ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 5 , May 2017

Identification of Leaf Disease Using Fuzzy C-MEAN and Kernal Fuzzy C-MEAN and Suggesting the Pesticides

S.Jayamoorthy, Dr. N.Palanivel

Assistant Professor ,Department of Computer Science and Engineering, Manakula Vinayagar Institute of Technology, Puducherry.
Associate Professor, ,Department of Computer Science and Engineering, Manakula Vinayagar Institute of Technology, Puducherry.

ABSTRACT: Agricultural crops in India are under constant threat of pests affecting their roots as well as leaves. Diseased plants can exhibit a variety of symptoms and making diagnosis was extremely difficult. Common symptoms are includes abnormal leaf growth, color distortion, stunted growth, shrivelled and damaged pods. Image acquisition devices are used to acquire images of plantations at regular intervals. These images are then subjected to pre-processing, transformation and clustering. The leaf images are segmented using clustering techniques. Clustering is the process of partitioning a group of data points into a small number of clusters. In this paper we present a clustering technique called Spatial FCM (SFCM) to identify the disease and suggest the pest. Also the performance of proposed technique is compared with other clustering techniques such as K-means, Fuzzy C-Means (FCM), Kernel based FCM (KFCM) & Spatial FCM (SFCM). Then the features such as color, texture are extracted from diseased leaf image & then compared with normal leaf image. The neural network method is used to classify the variety of Disease in crops and suggesting pest for that diseases.

KEYWORDS*:* Crops, Spatial Filtering, Clustering, Pesticides, Disease Identification.

I. INTRODUCTION

Agriculture is heart of our civilization. But Plant diseases have turned into a dilemma as it can cause significant reduction in both quality and quantity of agricultural products. Nowadays farmers are facing many crucial problems for getting better yield cause of rapid change in climate and unexpected level of insects, in order to get better yield need to reduce the level of pest insect. India is an agricultural country wherein about seventy percentage of the population depends on agriculture. Farmers have wide range of diversity to select suitable fruit and Vegetable crops. However, the cultivation of these crops for optimum yield and quality product is highly technical. It can be improved with the aid of technological support. The management of perennial fruit crops requires close monitoring especially for the management of diseases that can affect production significantly and subsequently the post-harvest life. In case of plant the disease is defined as any impairment of normal physiological function of plants, producing characteristic symptoms. A symptom is a phenomenon accompanying something and is regarded as evidence of its existence.

Disease is caused by pathogen which is any agent causing disease. In most of the cases pests or diseases are seen on the leaves or stems of the plant. Therefore identification of plants, leaves, stems and finding out the pest or diseases, percentage of the pest or disease incidence, symptoms of the pest or disease attack, plays a key role in successful cultivation of crops. In general, there are two types of factors which can bring death and destruction to plants; living (biotic) and nonliving (abiotic) agents. Living agent's including insects, bacteria, fungi and viruses. Nonliving agents include extremes of temperature, excess moisture, poor light, insufficient nutrients, and poor soil pH and air pollutants. Diseased plants can exhibit a variety of symptoms and making diagnosis was extremely difficult. Common symptoms are includes abnormal leaf growth, color distortion, stunted growth, shrivelled and damaged pods.

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 4, Issue 5 , May 2017

II. RELATED WORKS

To detecting plant diseases early and accurately, using diverse image processing techniques and artificial neural network (ANN). Farmers experience great difficulties in changing from one disease control policy to another. Relying on pure naked-eye observation to detect and classify diseases can be expensive various plant diseases pose a great threat to the agricultural sector by reducing the life of the plants. the present work is aimed to develop a simple disease detection system for plant diseases. The work begins with capturing the images. Filtered and segmented using Gabor filter[1]. The detection of plant leaf is an very important factor to prevent serious outbreak. Automatic detection of plant disease is essential research topic. Most plant diseases are caused by fungi, bacteria, and viruses. Fungi are identified primarily from their morphology, with emphasis placed on their reproductive structures. Bacteria are considered more primitive than fungi and generally have simpler life cycles [2]. Crops are very important for the farmers, just like the bread and butter for them. The mainly Indian Economy is depending on the Agricultural productivity. So through this research we can directly help the farmer. By using the automated agricultural inspection, Farmer can give potentially better and accurate productivity .The different products can be yield with better quality [3]. 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 [4]. Digital camera or similar devices are use to take images of leafs of different types, and then those are used to identify the affected area in leafs. Then different types of image-processing techniques are applied on them, to process those images, to get different and useful features needed for the purpose of analyzing later.

