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CARDAMOM PLANT DISEASE DETECTION APPROACH USING KNN.

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Abstract

Identification of the plant disease is the key to precludig the losses in the yield and quantity of the agriculture product. The studies of the plant diseases means the studies of visually observable patterns seen on the plant. Health monitoring and disease detection on leaf is very critical for sustainable agriculture. It is very critical to monitor the plant disease manually.It requires tremendous quantum of work and expertise in plant disease and also require the inordinate processing time.Hence,image processing is used for the detection of plant disease. Disease detection involves the steps like image acquisition,image processing,imagesegmentation,feature extraction and classification.This paper discussed the methods used for the detection of plant diseases using leaves images and also discussed some segmentation and the feature extraction algorithm used in the plant disease detection.It dedicated to the automatic estimation of the inflexibility of these diseases.The instant results can be made available to the farmers by designing mobile applications.Online solutions related to plant diseases can be provided by using web portals.

Keywords: Disease Detection,image acquisition,KNN,CNN,machine learning.

I.INTRODUCTION

Therefore in the field of agriculture, detection of disease in plants plays an important role. To detect plant disease in very initial stage, use of automatic disease detection technique.The affected plant has stunted growth and dies within 6 years.Its impact is found in Alabama, Georgia parts of Southern US.The existing method for plant disease detection is simply naked eye observation by experts through which classification and detection of plant diseases is done. For doing so, a large team of experts as well as continuous monitoring of plant is required,

which costs very high when we do with large farms. At the same time, in various countries, farmers do not have an proper facilities or even idea that they can contact to experts. Due to expensive as well as time consuming too. Automatic detection of the diseases by just seeing the symptoms on the plant leaves makes it easier as well as cheaper. This also supports machine vision to provide image based automatic process control, inspection, and robot guidance .Plant disease identification by visual way is more difficult task and at less accuracy and can be done only in limited areas. Whereas if automatic detection technique is used it will take less efforts, low time and become more accuracy.The proposed solution for plant disease identification is computationally less expensive and takes little time in
processing of images through neural networking and find out the description about the disease,then prevent this plant disease by various steps and buying the medical products through mobile web applications.

II.Literature Review

Modern image processing and machine learning based techniques are widely used for the detection of plant disease.Many diagnostic methods used a Conventional neural network(CNN) to detect and identify the diseases.

S. Arivazhagan, R Newlin shebiah, S Ananthi, S Vishnu varthini the approaches and methodologies which are used in this survey includes RGB acquisition: input image and consider the image color according to the RGB Color transformation structure that includes the transformation of colors from RGB to Hue saturation intensity component taken into analysis. Masking green pixels identifies the green colored pixels that based on threshold value. Jayamala k Patil, Rajkumar.To retrieve the related images should be search is done in Two Steps, first step is to matches the images by comparing the standard deviations of three colour components, the second step is to weighted version of the Euclidean distance between the feature coefficients of an image selected in the first step, this reported following important image processing method first one is image clipping and separating the leaf with various spots from the complex background.Amar Kumar dey.deals with leaf rot disease detection for betel vine based on image processing. The proposed methodology has three vital stages the initial stage was the image acquisition stage through which the real world sample is recorded in the digital form using flatbed digital scanner next stage is image processing segmentation classification and leaf area calculation.

Savita N Ghaiwat, Parul Arora.presented an image processing technique for detection and classification of plant disease classification technique deals with classifying each pattern in one of the distinct classes the author suggested so many techniques for classification such as K nearest neighbour classifier probabilistic neural network genetic algorithm support vector machine and principal component analysis artificial neural network Fuzzy Logic the technique is presented using image processing as a tool to enhance the feature extraction of an image by using of local binary pattern .

Ashwini Vedula proposed detection and classification of plant disease using image processing and artificial neural networks in this paper a software solution for fast accurate and automatic detection and classification of plant disease through image processing identification of disease is key to preventing losses in the quality

and quantity of the agricultural product.E-C Oerke.Work expertise in plant diseases requires successive processing time hence image processing is used for the detection of plant diseases, this paper discuss the method used for the detection of plant diseases using the leaves images, and also various techniques to segment the disease part of the plant.Anjali chandavale survey mainly concentrates on disease detection of dicot plants, here the image acquisition is done by taking RGB image pattern as input and transform it into HSI form, after that for texture analysis CCM and SGDM is used. Karthik Ingale proposed fast and accurate method for detection and classification of plant diseases. The proposed algorithm is tested on main five diseases on the plant they are Early Scorch, Cottony mold, Ashen Mold, Late scorch, Tiny Whiteness. Initially the RGB image is acquired then a color transformation structure for the acquired RGB leaf image is created. S. Nalini presented a concept of plant disease classification using image segmentation and SVM techniques. This paper describes an image processing technique that identifies the visual symptoms of plant diseases using an analysis of colored images, work of software program that recognizes the color and shape of the leaf image.Chandra Shekar Mithlesh, Dr. Vivek Baghel describes an approach for disease detection of crop for economic growth of rural area. This paper discussed about an automated system for identifying and classifying different diseases of the contaminated plants is an emerging research area in precision agriculture. This paper describes the approach to prevent the crop from heavy loss by careful detection of diseases. The region of internet is leaf because most of the diseases occur in leaf only. Histogram equalization is used to pre-process the input image to increase the contrast in low contrast image, K-mean clustering algorithm which classifies objects. Disease in crop leaf are detected accurately using image processing technique it is used to analyse the disease which will be useful to farmers.

