International Journal of Engineering Research and General Science Volume 3, Issue 2, Part 2, March-April, 2015
ISSN 2091-2730

DETECTION & RECOGNIZATION OF PLANT LEAF DISEASES USING IMAGE PROCESSING AND ANDROID O.S.

Renuka Rajendra Kajale.

E-mail Id: renukajale@gmail.com

Abstract— In this paper we present an automatic detection of plant diseases using image processing techniques. The presented system is a software solution for automatic detection and computation of texture statistics for plant leaf diseases. The processing system consists of four main steps, first a color transformation structure for the input RGB image is created, then the green pixels are masked and removed using specific threshold value, then the image is segmented and the useful segments are extracted, finally the texture statistics is computed. From the texture statistics, the diseases, if present on the plant leaf are evaluated.

Keywords — HSI, Texture, Co-occurrence matrix, Hue color attribute, segmentation, Masking of pixels, Plant Disease Detection

INTRODUCTION

Digital image processing and image analysis technology based on the advances in microelectronics and computers have many applications in biology and they find a way to the problems that are associated with traditional photography. This new tool helps in improving the images from microscopic to telescopic range and also analyzing them. Plant diseases cause periodic outbreak of diseases which leads to a number of disasters. Because of the devastating effects of plant diseases, some of the crop cultivation has been abandoned. The naked eye observation of experts is the main approach adopted in practice for detection and identification of plant diseases. but, this requires continuous monitoring of experts which might prove to be quite expensive in case of large farms. Further, in some developing countries, farmers may have to go long distances to contact experts, this makes the process time consuming and moreover farmers are unaware of non-native diseases.Automatic detection of plant diseases is an important research topic as it may be quite beneficial in monitoring large fields, and it canhelp in automatically detecting the corresponding diseases from the symptoms appearing on the plant leaves. This enables machine vision that is to provide image based automatic inspection, process control and robot guidance.

The classification accuracy is achieved with the help of HSI transformation. It is applied to the input image, and then, segmented using Fuzzy C-mean algorithm. Feature extraction stage deals with the color, size and shape of the spot and finally classification is done using neural networks.

Fig.1 Affected leaves with various Diseases

The fast and accurate method for detection of leaf diseases is by using the k-means which is based on segmentation. Automatic classification of leaf diseases is done based on high resolution multispectral and stereo images. This approach uses sugar beet leaves. Here the diseased region is extracted using segmentation and the plant diseases are graded by calculating the quotient of disease spot and leaf areas. An optimal threshold value for segmentation is obtained using weighted Par-Zen window. This reduces the computational burden and storage requirements without degrading the final segmentation results. Detection and classification of leaf diseases is based on masking and removing of green pixels, applying a specific threshold to extract the infected region and computing the texture statistics to evaluate the diseases.

3. EXISTING TECHNIQUES -

Sr. No.	Reference Name (IEEE/ACM/Springer/Any other journal, etc. Paper Title)	Work description	Problems found	Publication year
1	Jayme Garcia , Arnal Barbedo (SpringerPlus)	This paper presents a survey on methods that use digital image processing tech.to detect ,quantify and classify plant diseases from digital images the visible spectrum.	Lose Concentration ,thus decreasing their accuracy.	2013
2	Parul Arora, S.N.Ghaiwat (ISSN)	In this paper classification performed in two different phase, Uninfected and diseased leaves are classified based on the number of peaks in the histogram.	This Classifier involves long training time. In SVM it is difficult to understand the functions.	2014
3	B.Tanawal, V.shah (IJARCSSE)	This paper consists of two phases to identify the affected part of disease. Initially edge detection based image segmentation is done, and finally image detection and classification of diseases is performed using homogenous pixel counting technique.	Disease management is a problematic task for these implementation technique. Precise quantification of these visually observed diseases has not studied because of high complexity.	2013

4.WORK CONTRIBUTION-

PROCEDURE OF THE PROPOSED SYSTEM as follows:

1. RGB image acquisition.
2. Convert the input image from RGB to HSI format.
3. Masking the green-pixels.
4. Removal of masked green pixels.
5. Segment the components.

