SURVEY ON CROP DISEASE DETECTION

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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. Many researches are actively being pursued on this field. Here we have considered a few major ones.

***Keywords- Machine Learning*,Disease, image-processing.**

I. Introduction

Plant diseases are generally caused by pest, insects, pathogens and decrease the production to large scale if not controlled within time. To detect the plant diseases a fast automated way is needed. The proposed system mainly deals with detection and prevention of sugarcane diseases. The work proposes an efficient system for identification and classification of 6 major sugarcane diseases. After detecting the disease,the name of disease with its remedies will be provided to the farmer.

The soft computing techniques are helpful in developing the knowledge based systems, may be effectively utilized to develop the expert system. The proposed system will be helpful for farmers to find the solutions to their farming problems.

The complete system can be processed in two different phases. The first phase is about getting the input from farmers that is images of their crop, processing the image, segmenting the image, extracting the features from image and then comes the detection and classification of plant disease. The second phase is about providing the service to the end user that is to the farmer.

II. LITERATURE SURVEY

In the paper Novel Machine Learning Based Approach For Detection And Classification Of Sugarcane Plant Disease By Using DWT. Presented at IRJET Vol.4 in 2017 by B Sravya Reddy, R Deepa, S Shalini and P Bhagya Divya.

In this paper the disease detection is done by using Discrete wavelength transform (DWT) algorithm. There are some set of diseases in the database which 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 leaf images and those are used to identify the affected areas in a leaf. There are different types of techniques used to process those images to get different and useful features needed for the purpose of analysing later.

The methodology discussed in this paper is given below in step by step approach for the proposed image recognition and segmentation process.

- Image Acquisition

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

- 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.

- 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.

- 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).

- 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 .

- 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.

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 colour 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).

In the paper Detecting Sugarcane Borer Diseases Using Support Vector Machine. Published by Tisen Huang , Rui Yang, Wenshan Huang , Yiqi Huang and Xi Qiao in the year 2017.

This paper addresses a specific disease called Stem Borer disease that infects a sugarcane plant, where the larvae feeds on the stem. From the images, the sugarcane borer diseases are characterized by different sizes of approximate elliptic wormhole and theirs color are black.

Considering that there was a sag in the wormhole, which was not sensitive to the light reflection, so the grey value of wormhole is lower and closer to black, while other parts are higher and closer to white or cinereous because of the high exposure.

Preprocessing of image is done as follows:

1) The target image and part area of the target were obtained by segmentation which the threshold was 150, and the connected domain was divided into disconnected area, then the largest area which was selected by area method was the target area of sugarcane seed. This step mainly reduced the influence of the background on the segmentation result and achieved the sugarcane target region which includes some noises and the wormhole target.

2) Now select the wormhole. Removed the region which area of 1 and selected the region corresponding to the minimum average grey value for the wormhole after calculating the area and average grey value of each non-connected region. As a result, the region corresponding to the minimum average grey value was the result that we segmented.

Classification is done using SVM.

The selection of the SVM has been carried out taking into account the computational resources was required by it for making a decision. But, the SVM approach has a good classification effect.

The minimum average grey value and the corresponding minimum grey value can effectively avoid miscalculation of pseudo diseases for the wax and leaf scar. Compared to RBF kernel function and Polynomial kernel function, the recognition rate is more stable and reliable when RBF kernel function as inner product function. This shows that the RBF kernel function can be used as the kernel function of the support vector machine to solve the problem of sugarcane borer disease detection.

In the paper An Algorithm for Plant Diseases Detection Based on Color Features.By Mosbah El Sghair, Raka Jovanovic, Milan Tuba published at IJAS Vol.2 in 2017.

In this paper four different color models were tested and compared: RGB, YCbCr, HSI color model. Median filter is employed for image smoothing (Noise reduction). Kapur's thresholding for plant diseases detection was proposed.

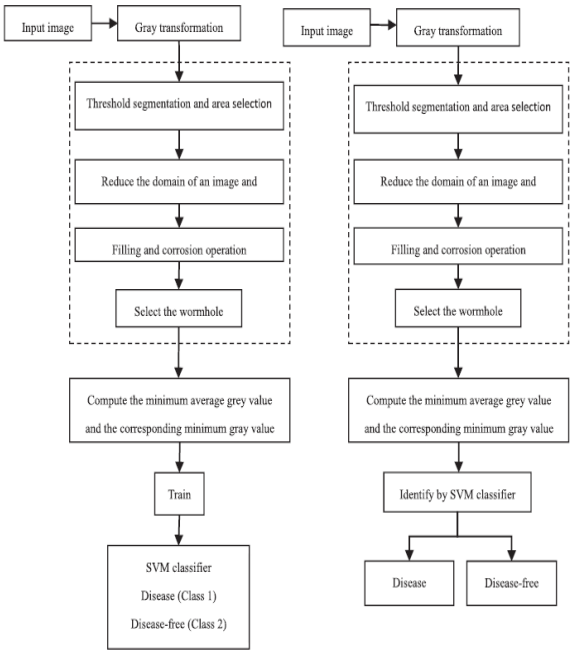

Fig 2: Flow chart for Image Processing.

