



SURVEY ON DISEASE PREDICTION AND CLASSIFICATION OF COTTON PLANT

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Abstract — Cotton has been cultivated in the Asia since 1500 B.C. and archaeological evidence proved that cotton plant originated in India. So it is very necessary for Indians to take product of cotton on very large amount every year. Cotton plant suffers from various diseases which decreases production to large extent. The leaves are most probably affected by the fungi, viral and bacterial diseases in the leaf spot areas which plays vital role of crop situation. The significance of this research work design is based on advanced image processing techniques to reduce the complexity, cost and time.

Keyword- Image Acquisition, Preprocessing, diseases, Feature extraction, neural network.

I. INTRODUCTION

Plants and crops are very important source of energy as they play an important role in both human life and the other lives than exists on the earth. In recent times, plant and crop cultivation in agriculture is being used much more than just feeding the growing population. In this regard, diagnosing the disease in timely and accurate way is most important.

In whole world, India accounts approximately 25 percent of cotton land. Cotton diseases are main problems for decreasing production of cotton. Crop diseases contribute directly and indirectly to the spread of human infectious diseases and environmental blemishes. As these diseases are reaching throughout the world causing damage to the normal functioning of the plant and also damaging the financial condition by significantly reducing the quantity of crops grown. The crop cultivation reduces its quality due to much type diseases and sometimes they occur but are even not visible with naked eyes. Farmers judge the diseases by their experience but this is not proper way to detect the diseases. The main approach adopted in practice for detection and identification of plant diseases is unassisted observation of experts. The decision making capability of an expert also depends on his/her physical condition, such as fatigue and eyesight, work pressure, working conditions such as improper lighting, climate etc. Hence in that sense this is not a proper way and also time consuming. It might be expensive as continuous monitoring of experts in large farms. So, we need a fast way and remote sensing form to protect the crop from disease.

In many advance techniques for agriculture and medical, image processing is used for multi-dimensional image analysis and field applications. Image processing will be the best solution in agriculture for detecting diseased leaf, stem and fruit, size and shape of affected area. Image processing is used in agriculture field for detecting veins, color and texture of plant leaf image.

1.1 Cotton diseases and symptoms

There are many factors that make cotton production become slow and less productive. One of the main factors is cotton disease. Below some diseases and their symptoms are discussed. The diseases on the cotton leaves are classified as

- 1) Bacterial disease: e.g. Bacterial Blight, Crown Gall,
- 2) Fungal diseases: e.g. Anthracnose, Leaf Spot, Alternaria
- 3) Viral disease: e.g. Leaf Curl, Leaf Crumple, Leaf Roll.
- 4) Diseases: Due To insects: e.g. White flies Leaf insects.

Above types of disease these are dramatically affect the leaf of cotton plant and its Leaves. We go through the selective type of diseases on plant by scanning of cotton leaves through our portable dedicated scanner. So many diseases are found on the cotton plant out of this we discuss the disease some of the major diseases which are often found on the leaves of cotton. And further we discuss the ANN image segmentation method to detect the diseases on cotton

II. LITERATURE SURVEY

Vivek Chaudhari and C. Y. Patil in “Disease Detection of Cotton Leaves Using Advanced Image Processing”. In this research, identification and classification of cotton diseases is done. The pattern of disease is important part where some features like the colour of actual infected image are extracted from image. There are so many diseases occurred on cotton leaf so the leaf color is different for different diseases. This paper uses k-mean clustering with Discrete Wavelet Transform for efficient plant leaf image segmentation and classification between normal & diseased images using neural network technique. Segmentation is basic pre-processing task in image processing applications and it is required to extract diseased plant leaf from normal plant leaf image and image background. Image segmentation is necessary to detect objects and borderlines in image[1].

Naik Durgesh and Dr. A. J. Vyavahare in “Disease Detection of Cotton crop using Image Processing Technique: A Survey” paper presents various types of diseases and control on it using image processing technique. The comparative study of artificial neural network, Support vector machine is discussed. In this paper, addressed how the disease analysis is possible for the cotton leaf diseases detection, the analysis of the various diseases present on the cotton leaves can be effectively detected in the early stage before it will damage the whole plant[2].

Ajay A. Gurjar, Viraj A. Gulhane in “Detection of Diseases on Cotton Leaves and Its Possible Diagnosis” proposed that, The features could be extracted using self-organizing feature map together with a back-propagation neural network is used to recognize colour of image. This information is used to segment cotton leaf pixels within the image, now image which is under consideration is well analyzed and depending upon this software perform further analysis based on the nature of this image. According to them this system is providing 85 to 91% of exact disease detection depending upon the quality of image provided by the portable scanner and the training. More train network leads to a very efficient diagnosis of the cotton leaf disease[3].

