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DETECTION OF DISEASES IDENTIFICATION IN COTTON PLANTS USING K-MEAN CLUSTERING METHOD

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Abstract- There's a variety of development which has been made regarding digital image processing and machine learning algorithms which also include its various applications. Now we are living in an era where the problem regarding agriculture is a major issue nowadays. Diseases are decreasing the production of the plants. Crop cultivation plays a vital role in Agriculture. Above 70 % of the people are in the agriculture field. Currently, the inefficient of the food materials are appropriate by the crop infection, where the production rate is reduced. It is because of the pesticides used in the agriculture field that leads to the diseases among the plants. This work explores the leaf detection and finds whether it is affected by the diseases or not. That makes the initial step to controlling the disease from spreading. A proposed method of enhanced k means clustering (EKMC) for crop early prediction the plant on image segmentation and masking of the green pixel. And finally, it detects the normal and abnormal leaf.

At present, farmers are identifying and diagnosing the diseases and monitoring the health of plants with their own knowledge and experience. Naked eye observation by farmers and experiments on big plantation area can not be possible each time and it can be expensive too. The major problem in crop growth is we have to take care of the health of the plants and crops .In this report we basically focused on classification of plants as different type of diseases. For this we use clustering algorithm .We also used MATLAB for our project. The proposed system is based on image processing, the infected cotton plant leaf image is first segmented using the K-means algorithm. Then Color and texture features have been extracted from the segmented image. Disease detection through feature classification will be done by support vector machine.

Key words- cotton plant, K-means algorithm, enhanced k means clustering

I. INTRODUCTION

In this project work is exposes to automatic detection of disease on cotton leaves. Cotton is one of the major domains in agriculture which decides economy of the nation. However there are certain issues with field crop like to identify deficiency of nutrition in plants, to identify various diseases, various pests which affect crops. Each issue has an importance. Among one is detection of pests so that proper action should be taken to control it leading to minimize loss. When any of such a condition occurs then farmers aware about the pest, then they can take correct action and control the situation but if farmers does not have correct knowledge, then misidentification of any

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pests can be possible and incorrect controls measure like non-affecting pesticides can be used leading to wasting ofwork and money and most importance it may lead to serious problem to crops. Otherwise, they may approach to any agricultural experts who give them suggestion regarding detection of diseases and increase the crop productivity. But, commonly they may face following situations like: Sometimes they have to go long distances for approaching the expert and expert may not be available at that time. Sometimes, the expert whom a farmer contacts, may not be in a position to advise the farmer with the available information and knowledge**.**

In the image processing area the segmentation of imageplays a major role because it is applied in agriculturalareas to detect and classifies the various leaf diseases.Classification is performed based on their distinctcharacteristics. This work focuses the detection andrecognition of paddy leaf diseases using SVM classifier.K means clustering is used for segmentation of images.This method provides a solution to the early recognitionof diseases. By using this method farmers canautomatically identify the leaf diseases at initial stages. The main purpose is detect the diseased part of the plant.Using MATLAB convolutional neural networks areimplemented in order to classify the diseased part. Aimis to detect the diseased part by finding the optimum waywith minimum cost. In this problem we have considered fundamental five categories of the plant leaf disease which are Alternaria Alternata, Anthracnose, BacterialBlight, Cercospora leaf spot and Healthy Leaves. All ofthese disease belongs to fungal, viral or bacterial type ofthe diseases. In our proposed solution we identify thepercentage of the affected area and identify the disease.Our approach provide the result in minimum time spanwith maximum precision and accuracy in comparison toother existing approaches.

