A Survey on Plant Leaf Disease Detection Using Image Segmentation based on Clustering with Artificial Neural Network Technique

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Abstract - This research work present survey on plant leaf disease detection using Image Segmentation based on clustering with Artificial Neural Network technique. Disease in crops causes significant reduction in quantity and quality of the agricultural product. Identification of indications of disease by stripped discernment is problematic for farmer. Crop fortification exclusively in huge farm house is done by using computer image processing technique that can detect diseased leaf using color information of leaves.

Keywords - leaf disease, k-means clustering, Image segmentation, Neural network.

1. INTRODUCTION

Creating nations like India the economy is significantly depend upon farming. Developing countries like India the economy is greatly depend on agriculture. The quantity and quality of agricultural merchandise is concentrated due to plant disease. Plant disease is caused by micro-organism like fungi and bacteria .the lifecycle of micro-organism is unable to predict .some disease do not have visibility during early stage it only appear that final stage. The prediction of plant disease by naked eye is used in practice but results are subjective and disease extent is not precisely measured. Nowadays automatic detection of plant disease is an important research topic and thus automatically detects the diseases from the symptoms that appear on the plant leaves. Depending on the applications, many image processing technique has been introduced to solve the problems by pattern recognition and some automatic classification tools. In the next section this papers present a survey of those proposed systems in meaningful way.Some following Points are:

2. LITERATURE SURVEY

The various approaches for detecting the disease in plant leaf using image processing technique is described in this section

Vijai Singh et all [1] describe the plants plays an important role in agriculture field, as having disease in plants are quite natural. If proper care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is affected. For instance a disease named little leaf disease is a hazardous disease found in pine trees in United States.

Detection of plant disease through some automatic technique is beneficial as it reduces a large work of monitoring in big farms of crops, and at very early stage itself it detects the symptoms of diseases i.e. when they appear on plant leaves. This paper presents an algorithm for image segmentation technique which is used for automatic detection and classification of plant leaf diseases. It also covers survey on different diseases classification techniques that can be used for plant leaf disease detection. Image segmentation

Amar Kumar Deya et all [2] discuss leaf rot disease detection for betel vine (Piper betel L.) based on image processing algorithm. The measurement of plant features is a fundamental element of plant science research and related applications. The information related to plant features is especially useful for its applications in plant growth modeling, agricultural research and on farm production. Few methods have been applied in leaf rot disease detection for betel vine leaf (Piper Betel L.). Traditional direct measurement methods are generally simple and reliable, but they are time consuming, laborious and cumbersome. In contrast, the proposed vision-based methods are efficient in detecting and observing the exterior disease features. In the present investigation, image processing algorithms are developed to detect leaf rot disease by identifying the color feature of the rotted leaf area. Subsequently, the rotted area was segmented and area of rotted leaf portion was deduced from the observed plant feature data. The results showed a promising performance of this automatic vision-based system in practice with easy validation.

A.P Soni et all [3] Proposed a The green heart shaped betel leaf, in India it is known as Paan. It is useful in number of traditional remedies such as weakness of nerves, stomach disorder, headache, respiratory disorders, constipation, sore throat, inflammation, scanty or obstructed urination and wounds. There are many more traditional uses of the betel leafs. This paper includes the easy, accurate, and less expensive method of leaf area measurement. Leaf area of plants is a useful tool in physiological and agronomic studies. Investigation of betel leaf area is done over 100 leaves out of which some are included in this paper. Results are compared with the

graphical technique of leaf area measurement. The advantage of this method is the easiness and the stability of precise estimation of area.

Pawanp.warne& et.al., [4] describes the approach to prevent the crops from heavy loss by careful detection of disease. In cotton, diseases in leaf are critical issue because it reduces the production of cotton. The region of interest is leaf because most of diseases occur in leaf only. The diseases that occur in cotton leaf are Alternaria, Cercospora and Red Leaf Spot. Histogram equalization is used to preprocess the input image to increase the contrast in low contrast image, K-means clustering algorithm which classifies objects. Segmentation is based on a set of features that partition the preprocessed image into number of classes and finally classification is performed using Neural-network. Disease in cotton leaf are detected accurately using image processing technique.It is used to analyze the cotton diseases which will be useful to farmers.

Daisy shergill& et.al.,[5] describes a approach is useful in crop protection especially in large area farms, which is based on automated techniques that can detect diseased leaves using color information of leaves. The disease can be detected by capturing an image of a certain plantleaf followed by extracting feature from the captured image. First the captured RGB image is converted to gray image &then gray image is resized and perform canny edge detection, apply various comparison techniques, which detect the presence of disease and also the type of diseases . it enables early control and protection measures for specific diseases.

MalvikaRanjan& et.al.,[6] describes a diagnosis process that is mostly visual and requires precise judgment and also scientific methods. Image of diseased leaf is captured .As the result of segmentation Color HSV features are extracted. Artificial neural network (ANN) is then trained to distinguish the healthy and diseased samples. ANN classification performance is 80% better in accuracy.

RenukaRajendraKajale [7] describes the approach for detection and computation of texture information for plant leaf diseases. The processing system consists of four main steps, color image is converted to HSI, then the green pixels are masked and removed using specific threshold value, then the preprocessed image is segmented and the useful segments are extracted, finally the texture information is obtained. The diseases present on the plant leaf are evaluated based on the texture information.

Prakash M. Mainkar& et.al.,[8] provides a software solution to automatically detect and classify plant leaf disease. This approach will increase productivity of crops. It includes several steps that are image acquisition, image preprocessing, segmentation, feature extraction and classification.

Mr. Sachin B. Jagtap& et.al., [9] describes a system consists of four stages; the first stage is the image enhancement, which includes, histogram analysis, HSI enhancement and intensity adjustment. Fuzzy c-means algorithm is used for segmentation of captured image. Color, shape of spot, size is three features used to extract features from leaf. Then classification is based on back propagation based neural networks.

Niket Amoda& et.al., [10] provide image processing based solutions that are automatic, cheap, and accurate. Solution is composed of four main steps; in the first step the RGB leaf image is transformed to other color model. Next, in the second step, the transformed images are segmented to obtain better information .the K-means clustering techniques used for segmenting the input image. In the third step, the features based on texture of leaf for the segmented infected objects are calculated. Finally, in the fourth step the classification is done by using pre-trained neural network based on the result of feature extraction.

SmitaNaikwadi&et.al.,[11]describes the approach that has different steps. In first step, mostly green colored pixels are identified. Next, based on specific threshold values green pixels are masked. Otsu's method computes threshold value to mask the green pixels. The other additional step is that the pixels in the image which has zero RGB values and infected cluster (object) pixels at boundary were completely removed. This is the robust technique for the detection of plant leaves diseases. The precision of this technique for classifying diseases is between 83% and 94%.

Anand.H.Kulkarni et.al., [12] describes the approach begins with capture of leaf the images from agricultural field. Gabor filter is used segment the input image before feature extraction. Then segmentation of input image is done to extract the texture information and color features .proper selection of the feature values to train artificial neural network to exactly distinguish the healthy and diseased samples leaf correctly. ANN based classifier has accuracy of 91%

3. CONCLUSION

This paper presents a survey on different method for plant leaf disease detection using image processing technique There are many methods in automated or computer vision for disease detection and classification but still there is lack in this research topic. All the disease cannot be identified using single method .The future work is to develop a method for processing an image that acquired with different background.

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