

A Survey On Detection Of Unhealthy Region Of Plant Leaves By Using Image Processing

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Abstract - Detection of disease of plant leaves is emerging field in India as agriculture is important sector in Economy and Social life.To finding out which disease affect the plants, mainly the farmer contact the expert for the solution. The expert gives the advice based on its knowledge and information but sometimes seeking the expert advice is time consuming, expensive and may be not accurate. So to solve this problem, Image processing techniques gives the accurate and fast solution. Such techniques are beneficial for farmer as disease detection of leaves possible with minimal time and the accurate action are carried out in appropriate time. There are many image processing techniques we can use such as Artificial Neural Network, Probabilistic Neural Network, Genetic algorithm, Back propagation neural network and Support vector machine (SVM). In this survey paper we have discussed existing segmentation method along with classifiers for detection of plant leaves.

Key Words: k means cluster; pattern recognition; support vector machine(svm).

1.INTRODUCTION

The existing method for detecting diseases of plant leaves is simply the naked eye observation by experts through which identification and detection of plant leaves diseases is done.Detection and Classification of unhealthy region of plant leaves is an important task for the increasing plant productivity and economic growth. Images of the infected part of the leaves i.e the image of the leaves captured by the digital camera.those images are preprocessed using image histogram equalization, filtering, color transformation and segmentation techniques to detect infected part of the leaves. Then the infected leaf has been used for the classification purpose using Support Vector Machine classifier. This can be achieved by getting the diseased part of a leaf based on the K means clustering method to segment the leaf area and affected area. Image processing technology in the agricultural research has made significant development. To recognize and classify unhealthy region of plant leaves an automated system has been implemented using image processing techniques and pattern recognition techniques.

1.1 Types Of Disease

There are varieties of disease spots which tend to resemble each other and can easily be confused with one another by inexperienced people. Misunderstanding one spot for another can be quite catastrophic as application of the wrong fungicide will result in loss of money without the plant being treated and allowing more time for the disease to spread further.

1) Red Rot: The disease first appears as red bright lesions on mid rib of leaves and shows itself as drooping and changing of color of upper leaves. Withering of the leaves proceed downwards. Usually third or the fourth leaf from the top is affected and shows drying at the tip. The pith becomes red and later on brown.

2) Leaf Spot: The disease may be characterized itself on leaves as small lesions, which gradually enlarge along mid rib and assure dark red to brown color. In severe infection, the leaves become dry affecting photosynthesis.

3) Yellow Spot: There exist two types of Yellow Spot. The first type of spot is yellow in color. However, in certain varieties of leaves with red stalks, the spots appear as red. Despite the color, both types have the same physical characteristics. They are irregular in shape and dimension. They can vary from minute dots to spots attaining 1 cm in diameter.

4) Brown Spot: Brown spot causes reddish-brown to dark brown spots on leaves. The spots are oval in shape, often surrounded by a yellow halo and are equally visible on both sides of the leaf. The long axis of the spot is usually parallel to the midrib. This spot often tends to be confused with the Ring Spot.

2. LITERATURE REVIEW

Many research papers are describing the advancement of image processing for a variety of methodologies.

Arti N. Rathod [1] proposed a system for detecting unhealthy part of the plant using Image Processing and

Neural Network. In this study made the efficient use of neural networks and ayes theorem to detect the infected leaf and identify the disease. But the complexity of neural network computation is too high.

H. Al-Hiary [2] proposed a system which fast and accurate detect and classifies the plant disease. In this study works on individual feature with the help of Otsu's method. But working on individual pixel increases the complexity of the system and there by hamper the accuracy of the system.

Anand K. Chaudhari [3] proposed a system for disease spot detection on plant leaf by using color transform based approach. In this study comparison of the effect of CIELAB, HSI and Ycbr color space in this process of disease spot detection is done. But color transformation does not 100% accuracy as the image color can be manipulated due to wrong angle image capture or brightness and darkness can affect the image color quality which decreases the reliability of system to detect accurate diseases.

Akanksha Rastogi [4] Proposed a system for disease spot detection on plant leaf and also the leaf scorch in hydrangea and maple in efficient and effective manner using various tools like GLCM, Artificial neural network, and k-means clustering. But in this system they do not have the ability to learn and adapt after solving problem. It require extensive testing this is the one of the demerits of this system.

Md Nazrul Islam [5] proposed a system for detecting diseases on tomato plant i.e. early scorch, late scorch and leaf spot on the tomato plant with the help of PNN i.e. Probabilistic Neural Network and the GLCM feature along with fuzzy logic. Which makes this system valuable, accurate and little computational effort. But the recognition rate varies for the dynamic image acquisition And also required more learning time need to maintain huge leaf.

S. Arivazhagan [6] proposed system for detecting disease on various plant i.e. early scorch , late scorch, brown spots and yellow spots using S.V.M. Classifier which improves the accuracy of the system to 94.7% by using S.V.M. which is the major advantage of the proposed system, And also require little computational effort. But it requires extensive memory therefore due to this lack of transparency occur and algorithmic complexity goes high.

K. Muthukannan [7] proposed system for detecting almost all disease in bean and bitter ground leaf by using tools like Feed Forward Neural Network (FFNN), Learning Vector Quantization (LVQ) Radial Basis Function Networks (RBF). This FFNN classification approach in proposed system provides better result. The network are easy to maintain and avoid the data even if it is noisy and quickly work it out. But it do not provide explanation and also not used for the little data.

Sanjay Dhaygude [8] proposed system for detecting diseases using various image processing techniques like HSI, Segmentation, Color co-occurrence,

matrix, texture which increases the recognition rate of classification process and also the extension of this work will focus on developing algorithms. But it is Time consuming process.

Smita Naikawadi [9] proposed a system detecting diseases in plant in which automatic detection and classification of plant disease takes place successfully with precision between 83% and 93%. In this system otsu method compute threshold value to mask the green pixel. The other additional step is that the pixel in the image which has zero RGB values and the infected cluster pixels at boundary were completely removed. This is the robust technique for the detection of unhealthy region leaves. But in biological science sometimes thousand of image generated in single experiment. These images can be required for further studies like classifying lesion and also calculating area eaten by insects. Almost all these tasks are processed manually, it also suffers from major issues of excessive processing time.

3. CONCLUSION

Recognizing the disease is main purpose of the proposed system. The result shows the valuable approach which support accurate detection of the diseased leaf. Image processing technique is applied to detect the affected part of leaf from the input image. K-means algorithm is used for clustering of images. Disease detection is the main motive of this system. Thus this technique would be useful for saving the farmers from huge loss.

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