P. Revathi and M. Hemalatha in “Homogenous Segmentation based Edge Detection Techniques for Proficient Identification of the Cotton Leaf Spot Diseases” proposed a system that uses mobile captured symptoms of cotton leaf spot images and classify the diseases using neural network. The major objective of their Research work is to use Homogeneity-based edge detector segmentation, which takes the result of any edge detector and divides it by the average value of the area. In this work achieving the goal of Homogeneity-based edge detector takes the result of any edge detector and divides it by the average value of the area[4].

Swati Singh and Sheifali Gupta in “Digital Image Processing Techniques for Early Detection and Classification of Different Diseased Plants” surveys different techniques for early spotting and classification of diseased plants. As in agribusiness, agriculturists detect plant diseases straight through the bare eyes. This type of detection requires continuum supervisory which can be expensive as well as time consuming on large farms. Therefore, recognizing the disease on plants is of extreme importance in agriculture sector. The selected proposal is divided into three classes: detection, classification and extraction. The three classes are further sub divided according to the different algorithm. This paper provides an overview of different image processing techniques and classification method[5].

From above literature survey it is observed that numbers of methods are used by number of researchers for leaf disease detection and classification. While developing the system, researchers considered some key points like accuracy, speed, complexity, cost and flexibility. Following is the summary of used techniques and the gaps identified by the researchers. Table shows different techniques used, its features and the efficiency provided by the implemented system.

Rf No.	Techniques used	Features	Efficiency(%)
1	K mean clustering, DWT, Neural network	Hard to accurately segment random images	Not given
2	Artificial neural network, support vendor machine	Able to detect the disease very accurately	90%
3	Eigen feature extraction, scatter matrix, back propagation	Eigen feature extraction has more success rate than other methods.	90%
4	Image enhancement sobel and Canny edge detection , HPCCDD Algorithm	The proposed HPCCDD algorithm gives high detection accuracy	98.1%
5	Continuum supervisory system is adopted	Expensive	Not given

III. BASIC METHODOLOGY

3.1 Digital Image Processing

Precision agriculture is a new and developing technology which leads to incorporating the advanced techniques to enhance farm output and also enrich the farm inputs in profitable and environmentally sensible manner. Farm inputs were important parameters to be controlled and if not will result in adverse effects causing reduction in yield, deteriorating plant health, etc. Irrigation/Water stress, Fertilizers, pesticides and quality of yield were the major factors of concern in agriculture. Most of the time the expertise are required to analyse the problems, which may be time consuming and costly issue in developing countries. Image processing is one of the tools which can be applied to measure the parameters related to agronomy with accuracy and economy. Applications of image processing in agriculture can be broadly classified in two categories: first one depends upon the imaging techniques and the second one based on applications. This survey mainly focuses on the application of image processing in various domains of agriculture.

3.2 Image Processing

Digital image processing is the use of computer algorithms to perform image processing on digital images. An image may be defined as a two-dimensional function, $f(x, y)$, where x and y are spatial (plane) coordinates, and the amplitude of at any pair of coordinates (x, y) is called the intensity or grey level of the image at that point. When x, y and the intensity values of f are all finite, discrete quantities, we call image a digital image. Digital image is composed of a finite number of elements, each of which has a particular location and value. These elements are referred to as picture elements, image elements, pels, and pixels. Pixel is the term most widely used to denote the elements of a digital image. Vision is the most advanced of our senses, so it is not surprising that images play the single most important role in human perception. DIP is the use of computer algorithms to create, process, communicate, and display digital images. The input of that system is a digital image and the system process that image using efficient algorithms, and gives an image as an output.

IV. CONCLUSION

This paper addresses a survey and states an appropriate method i.e. feature extraction which shows, how the disease analysis is possible for the cotton leaf disease detection. We are trying to find out the various diseases present on the cotton leaves in the early stage before it will damage the whole plant and if it detects in early stage we can say that, we able to make better Productivity. It also provides the survey of different techniques for leaf disease detection. The main characteristics of disease detection are speed and accuracy. Hence there is working on development of fast, automatic, efficient and accurate system, which is use for detection disease on unhealthy leaf. Also Comparison of different techniques of digital image processing is done which gives the different results on different databases. Work can be extended for development of system which identifies various pests and leaf diseases also.

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