy is main thing to detect the disease faster. Image segmentation is main technique to detect the affected area using threshold value. Here according to the pixel of the image the threshold value have to be assigned according to the pixel the system will compare with images that saved in the dataset. By using DWT algorithm the pixel of the image is to be compared and remove the unused pixels using Fourier transform by forming a matrix over the image. Most of the plants will be in green pixels if its changed means that part is affected by some virus or fungus. The proposed method is the improvement of the approach which will increase the accuracy and quality of the image. According to the severity of the situation the system will give the simple recommendations and notifications to suggest some pesticides and mention the fungus that is effected.

1.1 Literature survey:

[1] Identification of leaf disease in the pepper plants using soft computing techniques. This paper the images are taken and will be give the data in the form of genetic sciences. As image processing will give the perfect results in the agricultural products. Generally pepper plants are affected by cotton leaf disease

[2]Recent machine learning based approaches for disease detection and classification of agricultural products. In this paper identifies the diseases in the plant, vegetables, fruits by using svm classifier the images are to be classified [3]fast and accurate detection and classification of plant diseases and classification of plant diseases in this paper they are proposing experimental solutions to increase the accuracy upto 90%.

[4] detection and classification of disease affected region of plants leaves using image processing techniques.in this paper they are taking the RGB color based for capturing the image.

[5]sugarcane leaf disease detection and severity estimation based on segmented spots image. In this paper the estimating the severity based on the affected region all over the crop and how much its is affected and steps to control the loss by finding it in early stage itself.

2. Existing system:

In the existing system the disease detection is done by using the matlab. Here detection of the sugarcane

diseases will be finding by using the set of samples collected in the database. Here in the paper they are taking only yellow leaf disease that is affected to the sugarcane crop severity every crop has some resistance if it is decreased means the crop will effects by some disease and it will spread continuously and causes the damage of the whole crop for improving the production range. The SVM classifier is used to separate the effected part and detect the disease properly. The detection range have to be improved to identify quantitative train to increase the resistance rate the (GWAS) genome-wide association study on the sugarcane cultivar panel will be used for the quality assurance .

3. Proposed system:

In our system the detection disease is done by using Discrete wavelength transform (DWT) algorithm. There are some set of diseases in the database and check with the already stored input images. Digital camera or similar devices are used to take the pictures and stored in the data set which are different types of leafs and those are used to identify the affected area in leafs. There are different types of techniques used to process those images to get different and useful features needed for the purpose of analyzing later. Algorithm will be written below in step by step approach for the proposed image recognition and segmentation process.

3.1 Image Acquisition

In this section, disease affected leaf image is considered as an input image from the dataset of disease affected leaves.

3.2 Image Pre-Processing

After insertion of image, image is pre-processed. Preprocessing is performed to decrease the noise rate and improve the contrast of the image using filters. Spatial filters is a operation where each pixel value is changed by function of intensity of pixel of the neighbourhood image.

3.3 Image Segmentation

Enhanced image is segmented using edge detection method. To highlight the affected part and mask the green pixels and compares with the part which is turned in to another color.

3.4 Feature Extraction

Here, diseases affected Region of Interest is selected from the segmented images. Then, Convert the RGB color (ROI) image into grey scale image and maintain the color Co Occurrence Matrices (CCMs).

3.5 Classification:

Here ,the diseases are classified based on the type of the fungus, bacteria, pathogen or virus the plant is affected .already predefined constraints given to classify the disease .

3.6 Disease detection:

Here the detection of disease is the final step, based on the image the affected part is detected and disease is identified . Obtain the useful segments to classify the leaf diseases. Segment the components using DWT algorithm.

