ANALYSIS AND IDENTIFICATION OF DISEASE IN PADDY LEAF

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Abstract

Nowadays agriculture becomes challenging because of climate condition and diseases found in the crops. There are many constraints diseases in crops will be the topper. Hence the identification of diseases in proper time will increase the yield and provide profit to the farmers. The main objective of this research is to detect diseases such as Paddy Blast Disease, Brown Spot Disease, and Narrow Brown Spot Disease in paddy crop. This paper concentrates on the image processing techniques to enhance the quality of the image and to classify the paddy as healthy or disease. The methodology starts by, pre-processing then segmentation, analysis and finally classification. This proposed work effectively identifies diseases and its great potential to be further improved in the future.

Keywords : Diseaser detection, GLOM Entropy, Classification

INTRODUCTION

In Agricultural the paddy is one of the important foods. Normally the paddy plants are affected by various fungal and bacterial diseases. These diseases are divided into two categories are Nursery diseases and Field diseases. The nursery diseases are Blast, Bacterial Leaf Blight (BLF) and Rice tungro which are affected by the virus. The field diseases are Brown spot, Sheath rot, False smut, Grain discoloration, Leaf streak. This paper is focused on three main diseases like Rice tungro, Sheath Rot and Blast Light Blight (BLB). Rice tungro is affected by a virus. Sheath Rot is like irregular spots in paddy plant and discoloration in the flag leaf sheath. At the first step the paddy image is captured and the diseased leaf is detected using image processing technique like image enhancement, color image processing, and image segmentation. The disease symptoms and management is a challenging task.

Crop protection, especially in large farms is managed by computerized image processing technique which can detect diseased leaf using color information of leaves. Depending on the applications, many images processing technique has been introduced to solve the problems by pattern recognition and some automatic classification tools. [1]



Fig 1. Blast Fig 2. Bacterial Leaf Blight Fig 3. Rice Tungro Fig 4.Brown Spot



Fig 5. Sheath Rot Fig 6. False Smut Fig 7. Grain Discoloration

DISEASE DETECTION METHODS

R. P. Narmadha et al., [2] proposed an automated system to identify the paddy leaf disease like Blast, Brown spot, Narrow Brown Spot. A software prototype system for rice disease detection depending on the infected image of various rice plants is described. A Digital camera is used to capture the images of infected leaves. ANN technique is used for the classification of disease.

In [3] Paddy leaf disease detection is proposed based on BP neural network by **Libo Liu et al.,** The diseased and healthy color features were given as input values to BP neural network and the system classifies the diseased and healthy crops.

Sannakki S.S. et al., [4] presented a Hybrid Intelligent System for Automated Pomegranate Disease Detection. Initially, the image is enhanced by filtering. Then the noises and holes are removed in post-processing using morphological operations and region filling. Finally, machine learning techniques are used, to detect the diseases.

Barbedo [5] proposed to differentiate the signs and symptoms of plant disease from asymptomatic tissues in plant leaves. The simple algorithm manipulates the histograms of the color channels. Depth analysis of the problem of disease symptom differentiation is also presented. The proposed algorithm was tested under a wide variety of conditions, which included 19 plant species, 82 diseases, and images gathered under controlled and uncontrolled environmental conditions. The algorithm proved useful for a wide variety of plant diseases and conditions.

Haiguang Wang, et al., [6] proposed a technique to detect Plant Diseases in wheat and grape plant Based on Principal Component Analysis and Neural Networks. It uses 21 color features, 4 shape features and 25 texture features extracted from the images for better detection of disease.

Shantanu Phadikar et al., [7] proposed a pattern recognition based paddy disease identification system. It uses HIS model for segmentation of the image. After getting the interested region, the boundary and spot detection is done to identify the infected part of the leaf.

A.R.Zadokar et al., [8] proposed a Probabilistic Neural Network (PNN) method to classify the disease in cotton leaf. This method uses FCM & PNN classifier to identify the type of disease in the cotton plant.

Prof. Sanjay et al., [9] proposed a plant leaf disease detection method by transforming the color structure from RGB to HSV. Masking is performed to remove green pixels with a pre-computed threshold level and then segmentation is performed using 32X32 patch size and obtained useful segments. These segments are used for comparing texture parameters of the normal and diseased leaf by color co-occurrence matrix.