Leaf diseases detection is presented in [1] which using k means clustering to identify the affected areas and classify the disease type using neural network. Image segmentation for leaf region is described using Otsu method in [2], and finally it is graded. The paper [3] presented a visually observable diseases and their symptoms of a particular plant. A work for discriminating three cotton leaf maladies in particular Bacterial Blight, Myrothecium, Alternaria is proposed in[4] in which dynamic shape mode is utilized for Image Segmentation In paper [5] cotton leaf analysis using Principal Component Analysis and KNN Classifier which consists sicknesses like Blight, Gray Mildew, A novel method is introduced for the Cercospora leaf spot detection in sugar beet in [6]. A plant disease detection utilizing neural

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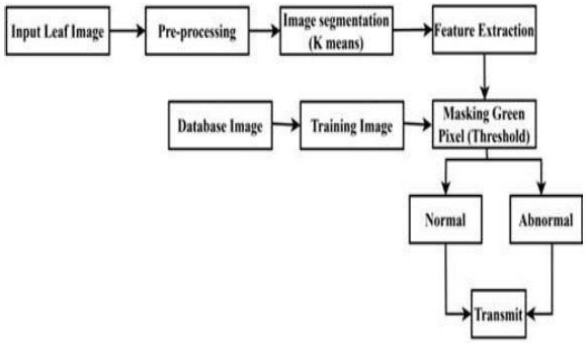
network classifier was demonstrated in [7].An automatic detection of diseases and diseased part presented in the leaf images of plants are discussed in paper [8]. The paper [9] emphasized a software approach of automatic detection and computation of of plant leaf diseases using texture features. The Paper [10] reviews the growth and symptoms of plant diseases.

II. WORKING PROPOSED METHODS

Here, The aim is to detect the diseases in a leaf and give an accurate solution for it by providing a required control measure for the crop by image processing techniques. Initially, the image of various leaves is taken by the camera in a high resolution for better results and efficiency. The proposed image processing techniques include five processes they are:

Image obtained
- Unwanted noise removable
- K means Segmentation
- Extracting the Feature of the leaf
- Masking green Pixel



By using these phases the result is been obtained. The proposed workflow is been summarized as:

1. Initially, the leaf image are incarcerated and accumulated in the database.
2. Then, RGB image acquisition is done.
3. Image segmentation tends to be used by K-means clustering
4. The feature extraction is processed for the image.
5. The fifth step is the masking of the green pixel.
6. The images are been retrieved from the database and find whether the leaf is normal or abnormal.
7. In final, if it is abnormal the message is been transmitted to the farmers through GSM

K-MEAN CLUSTERING

Image segmentation is the process of dividing the images in to different parts i.e. clusters and which is done by using k-means clustering algorithm. K-means clustering algorithm is used to separate the stained part and healthy leaf region. In this, first step is-Load the image into MATLAB from the database, then convert the RGB image into L*a*b* colour space. L* represents the lightness, a* and b* represents the chromaticity layers. All of the colour information is in the a* and b* layers.

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And next step is clustering the variant colours. The Image gets partitioned into three regions by reallocating each pixel to its nearest clusters which reduces the sum of distances and recalculate the centroids of the clusters. Each cluster consists of different segments of leaf image. Three clusters have index values which are used to label the every pixel in the image using results from K means. And next step is creating a blank cell array to store the results of clustering

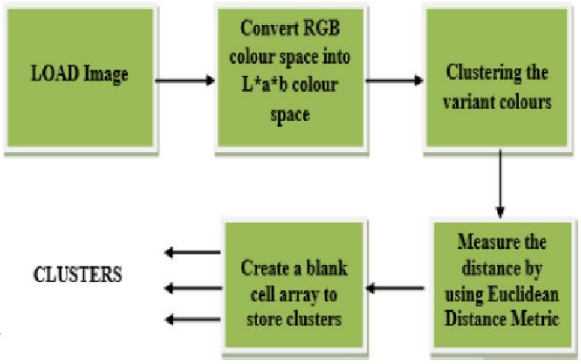

Fig-3.2 K-Means clustering Algorithm

Fig.-3.3 Normal and Diseased Cotton Leaf

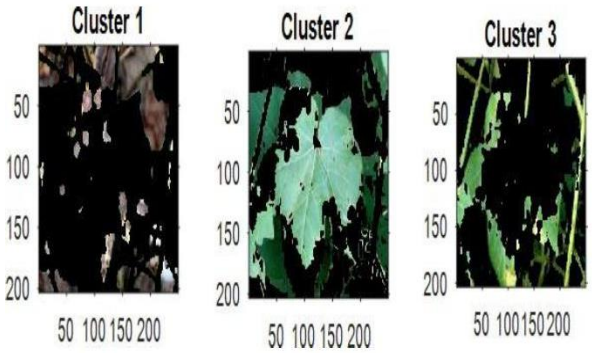

Fig.-3.4 Cotton Leaf Clusters

In user interface plot we have different buttons which are load image, enhance image and segment image. Above GUI is designed in MATLAB using guide command. Load image lets the user to choose image from the dataset. When user select one of the particular diseased or healthy leaf image then that particular image is loaded in the userinterface