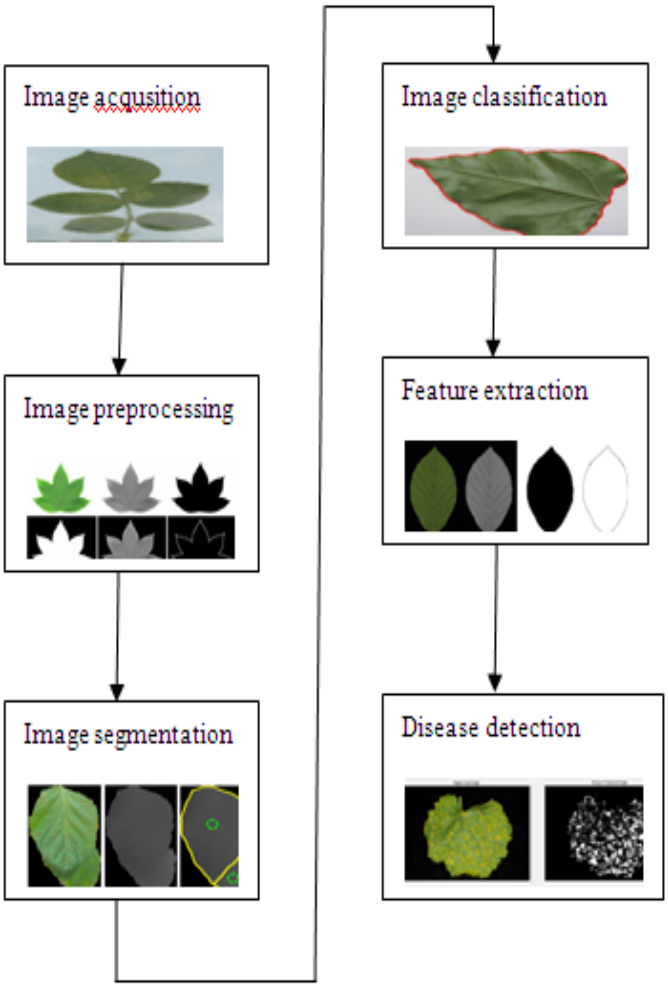

Fig 1: System Architecture

4. Dataset :

The proposed integrated concept is used to detect plant leaf diseases. For this, we have considered the expert dataset having leaf of thirteen different types of diseases (Eyespot ,Leaf Scald, Mosaic, Orange Rust ,Pokkah Boeng , Ratoon Stunting, Red Rot ,Ring Spot, Smut, Yellow Leaf ,brown stipe). In this concept, we have considered the dataset images of mainly fungal and bacteria, Viral affected leaf images. Yellow virus is bacteria affected to leaf. Gummerealla sacharri, Fungal Leaf Spot and Fungus Anthracnose are fungus affected leaf diseases. In this dataset, some healthy leaf images are also considered for the evaluation of results.

Figure 1: Leaf suffering from leaf scald disease

Figure 2: Leaf suffering from brown stripe disease

Figure 3: Leaf suffering from downy mildew disease

5. Conclusion:

In this paper, approach based on image processing to first detect and then classify leaves according to diseases is used. Here, image acquisition is performed by considering RGB color disease affected leaf image. Pre-processing of an image is done to enhance the image using filtering. Image segmentation is performed by making use of threshold value. Image feature extraction is performed to obtain the features of leaf disease symptoms. Image classification is performed using Decision tree (DT). Dataset of plant leaf affected from the diseases of Brownstripe, Ring Spot, Leaf scald and downy mildew are considered. These diseases are mainly of fungal,viral and bacterial diseases. In existing concept, SVM is implemented with ACO to improve the disease detection results. In proposed system we are using DWT algorithm to improve the disease detection by improving the pixel range of the image. So, we say that proposed image processing concept is efficient enough to determine the plant diseases.

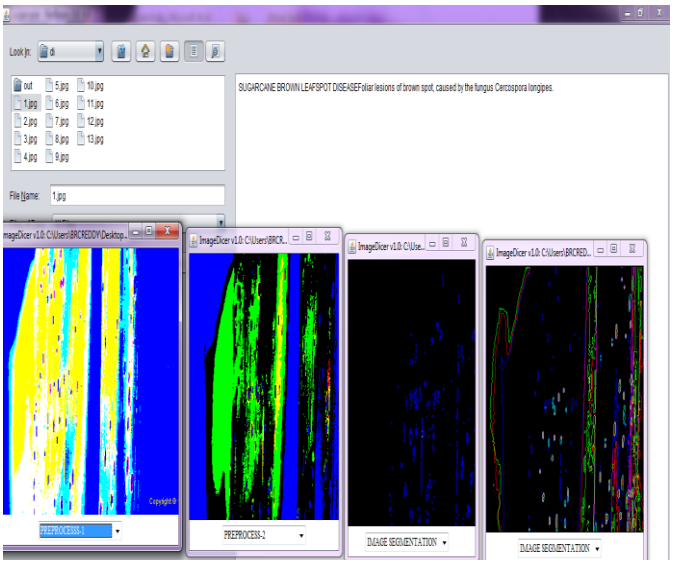

Figure 4 : Detection of disease

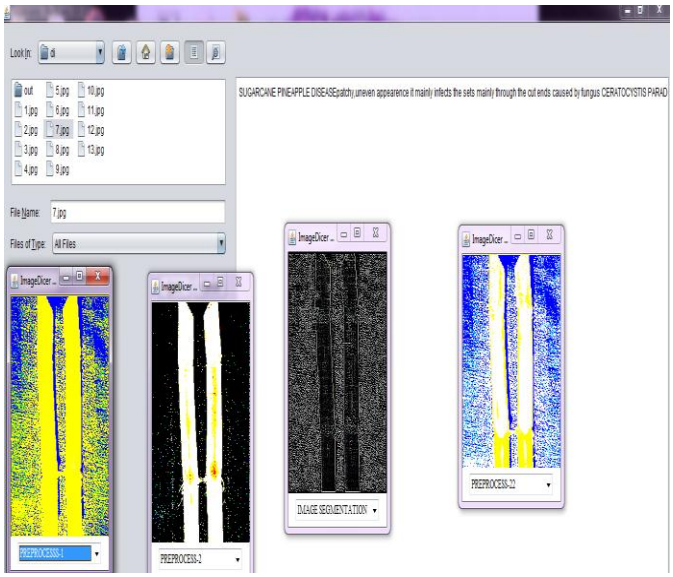

Figure 5:screenshot of disease detection

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