Y.Sanjana et al., [10] proposed a research technique to develop an image recognition system that can recognize crop diseases. Image processing starts with the digitized color image of a diseased leaf. A method of mathematical morphology is used to segment these images. The texture, shape and color features of a color image of disease spot-on leaf were extracted, and a classification method of membership function was used to discriminate the diseases.

Malvika Ranjan et al., [11] proposed a work to distinguish the healthy and diseased samples approximately by using the ANN technique. This Experimental result shows the classification performance with an accuracy of 80%.

Bhumika S.Prajapati et al., [12] proposed a survey on plant leaf disease detection and classification technique based on background removal and segmentation techniques. Through this survey, the background removal color space conversion from RGB to HSV is done and SVM gives good results, in terms of accuracy, for classification of diseases.

P.Revathi et al., [13] proposed a spot detection technique. The Input image is preprocessed and then R, G, B color Feature image segmentation is carried out to get target regions (disease spots). Later, image features such as boundary, shape, color, and texture are extracted for disease identification.

Mr. Pramod S. landge et al., [14] proposed an automatic plant disease detection and classification. This paper recognizes problems in crop images, based on color, texture and shape for automatic disease detection and sends SMS to the farmers.

Amandeep Singh et al., [15] proposed a methodology to be used to compare the crop leaf color with the leaf color chart (LCC) for getting a detail about the requirements of the plant. The color prediction method along with the Mathematical Modeling has been used to analyze the crop health problems and solutions.

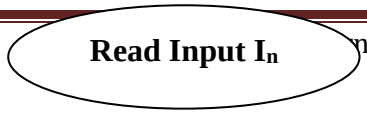
PROPOSED WORK

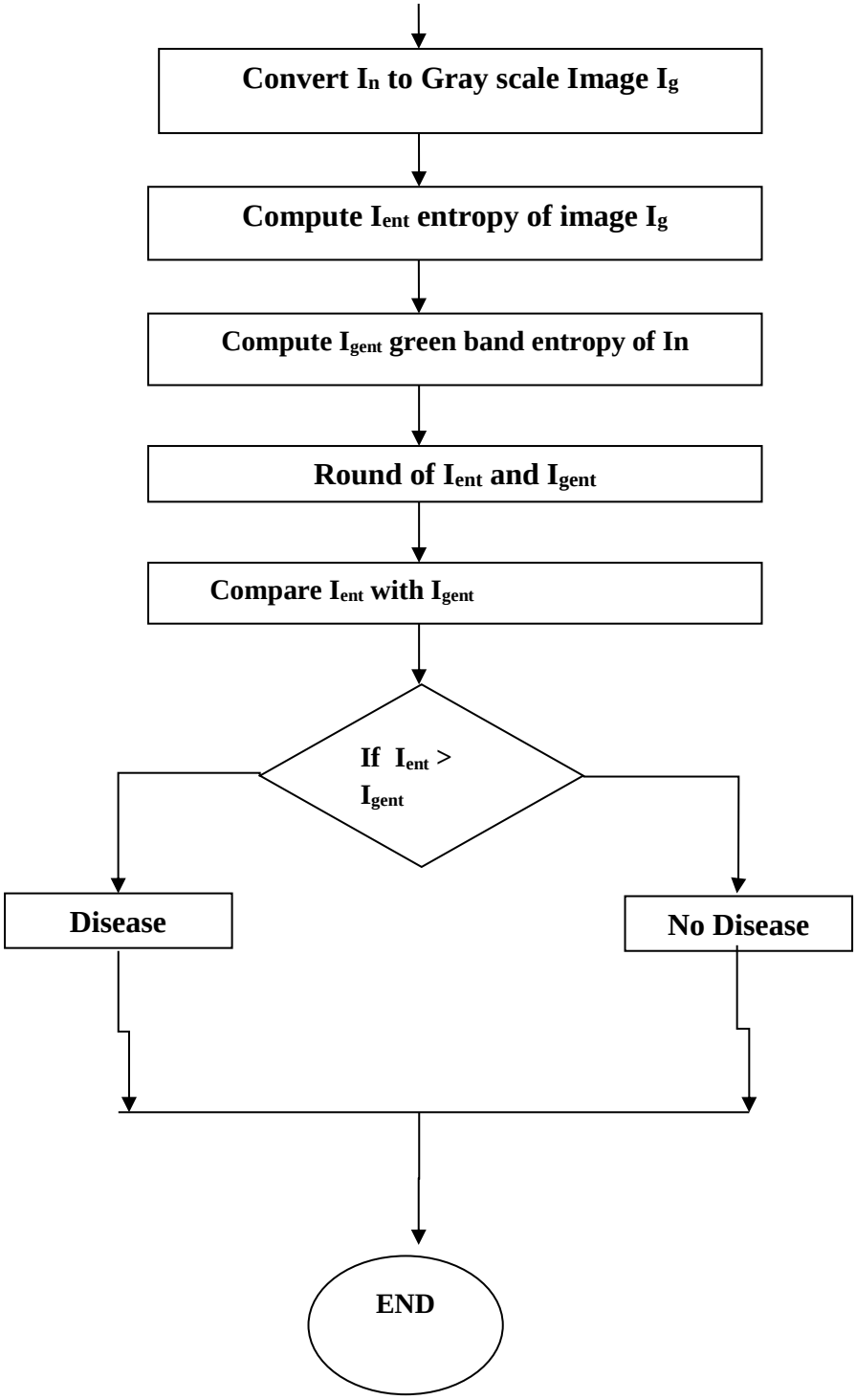
This proposed work is aim to detect the diseased leaf automatically using entropy of the input leaves. The algorithmic description of the proposed technique is processed as follows:

