

Investigation on Crop Disease Detection using Machine Learning Algorithms

INTRODUCTION

Agriculture gave birth to civilization. India is an agrarian country and its economy largely based upon crop production. Agriculture is the backbone of every economy. In a country like India which has ever increasing demand of food due to the raising population, advances in agriculture sector are required to meet the need. The agriculture sector needs a huge up-gradation in order to survive the changing conditions of Indian economy. For optimum yield, the crop should be healthy, therefore some highly technical method is needed for periodic monitoring of crop. Crop disease is one of the major factor which indirectly influence the significant reduction of both quality and quantity of agricultural products. A number of varieties of pesticides are available to control diseases and increase the production. But finding the most current disease, appropriate and effective pesticide to control the infected disease is difficult and requires experts advise which is time consuming and expensive.

The presence of disease on the plant is mainly reflected by symptoms on leaves. So there is a need of an automatic, accurate and less expensive Machine Vision System for detection of diseases from the image and to suggest a proper pesticide as a solution.

LITERATURE SURVEY

Huang et al, studied the spectral characteristics of wheat and demonstrated a method to develop new spectral indices (NSIs) using RELIEF-F algorithm [2]. This method did not involve periodic monitoring of the crops.

Chenghai yang proposed a system describes the design and testing of an airborne multispectral digital imaging system for remote sensing applications. The system consists of four high resolution charge coupled device (CCD) digital cameras [4] this system involved huge maintenance cost.

Wenjiang Huang framed a systematic method for Canopy spectral characteristics of wheat infested by aphid [5], but this methodology involved tedious calculations.

Davoud Ashourloo, et. al.[11] proposed the machine learning techniques for Wheat Leaf Rust disease detection as well as evaluate the training sample size and influence of disease symptoms

effects on the methods of predictions. This paper compares the performance of PLSR, v-SVR, and GPR with the PRI and NBNDVI. The combinations of disease symptoms at each disease severity level results in complex spectra which declined the accuracies of PRI and NBNDVI while they do not have adverse impacts on PLSR, V-SVR, and GPR performances. The GPR's performance using smaller training data set results in higher accuracy than other methods.

P. Revathi, et al.[12] proposed two phases to identify the lesion region of the disease. First Edge detection technique is used for segmentation and then image analysis and classification of diseases is done using the proposed HPCDD Algorithm. This paper proposed RGB feature based techniques in which, the captured images are processed first and then color image segmentation is carried out to get disease spots. The edge features are extracted to identify the disease spots using Sobel and Canny filter

PROPOSED APPROACH

The proposed system has two phases, first phase deals with training datasets. Both healthy and diseased leaf images are collected. Once the dataset is ready with healthy and infected image samples, the threshold is extracted for both aging and for diseases.

Periodically images are obtained by remote sensing. RGB values of the monitored images are extracted and compared with threshold images. If the threshold is greater or less than given value, histogram analysis and edge detection techniques are used to identify particular plant diseases

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