

Plant Leaf Disease Detection System Using Image Processing

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ABSTRACT

Indian economy is highly dependent on agricultural productivity. This is the reason disease detection in plant plays an important role in agricultural field. Now a day's plant disease detection has received increasing attention in monitoring large field of crops. It is very difficult to monitor the plant disease manually. It requires tremendous amount of work, expertise in the plant disease. Hence image processing is used for detection of plant disease. In this paper the review of simple leaf disease is detected that helps in agricultural productivity indirectly. This paper discussed the methods used for detection of disease of plant using their leaves. The steps followed in this paper are image acquisition, image preprocessing, image segmentation, feature extraction in image, detection and classification of plant disease.

Keywords: Image acquisition, Image enhancement, Segmentation, Feature extraction.

ARTICLE INFO

Article History

Received: 25th March 2017

Received in revised form :

25th March 2017

Accepted: 25th March 2017

Published online :

4th May 2017

I. LITERATURE SURVEY

In paper [1] need of detection of plant disease in agriculture field is given and Also basic process required for detecting diseases are given they are image acquisition , image pre-processing ,image segmentation ,feature Extraction ,detection and classification of plant disease .by referring this five steps detection is done.

In that image acquisition first of all the images of plant leaf are captured through the camera is in RGB form. Color transformation is done. that means RGB to gray conversion.

In paper [2] presents image pre-processing here histogram matching is used to identify plant disease. Disease appears on leaf therefore the histogram matching is done on the basis of edge detection technique and colour feature.

In Paper[3] various image enhancement techniques are given out of that edge based segmentation is preferred. edge based technique consist of various methods that are gradient ,log ,canny ,sobel ,laplacian ,Robert . Sobel technique is used in paper. The boundary is identify to segment edge are detected to identify the discontinuities in image.

In paper[4]feature extraction techniques are considered the extraction methods are used for extracting interesting and relevant features from the inputted image. Feature extraction is used in many application of image processing. colour ,texture, edges, morphology are main features which plays an important role in disease detection.

In paper [5] Feature extraction of an image is a property where the major attributes which have to be analyzed are extracted .4 features of the GLCM matrix(including contrast, energy, homogeneity, correlation)have been calculated for detecting the type of disease in the plant leaf and further grading it.

II. INTRODUCTION

In agriculture the research is focused towards to increase food quality and productivity at low cost but with increase profit. The progress in agriculture field will directly affect on the financial growth of India because all most 75% of people has occupation of. Farming according to the researches the quality of product in agriculture is reduce due to the plant disease. Hence the early stage diagnosis is very much important to reduce to effect of diseases.

The continuous requirement of monitoring of experts will cause highly expensive and time consuming hence by using image processing the symptoms that appear on plant leaf can be automatically detected with low expensive and accurate method

Plant disease identification by visual way is more laborious task and at the same time less accurate and can be done only in limited areas. Whereas if automatic detection Technique is used it will take less efforts, less time and more

Accurately. In plants, some general diseases are brown and yellow spots, or early and late scorch, and other are fungal, viral and bacterial diseases. Image processing is the technique which is used for measuring affected area of disease, and to determine the difference in the color of the affected area[2] this paper gives information to reduce plant disease by using image processing.

Basic steps for disease detection

A. Image Acquisition

Firstly, the images of various leaves acquired using a digital camera with required resolution for better quality. The construction of an image database is clearly dependent on the application. The image database itself is responsible for the better efficiency of the classifier which decides the robustness of the algorithm.

This image is in RGB (Red, Green And Blue) form. Color transformation structure for the RGB leaf image is created, and then, a device-independent color space transformation for the color transformation structure is applied [1].

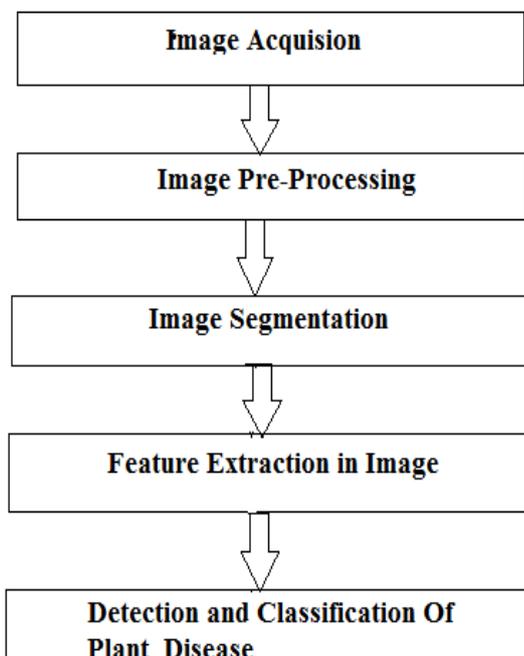


Figure 3.1:Basic Steps for Disease Detection

B. Image Pre-processing

First of all in image pre-processing the colour transformed image or RGB image is converted into a gray scale. The `rgb2gray(`RGB) converts the truecolor image RGB to the grayscale intensity image I. `rgb2gray` converts RGB images to grayscale by eliminating the hue and saturation information while retaining the luminance.