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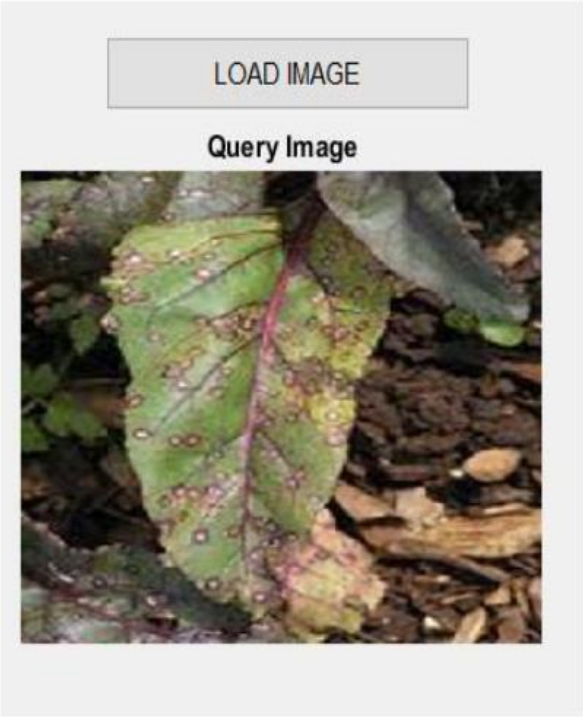


Fig-3.5: Input Image

Above figure shows user the image which is loaded from the input dataset. One of the image corresponding to particular type of the disease is chosen by the user and it gets loaded in the user interface for further process. Query image can be replaced with other images from the input dataset by clicking again on the load image button.

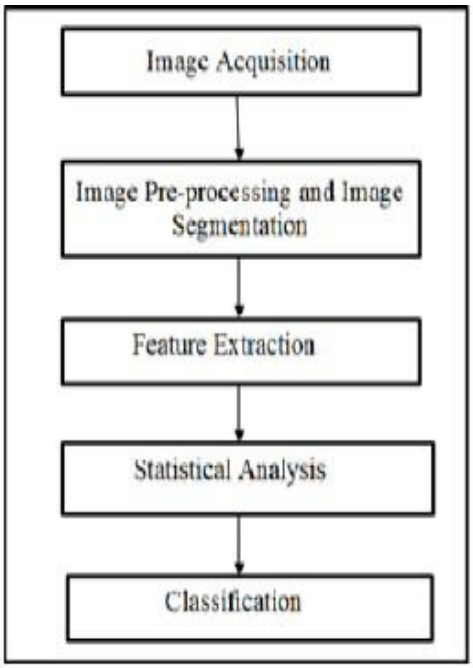
In figure we see the another button named enhance contrast. This tab is basically responsible for the preprocessing of the loaded image before sending it to the segmentation process. Noise reduction and pixel gets more clarified in this phase

Fig-3.6: Enhanced Preprocessed Image

The above figure shows the contrast enhanced image of the input image. In this phase if in any diseased leaf of the plant dark level spot are there then contrast enhancement button highlight those buttons and it gets easy to segment the image into the different clusters for the classification and the prediction of the disease. There is improvement of the unwanted distortions and enhances the features of the image for further process.

The third button named image segmentation is third step in image processing of input image. In this phase main algorithm starts working. K means color based clustering algorithm and the classification using the Otsu method is done in this phase.

PLANT MATERIALS AND DISEASE IDENTIFICATION



;-4.1 Stages for Classification of Diseases

The RGB color images of most frequently encountered Phyto-pathological problems affecting Cotton leaves were captured using camera. Images were stored in.JPG format.