A. ALGORITHM:

1. Read an input image I_n
2. Convert the color image I_n or grayscale image I_g

B. PROPOSED WORKFLOW DIAGRAM:



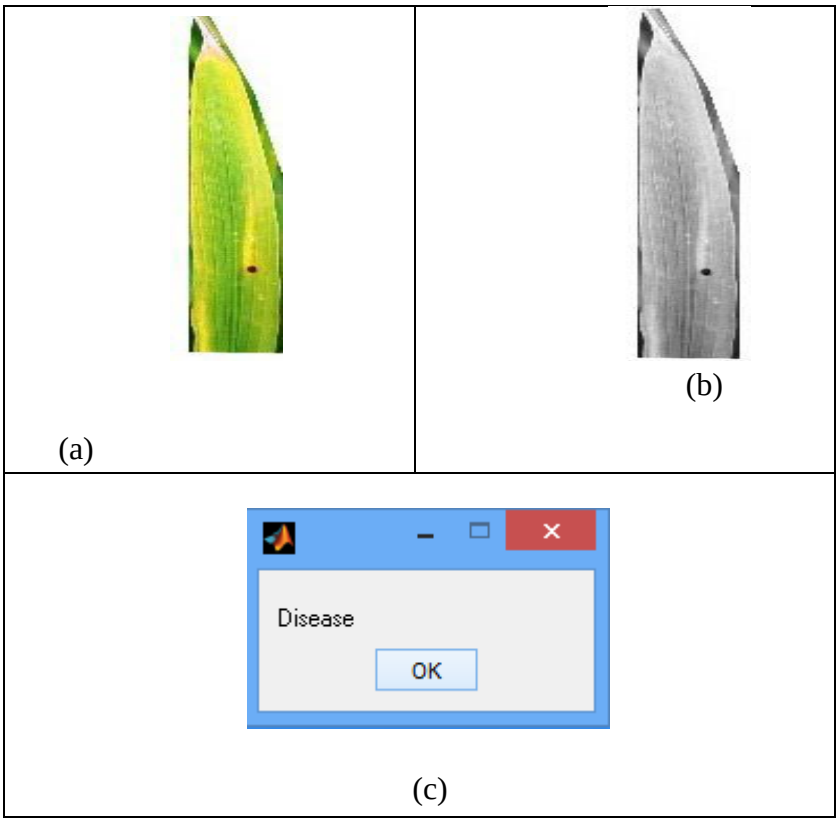


3. Compute I_{ent} entropy of image I_g
4. Compute I_{gent} green band entopy of I_n
5. Round of I_{ent} and I_{gent}
6. Compare I_{ent} with I_{gent}