III.METHODOLOGY

In this study, we proposed a cardamom plant leaf disease detection approach by finding the disease of the plant leaf image by using KNN.CNN,machine learning model is used for the classification.

1. IMAGE ACQUSITION

This involves capturing an image using a mobile phone or scanner, or importing an existing image into a computer.Mobile images have an 2 pixels or more resolution.

DATASET

In this data-set, has 39 different classes of plant leaf images and background images are accessible. The data-set having 61,486 images. We used six different augmentation techniques for increasing the dataset size. The techniques are image flipping, Gamma correction, noise injection, PCA color augmentation,scaling and rotation.There is a total of 39 different Classes that we have to predict using the CNN Model.

Fig 1.Village Plant Leaves Dataset

2.IMAGE PROCESSING

Image processing is any form of processing for which the input is an image or a series of images or videos, such as photographs or frames of video. The output of image processing can be either an image or a set of characteristics or parameters related to the image. It also means "Analysing and manipulating images with a computer". The result might be the image changed by some way or it might be a report based on analysis or result of the images.If the input image is of leaf disease, the system will identify and classify it to Alternaria Alternata, Anthracnose, Bacterial Blight, Cercospora Leaf Spot, and Healthy Leaf.

EDGE DETECTION

The Edge Detector is one of the most widely used image processing tools, paying attention to edges in a very robust way. This is used for the purpose of segmentation of the affected area on the leaf.

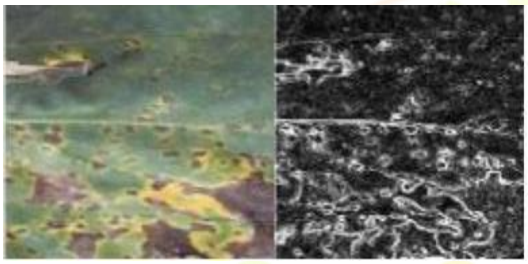

Fig 2.Cardamom plant disease detection using Image processing.

3.IMAGE SEGMENTATION

In this process the leaf disease is segmentated by using the K-means clustering. After the segmentation, in plant leaf green color pixels are masked based on the specific threshold values that are computed using the Otsu's method. Here, the neural network is trained for classification.Image segmentation is a commonly used technique in digital image processing and analysis to partition an image into multiple parts or regions, often based on the characteristics of the pixels in the image.

4. CLASSIFICATION

Based on the signs and symptoms produced by the pathogens .Diseases are classified as rusts, smuts, powdery mildews, downy mildews, root rots, wilts, blights, cankers, fruit rots, leaf spots.

NEURAL NETWORK(CNN)

When it comes to machine learning Artificial Neural Networks perform really well. Artificial Neural Networks are used in various classification tasks like image, audio, words. Different types of Neural Networks are used for different purposes, for example for predicting the sequence of words we use Recurrent Neural Networks more precisely an LSTM, similarly for image classification we use Convolutional Neural Network. In this segment, we build a basic building block for CNN.ConvNets derive their name from the “convolution” operator. The primary purpose of ConvNet is to extract features from the input image. Convolution preserves the spatial relationship between pixels by learning image features using small filters.

1.**Depth**: Depth corresponds to the number of filters we use for the convolution operation.

2.Stride: Stride is the number of pixels by which we slide our filter matrix over the input matrix.

3.Zero-padding: Sometimes, it is convenient to pad the input matrix with zeros around the border, so that we can apply the filter to bordering elements of our input image matrix.

4.Non-Linearity: ReLU is an element wise operation (applied per pixel) and replaces all negative pixel values in the feature map by zero. The purpose of ReLU is to introduce non-linearity in our ConvNet, since most of the real-world data we would want our ConvNet to learn would be non-linear (Convolution is a linear operation element wise matrix multiplication and addition, so

we account for non-linearity by introducing a non-linear function like ReLU).

5.Spatial Pooling: Spatial Pooling (also called subsampling or down sampling) reduces the dimensionality of each feature map but retains the most important information. Spatial Pooling can be of different types: Max, Average, Sum etc. These networks have grown in the number of layers leading to architectures such as RestNet and AlexNet that have been trained on images such as Cifar-10 and then fined tune to other problems, such as plant classification.

Support Vector Machine

Support vectors are data points that are closer to the hyperplane and influence the position and orientation of the hyperplane. Using these support vectors, we maximize the margin of the classifier. Deleting the support vectors will change the position of the hyperplane. These are the points that help us build our SVM.

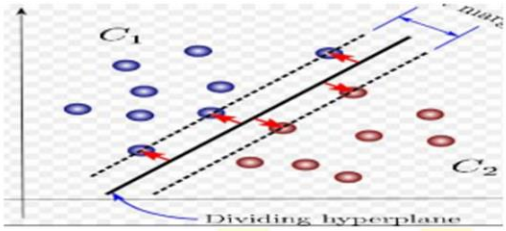

Fig.4 Working of SVM

IV.CONCLUSION

There are number of ways by which we can detect the disease of plants and suggest remedies for them. On one hand visual analysis is low expensive and simple method, it is not an efficient and reliable one. Image processing is a technique which is most spoken for very high accuracy and least time consumption are major advantages offered. The operations of K-means clustering and Neural Networks (NNs) have been formulated for clustering and classify the diseases that effect on plant leaves. Recognize the disease accurately and efficiently is main purpose of the proposed approach. The experimental results indicate that the proposed approach is a valuable approach, which can significantly support an accurate detection of leaf diseases in a little computational effort.To develop the open multimedia (Audio/Video) about the diseases and their solution automatically once the disease is detected.

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