The pre-processing involved the procedures to prepare the images for subsequent analysis. The affected leaf images were converted from RGB color format to gray scale images. Segmentation refers to the process of clustering the pixels with certain properties into salient regions and these regions correspond to different faces, things or natural parts of the things. We proposed k-means segmentation technique to fragment goal areas. Target regions are those areas in the image that represented visual symptoms of a fungal disease.

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RESULTS AND DISCUSSIONS

Fig -5.1: Test RGB

Image The processing scheme consists of test RGB image acquisition from database or web. Image pre-processing includes image enhancement and image segmentation where the affected and useful area are segmented each filter having size of 512 X 512 pixels.

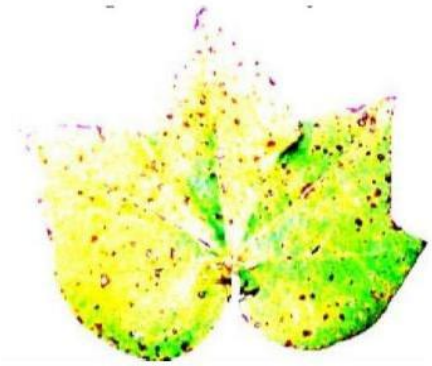

Fig-5.2: Enhance Test image using Histogram Equalization.

Here the size of feature vector is the size of image 512 X 512 pixels. Fig -5.2 shows that Enhance Test image using histogram equalization. Preprocessing the test image using histogram equalization is applied to increase the contrast in low contrast image where, leaf spot is highlight.

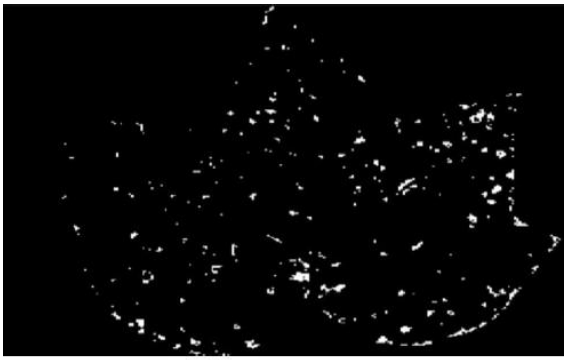

Fig -5.3: Segmentation Result

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CONCLUSION AND FUTURE SCOPE

CONCLUSION

In this project we describe our work concerned with the discrimination between healthy and diseased to cotton crops using an SVM. In this paper, respectively, the applications of K-means clustering have been formulated for clustering and classification of diseases that affect on plant leaves. Identifying the disease is generally the drive of the proposed method. Thus, the proposed process was tested on 2 diseases which influence on the plants; they are: Leaf spot and Leaf miner. These features are very important for the color and morphology of the leaf spots and they provide critical information about its visual representation. By using segmentation technique it is easy for us to extract the features of disease leaf of the image. A new approach based on K-mean features extraction was proposed for cotton leaf recognition in this work. The whole process of leaf classification can be implemented using leaf detection, feature extraction and classification. For studying the proposed method, the composed datasetis used. The dataset contains diseased images. Images were preprocessed and cropped to a fixed standard size. Then, features are extracted from all the leaf images in the dataset using K-mean algorithm. For each image leaf more frequent K-mean key points are extracted to identify a unique feature. It permits finding related features for different image. Ultimately, the extracted K-mean features are rendered to a SVM classifier for purpose of classification. There are distinguishing differences between diseased and non-diseased leaf in structure, color, size etc. Therefore, identification is based on these differences. In other words, differences between diseased and non-diseased leaves and the key points which are extracted from leaf are used for classifying. The different method is performed and the dataset was divided randomly in two parts, 70% for train and 30% for testing.

FUTURE SCOPE

Web based image processing techniques can be implemented. In this user is provide with two modes with and without internet. In case of web base processing remote area users can upload image in system and whole image system techniques and classification algorithm will we implemented in the cloud itself. Real time monitoring of the data is there using the cloud platform

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