7. If the I_{gent} exceeds I_{ent}
   Display message as disease.
   else
   Display message as no disease.
8. End

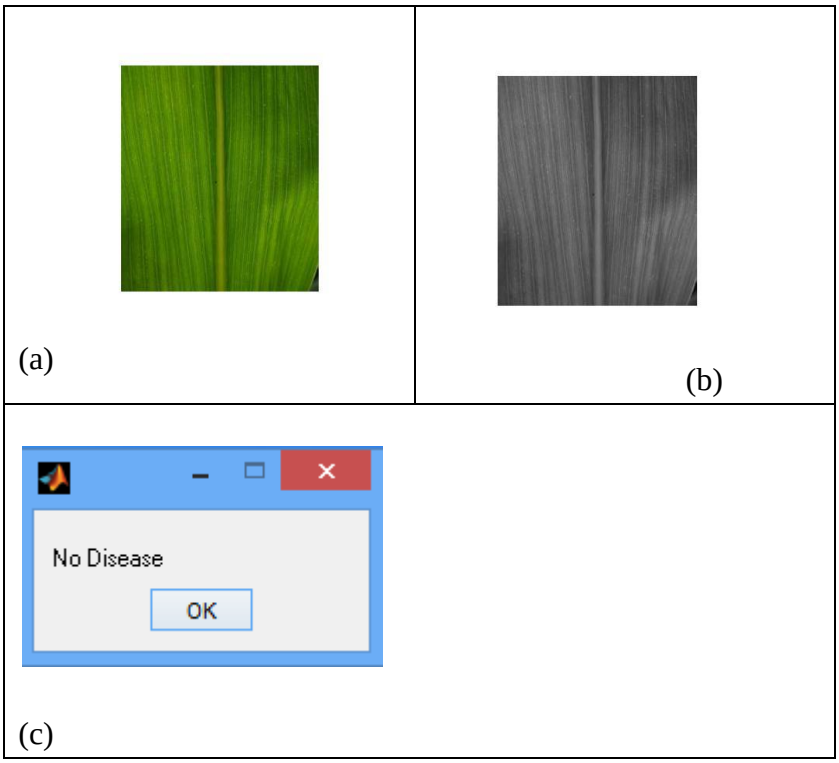
RESULT AND ANALYSIS

The proposed work is implemented using MATLAB. The image is converted from an RGB color image to grayscale image. If the Input Image is in the range of Entropy of Green band then the l paddy leaf, then it is automatically classified as Normal. The Entropy of the leaf image is computed and evaluated for the disease analysis. The performance of the proposed technique is displayed in Fig. 1

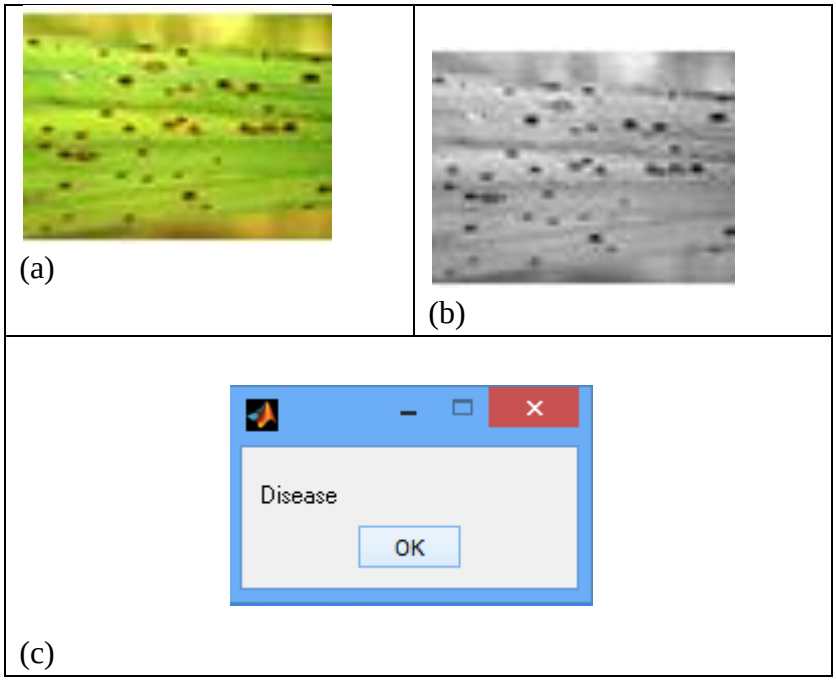


(a) Input image

(b) Residual image (c) Result of Disease Detection



(a) Input image (b) Residual image (c) Result of Disease Detection



(b) Input image (b) Residual image (c) Result of Disease Detection

Conclusion

Paddy is the most important crops around the world. Indian food culture is mostly based on paddy crops. So the identification and detection of paddy crop diseases is considered to be most important. A system for diagnosis the paddy disease has been developed using the Mat lab application. The image processing techniques are applied to improve and enhance the quality of the image. This proposed technique effectively detects disease in the paddy leaf and this research work can further be improved in future by applying deep learning techniques.

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