

Chapter 1

INTRODUCTION

India is an agriculture country. 70% of Indian economy depends on agriculture but leaf infection phenomena causes the loss of major crops results in economic loss.

Leaf infection is the invasion of leaf tissues by disease causing agents such as bacteria, virus, fungus etc leading to degradation of the leaf as well as plant. This can be characterized by spots on the leaves, dryness of leaves, color change in leaves and defoliation.

The leaf infections may occur due to environmental condition changes such as huge rain fall, drastic changes in temperature or may be due to improper maintenance and some insects and pesticides

Once the disease causing organisms such as bacteria, virus etc, entered into the leaf tissue, they starts multiplying and decreases the strength of the leaf and degradation starts. For instance it is seen that the outbreak of diseases which leads to large scale death and famine. It is estimated that the outbreak of helminthosporiose of rice in north eastern India in 1943 caused a heavy loss of food grains and death of a million people.

In order to detect and diagnosis the leaf infection/disease various research works have been carried out and various methods or algorithms have been proposed. For example grapefruit peel diseases was analyzed by color texture features analysis. The texture feature analysis is intern categorized into structural, statistical, model based and transform method.

Similarly in another method of analysis Hue Saturation Intensity [HSI] transformation is applied to the input image, Then it is segmented using Fuzzy C-mean algorithm. This algorithm is most popular method used in image segmentation because it has robust characteristics for ambiguity and can retain much more information than hard segmentation methods. Although the conventional FCM algorithm works well on most noise free images, feature extraction stage deals with the color, size and shape of the spot and finally classification is done using neural networks.

In proposed project leaf infection detection and diagnosis is made through image processing technique because Images form important data and information in biological sciences. Digital image processing and image analysis technology based on the advances in microelectronics and computers has many applications in biology and it circumvents the problems that are associated with traditional photography.

This new tool helps to improve the images from microscopic to telescopic range and also offers a scope for their analysis. Therefore it has many applications in biology.

The method for 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 using MATLAB.

1.1 Problem Statement

Plant diseases have turned into a dilemma as it can cause significant reduction in both quality and quantity of agricultural products. Automatic detection of plant diseases is an essential research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detect the symptoms of diseases as soon as they appear on plant leaves. The proposed system is a software solution for automatic detection and classification of plant leaf diseases. The scheme 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 followed by segmentation process, the texture statistics are computed for the useful segments, finally the extracted features are passed through the classifier.

In classifier the disease can be identified and solution for disease can be found. This information is sent to the farmer through GSM modem.

1.2 Objectives

- To detect unhealthy region of plant leaves.
- Classification of plant leaf diseases using texture features.
- Coding is used to analyze the leaf infection.
- The analyzed information / result is sent via SMS to the farmer.