In plants, leaf vein is totally different in intensity and disease spot is different in color compared to plant leaf. Therefore if Kapur's method is applied on grayscale image, vein will be detected in binary image with the disease spot. However the region of interest is simply disease spots, not vein. For minimize the effect of presence of vein, RGB color model is not suitable for segmentation. Thresholding method are often applied on color element to discover disease spot accurately.

The next step in proposed algorithm is image smoothing. During image assortment, some noise is also introduced due to camera flash. This noise might have an effect on the detection of disease. To remove unneeded spots, image smoothing technique is required. In this paper adjusted median filter is employed for this purpose.

After image smoothing, a method to detect and isolate the disease spot is required. It is necessary to find a threshold value that will differentiate the disease spots from plant leaf. One of the most used method for thresholding is Kapur's method that is based on the entropy. This method maximize the amount of information between the two parts of a intensity histogram that are separated by concrete threshold value or better to say maximize the entropy measure of the part of the histogram in order to each part has a more centralized distribution.

In this paper a method based on different color modelsand Kapur's thresholding for plant diseases detectionwas proposed. Four different color models were testedand compared: RGB, YCbCr, HSI and CIELAB color model. The best results were obtained when HSI color model was used. Component H was used for image segmentation where diseases were separated from the leaf. Median filter was applied to color transformed image. At the end, disease spots area are determined

by applying Kapur's threshold on different color components. Experimental result shows that noise that is introduced due to background, vein and camera flash makes the least problem for HSI color model. Following this technique totally different disease spots are detected accurately and results do not seem to be laid low with background, sort of leaf, type of disease spot and camera.

In the paper Sugarcane Disease Detection Using Data Mining Techniques. Published by S Sathiamoorthy, R Ponnusamy, M Natarajan in the year 2018. In this paper, the R-Dataset is used as a benchmark database to perform experimental study to find out the diseases which affects the sugarcane leaf. Classification algorithms like J48, pruned tree and Multilayer perceptron were analysed and compared with K-means clustering algorithm. These algorithms were implemented in WEKA tool forclassification and clustering.

J48 pruned trees algorithm generates the rules for the prediction of the target variable. With the help of tree classification algorithm the critical distribution of the data is easily understandable. The WEKA tool provides a number of options associated with tree pruning. In case of potential over fitting pruning can be used as a tool for précising. In other algorithms the classification is performed recursively till every single leaf is pure, that is the classification of the data should be as perfect as possible. This algorithm it generates the rules from which particular identity of that data is generated. The objective is progressively generalization of a decision tree until it gains equilibrium of flexibility and accuracy.

Basic Steps in the Algorithm:

i. In case the instances belong to the same class the tree represents a leaf so the leaf is returned by labelling with the same class.

ii. The potential information is calculated for every attribute, given by a test on the attribute. Then the gain in information is calculated that would result from a test on the attribute.

iii. Then the best attribute is found on the basis of the present selection criterion and that attribute selected for branching.

In this paper An Identification Of Crop Disease Using Image Segmentation published by K. Vinoth Kumar and T. Jayasankar in the year 2018. In this paper the methodology is broken down into two segments:

(a) Image Processing Segment: Where the properties of the leaf image will be enhanced segmented from the background.

(b) Pattern Recognition Segment: Where the required features will be extracted and this information will be matched with the predefined knowledge about the plant diseases for detecting which disease has actually affected the plant.

Pattern recognition further includes:

Feature Extraction: It is the procedure of outlining a set of necessary features, or image characteristics that form the core element which when represented in an efficient or meaningful manner give the required information that is important for analysis and classification purpose.

Disease Identification: It is the process of understanding the meaning of the feature extracted from the image and matching the extracted information with the predefined set of rules and thus coming to a conclusion. The result of the computation is obtained in this step.

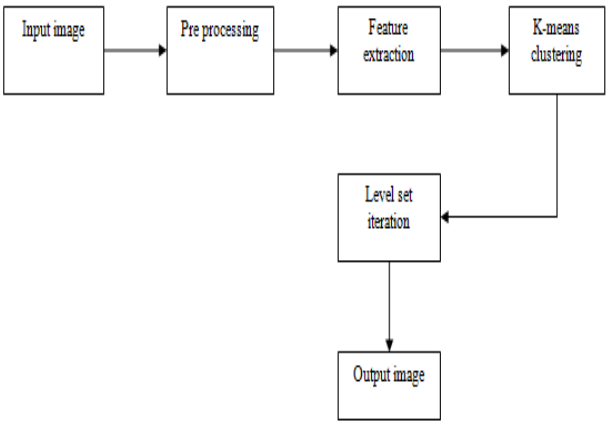

Fig 2: Flow chart for pattern recognition.

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