The Histogram block computes the frequency distribution of the elements in each column of the input, or tracks the frequency distribution in a sequence of inputs over a period of time. `histeq` enhances the contrast of images by transforming the values in an intensity image, or the values in the color map of an indexed image, so that the histogram of the output image approximately matches a specified histogram.

C. Image segmentation

Segmentation does separating of image into various parts of having same similarities and features. The segmentation has to be done when the object or region of interest in an application have been detected. The segmentation can be done different type such as region based, edge based, thresholding based-means clustering type etc.

Edge Based

Segmentation can also be done by using edge detection techniques. There are various techniques viz. gradient, log, canny, sobel, laplacian, robert. In this technique the boundary is identified to segment. Edges are detected to identify the discontinuities in the image. For classification they use both fixed and adaptive feature of support vector machine.[3]

we are using GLCM matrix(including contrast, energy, homogeneity, correlation)have been calculated for detecting the type of disease in the plant leaf and further grading it.

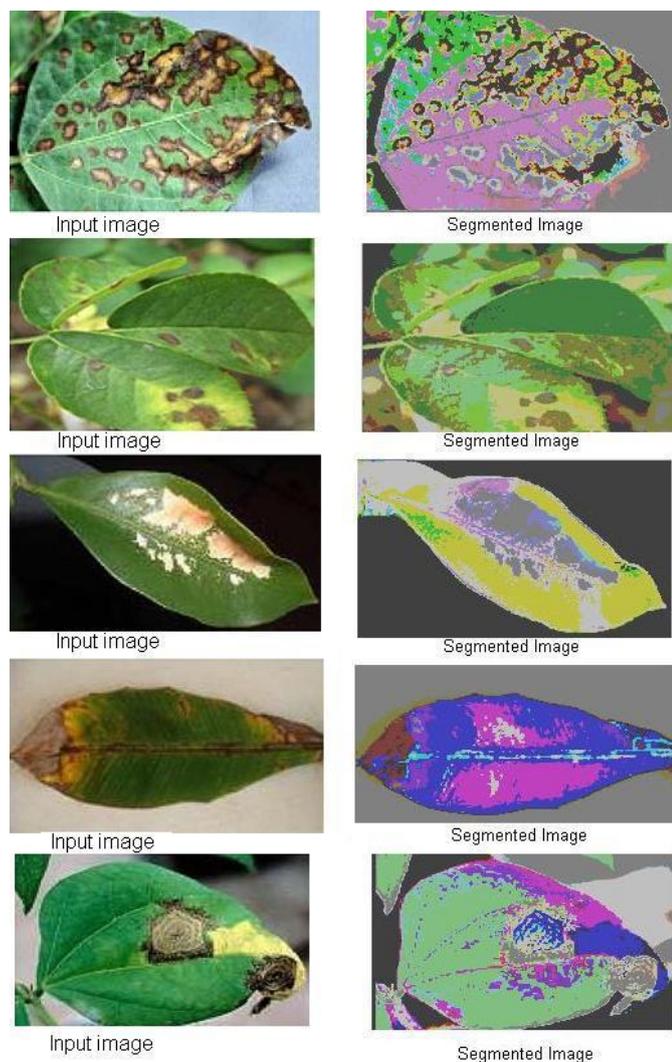
D. Feature Extraction

For Disease detection the feature extraction step plays an important role and also for identification of an object. The feature Extraction can be used for many application In many application. Color, edges, morphology, texture etc. are the features which can be used in plant disease detection. Texture means how the colour is distributed in the image, the roughness, hardness of the image. It can also be used for the detection of infected plant areas.[3]

After segmentation the area of interest i.e. diseased part extracted. Here most of the researchers taking plant leaf texture as the most important feature in classifying plants. With the help of texture features, plant diseases are categorized into different types.

Hence for detecting disease GLCM matrix (including contrast ,energy, homogeneity, correlation)have been calculated for detecting the type of disease in the plant leaf and further grading it[4]

1. Results



Conclusion

For the present scenario it is must to detect the disease on the leaf at early stage. In the agriculture the leaf disease cause an measure loss which can directly affect on the Indian economy. This paper discussed several methods which are useful for disease detection. here basic steps are image acquisition, image pre-processing, image segmentation and the feature extraction. In this paper has segmentation using an edge based method the sobel operator gives segmented output now very much important step feature extraction. here the GLCM matrix method is used for extracting feature from the leaf. all above techniques gives the detection of disease at accurate level.

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