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Leaf Disease Detection Using Image Processing Techniques: A Review

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ABSTRACT

This paper holds a review on leaf infection identification utilizing different picture handling system. Computerized picture handling is quick, solid and exact procedure for identification of infections likewise different calculations can be utilized for distinguishing proof and order of leaf illnesses in plant. This paper presents strategies utilized by various creator to recognize ailment, for example, grouping strategy, shading base picture investigation technique, classifier and fake neural system for grouping of infections. The principle focal point of our work is on the investigation of various leaf infection identification strategies and furthermore gives a diagram of various picture preparing systems.

1. Introduction

India is rural nation and the greater part of populace depends on agribusiness. Agriculturists have extensive variety of choice in Fruit also, Vegetable harvests. The development can be enhanced by mechanical help. Infection is caused by pathogen in plant at any natural condition. In the vast majority of the cases infections are seen on the leaves, foods grown from the ground of the plant, thusly location of malady assumes a vital job in effective development of products. In a large portion of cases plant ailments are caused by pathogens, microorganism, parasites, microorganisms, infections, and so forth. Now and again undesirable condition incorporate soil and water is additionally in charge of ailments in plants.

Utilizing computerized picture preparing technique, the ailment location in plant is effective, less tedious and exact. This procedure spares time, endeavors, works and utilization of pesticides. Diverse creators propose distinctive procedures with the assistance of computerized picture handling for precise plants infection recognizable proof. Loads of calculations have created by various analysts for picture handling. This paper is study on various kinds of picture preparing strategies for discovery and arrangement different leaf maladies.

There are lots of techniques to detect the different types of diseases in plants in its early stages. Conventional method of plant disease detection is naked eye observation methods and it is non effective for large crop.

2. Literature Review

In paper [1] authors present image processing technique for Rice disease identification and considered the two most common diseases in the north east India, namely Leaf Blast (Magnaporthe Grisea) and Brown Spot (Cochiobolus Miyabeanus). Image acquisition is basic step, after that author use segmentation, boundary detection and spot detection method for feature extraction of the infected parts of the leave. In this paper author introduces zooming algorithm in which SOM (Self Organising Map) neural network is used for classification diseased rice images. There are two methods to make input vector in SOM. First method is the padding of zeros and the second method is the interpolation of missing points. For fractional zooming to normalize the spots size, interpolation method is applied. Image transformation in frequency domain does not give better classification. For testing purposes, four different types of images are applied; the zooming algorithm gives satisfactory results of classification for test images.

In paper [2] authors present image-processing technique for Leaf & stem disease detection. The author used a set of leaf images from Jordan's Al-Ghor area. The five plant diseases namely: Early scorch, Ashen mold, Late scorch, Cottony mold and Tiny whiteness is tested by image processing technique. In this technique at starting, image acquisition is obtained and then K-Means clustering method is used for segmentation. After that in feature extraction, CCM (Colour Co-occurrence Method) is used for texture analysis of infected leaf and stem. Lastly paper presents Back propagation algorithm for neural network in classification of plant diseases. Result of this image processing technique shows accurate detection and classification of plant diseases with high precision around 93%.

In paper [3] authors present image processing technique for detecting the Malus Domestica leaves disease. Intensity values of grayscale images are obtained by histogram equalization method. In image segmentation, Co-occurrence matrix method algorithm is used for texture analysis and Kmeans clustering algorithm is used for color analysis. Texture analysis is characterization of regions in an image by texture content. Color analysis refers to minimizing the sum of squares of distance between objects and class centroid or corresponding cluster. In threshold matching process individual pixels value is compared with threshold value, if value is greater than threshold then it is marked as object pixel. The texture and color analysis images are compared with the previous images for detection of plant diseases. Author will use Bayes and K-means clustering in future.

In paper [4] authors present image processing techniques for detecting the Bacterial infection in plant. Common infection seen on plant is Bacterial leaf scorch and early detection of this helps in improvement of plant growth. The image processing starts with image acquisition which involves basic steps such as capturing of image and converting it to computer readable format. Then clustering is done to separate foreground and background image with help of K-means clustering method in image segmentation. Clustering is based on intensity mapping and leaf area highlighting is done by subtracting the clustered leaf images from base images. Compared to Fuzzy logic, K-means clustering algorithm is simple and effective in detecting the infected area.

In paper [5] authors present image processing technique for Orchid leaf disease detection. Black leaf spot and Sun scorch are two types of orchid leaf diseases mostly found. The basic step of image processing is image acquisition for capturing images and stores it in computer for further operation. Image pre-processing involves histogram equalization, intensity adjustment and filtering for enhancing or modifying the image. Three morphological processes are used in border segmentation technique for remove small object and preserve large object in image. Thresholding in segmentation is used for start and stop point of line to trace edges. Author added ROI (region of interest) in GUI. After the border segmentation process a classification is done by calculating white pixels in image.

In paper [6] authors present image processing technique for Groundnut plant disease detection. Groundnut plant has two major diseases namely: Early leaf spot (Cercospora) and Late leaf spot (Cercosporidium personatum). After obtaining leaf images in RGB are converted to HSV color images. Green colored pixels in image are found out to reduce processing time. In color and texture feature extraction analysis, co-occurrence matrices technique is used. In texture feature extraction there are two ways to analyze the texture images. First method is structured approach and second method is statistical approach. Author used statistical approach in this paper. Back propagation algorithm is applied for classification and recognition of groundnut diseases. In back propagation two type of phase are there namely: 1) propagation and 2) weight update. Authors classified four different diseases with 97 % of efficiency.

In paper [12] authors described plant disease recognition technique, in which first phase is to create color transformation structure for the RGB leaf image and convert color values from RGB to the space specified in that structure. Then apply color space transformation and image is segmented using the K-means technique. In the second phase called as Masking of green pixels, the unnecessary part such as green area within leaf area is removed. In third phase authors calculate the texture features for the segmented infected object also remove masked cells inside the boundaries of the infected cluster. Infected cluster are converted from RGB to HSI and SGDM matrix is generated for H and S. In the fourth phase GLCM function is used to calculate the features and compute of texture statistics. Finally, the extracted features are passed through pretrained neural network for disease recognition.

3. Conclusion

The study on leaf ailment discovery and characterization systems utilizing picture preparing. Unique creators utilized diverse calculations for exact discovery of maladies. Favorable position of utilizing picture handling technique is that the leaf maladies can be distinguished at its beginning time. For enhancing acknowledgment rate, a large portion of analysts utilized fake neural systems and classifiers like ANN, SVM, and so forth. All strategies in this paper spare time and give proficient result.

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