6. Obtain the useful segments.
7. Computing using color-co-occurrence method.

Working Overview:

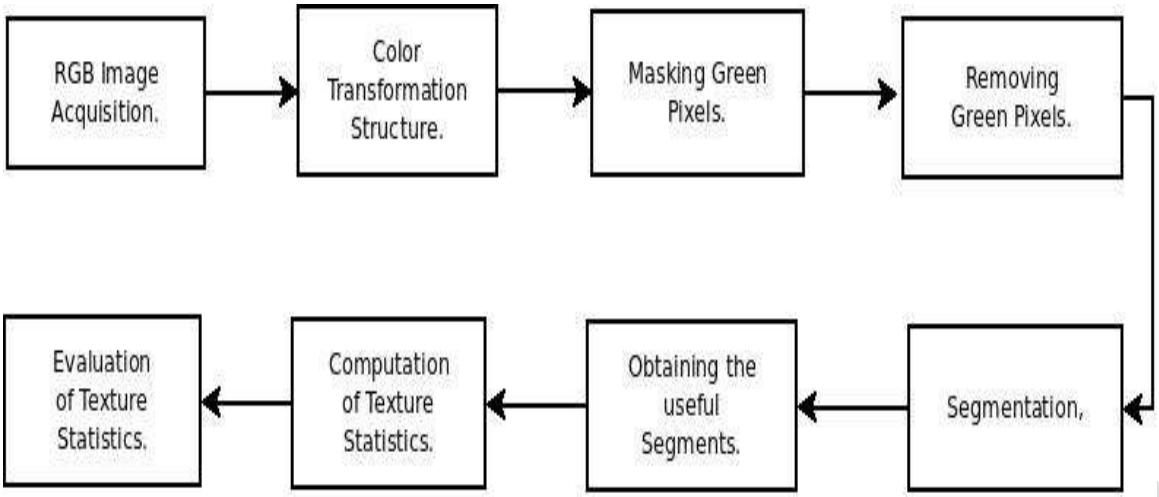

Fig 2: Block diag. of Working steps

A. Color Transformation Structure

First, the RGB images of leaves are converted into Hue Saturation Intensity (HSI) color space representation. The purpose of the color space is to facilitate the specification of colors in some standard, generally accepted way. HSI (hue, saturation, intensity) color model is a popular color model because it is based on human perception.

B. Hue Color Attribute

It refers to the dominant color as viewed by a person. Saturation refers to the relative Purity or the amount of white light added to hue and intensity refers to the amplitude of the light. Color spaces can be converted from one space to another easily. After the transformation process, the H component is taken into account for further analysis. S and I are dropped since it does not give extra information.

C. Masking Green Pixels

Here, we identify mainly the green colored pixels. After this, based on specified threshold value computed for these pixels, the mostly green pixels are masked as if the green component of the pixel intensity is less than the pre-computed threshold value, the red, green and blue components of the this pixel is assigned to a zero value.

D. Segmentation

From the above steps, the infected portion of the leaf is extracted. The infected region is then segmented into a number of patches of equal size. The size of the patch is chosen in such a way that the significant information is not lost. In this approach patch size of 32*32 is taken. The next step is to extract the useful segments. Not all segments contains significant amount of that information. So the patches which are having more than fifty percent of the information are taken into account for the further analysis.

E. Color Co-Occurrence Method

The color co-occurrence texture analysis method is developed through the Spatial Gray- level Dependence Matrices (SGDM). The gray level co-occurrence methodology is a statistical way to describe shape by statistically sampling the way certain gray- levels occur in relation to other gray levels. These matrices measure the probability that a pixel at one particular gray level will occur at a distinct distance and orientation from any pixel given that pixel has a second particular gray level.

F.. Texture Features

Contrast, Energy, Local homogeneity, Cluster shade and Cluster prominence are the texture features which are calculated for the Hue content of the image.

5. RESULTS–

The image processing can be used in agricultural application for following purposes:

1. Detecting leaves with disease.

2. Quantify area that is affected.

3. Finding the shape of affected area.

4. Determine color of the affected area.

5. Texture analysis by determining size and shape of leaf.

6. CONCLUSION -

The main approach of this approach is to recognize the diseases. Speed and accuracy are the main characteristics of disease detection. Hence, the extension of this work will focus on developing the advanced algorithms for fast and accurate detection of leaves with disease. This paper explains an application of texture analysis in detecting the plant diseases. The results of this approach can recognize the leaf diseases with little computational effort.

REFERENCES:

1. Jayme Garcia Arnal Barbedo" Digital image processing techniques for detecting, quantifying and classifying plant diseases"(SPRINGER PLUS-2013.

2.liboluo and Guomin Zohu, "Extraction of the Rice Leaf Disease Image Based on Software Engineering (CiSE2009) ,IEEE

3.S. Ananthi and S. Vishnu Varthini , DETECTION AND CLASSIFICATION OF PLANT LEAF DISEASES USING IMAGE PROCESSING TECHNIQUS. Year -2012

4.PATIL J.K. AND RAJ KUMAR.Department of Electronics & Telecommunication Engineering, Bharti Vidyapeeth College of Engineering, Year – 2012.

5.Hiroya Kondou, Hatuyoshi Kitamura, Yutaka Nishikawa, Yo-shitakaMotonaga and Atsushi Hashimoto, Shape Evaluation by Digital Camera for Grape Leaf. Year -2012.