A Survey on Plant Leaf Disease Detection Using Image Processing Techniques

M.Malathi [1], K.Aruli [2], S.Mohamed Nizar[3], A.Sagaya Selvaraj[4]

[1] *Student, M.E-Applied Electronics, IFET College Of Engineering, Tamilnadu*

[2] *Student, M.E-Applied Electronics, IFET College Of Engineering, Tamilnadu*

[3] *Associate Professor Electronics and Communication Engineering, IFET College Of Engineering, Tamilnadu*

[4] *Associate Professor Electronics and Communication Engineering, IFET College Of Engineering, Tamilnadu*

---***---

Abstract - *This paper provides survey on plant leaf disease detection using image processing techniques. Disease in crops causes significant reduction in quantity and quality of the agricultural product. Identification of symptoms of disease by naked eye is difficult for farmer. Crop protection especially in large farms is done by using computerized image processing technique that can detect diseased leaf using color information of leaves.*

Key words: leaf disease, k-means clustering, HSI, Neural network.

1. INTRODUCTION

Developing countries like India the economy is greatly depend on agriculture. The quantity and quality of agricultural product is reduced 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.

2. LITERATURE SURVEY

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

Pawanp.warne& et.al., [1] 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.,[2] 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.,[3] 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 [4] 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.,[5] 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., [6] 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., [7] 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.,[8]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., [9] 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.

REFERENCES

[1]   PawanP.Warne, Dr.S.R. Ganorkar" Detection of Diseases on Cotton Leaves Using K-Mean Clustering Method", *International Research Journal of Engineering and Technology(IRJET)* Volume: 02 Issue: 04 | July-2015, 425-431.

[2   ]Daisy Shergill, AkashdeepRana, Harsimran Singh "Extraction of rice disease using image processing",*International Journal Of Engineering Sciences & Research technology,*June, 2015,135-143.

[3   Malvika   Ranjan1,   Manasi   Rajiv Weginwar,NehaJoshi,Prof.A.B. Ingole**,** detection and classification of leaf disease using artificial neural network,*International Journal of Technical Research and Applications* **e-**ISSN: 2320-8163, Volume 3, Issue 3 (May-June 2015), PP. 331-333

[4   RenukaRajendraKajale. Detection & recognition of plant leaf diseases using image processing and android o.*s "International Journal of Engineering Research and General Science Volume 3, Issue 2, Part 2, March-April, 2015.,*ISSN 2091-2730

[5   Prakash M. Mainkar, ShreekantGhorpade, MayurAdawadkar", Plant Leaf Disease Detection and Classification Using Image Processing Techniques",*International Journal of Innovative and Emerging Research in Engineering Volume 2, Issue 4, 2015,139-144

[6   Mr. Sachin B. Jagtap, Mr. Shailesh M. Hambarde," Agricultural Plant Leaf Disease Detection and Diagnosis Using Image Processing Based on Morphological Feature Extraction", *IOSR Journal of VLSI and Signal Processing (IOSR-JVSP) Volume 4, Issue 5, Ver. I (Sep-Oct. 2014), PP 24-30.

[7   NiketAmoda,   Bharat   Jadhav, SmeetaNaikwadi,"Detection And Classification Of Plant Diseases By Image Processing",*International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 2, April 2014.

[8   SmitaNaikwadi, NiketAmoda**,"** Advances In Image Processing For Detection Of Plant Diseases,"*International Journal of Application or*

Innovation in Engineering & Management (IJAIEM) Volume 2, Issue 11, November 2013.,168-175

[9]   Anand.H.Kulkarni, AshwinPatil R. K., applying image processing   technique to detect plant disease. *International Journal of Modern Engineering Research (IJMER) Vol.2, Issue.5, Sep-Oct. 2012 pp-3661-3664 ISSN: 2249-6645*