1) Image acquisition is the very first step that requires capturing an image with the help of a digital camera.
2) Pre-processing of input image to improve the quality of image and to remove the undesired distortion from the image. Clipping of the leaf image is performed to get the interested image region and then image smoothing is done using the smoothing filter. To increase the contrast Image enhancement is also done.
3) Mostly green colored pixels, in this step, are masked. In this, we computed a threshold value that is used for these pixels. Then in the following way mostly green pixels are masked: if pixel intensity of the green component is less than the pre-computed threshold value, then zero value is assigned to the red, green and blue components of the this pixel.
4) In the infected clusters, inside the boundaries, remove the masked cells.
5) Obtain the useful segments to classify the leaf diseases. Segment the components using genetic algorithm.

III. PROPOSED METHOD

Image segmentation is the process of partitioning a digital image into multiple segments. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image. Each of the pixels in a region is similar with respect to some characteristic or computed property, such as color, intensity, or texture.

A cluster is usually represented as either grouping of similar data points around a center ie., centroid or a prototype data instance nearest to the centroid. Clusters with well-defined boundaries are called crisp clusters, while those without such feature are called fuzzy clusters. In the proposed Spatial FCM clustering is used for segmentation of leaf images and the results are compared with the existing clustering techniques such as

1. K-means clustering 2. Fuzzy C-Means clustering 3. Kernel based FCM

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 4, Issue 5 , May 2017

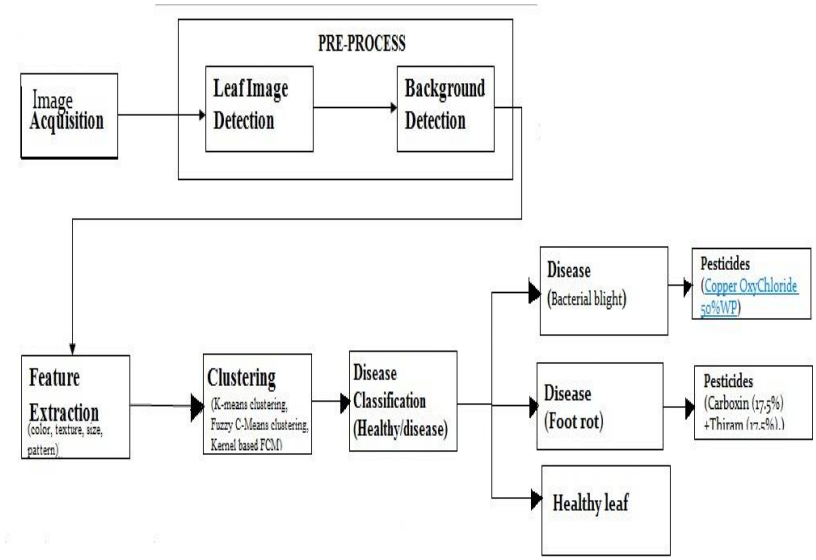

Fig 3.1 System Architecture

K-Means Clustering

It is used widely in cluster analysis for that the K-means algorithm has higher efficiency and scalability and computational time is very less. However it also has many in-efficiencies: the number of clusters K needs to be initialized, the initial cluster centers are arbitrarily selected, and the algorithm is influenced by the noise points.
In view of the shortcomings of the traditional K-Means clustering algorithm, an improved K-means algorithm using noise data filter. It is density based detection methods based on characteristics of noise data where the discovery and processing steps of the noise data are added to the original algorithm. By preprocessing the data to exclude these noise data before clustering data set the cluster cohesion of the clustering results is improved significantly and the impact of noise data on K-means algorithm is decreased.

Fuzzy C-Means Clustering

The algorithm is an iterative clustering method that produces an optimal c partition by minimizing the weighted within group sum of squared error objective function. FCM is an unsupervised clustering algorithm that is applied to wide range of problems connected with feature analysis, clustering and classifier design.

Kernel-Based Fuzzy C-Means Clustering

KFCM is an unsupervised clustering algorithm that is functional with clustering perception design. KFCM is widely practical in agricultural engineering, image analysis, medical diagnosis, and shape analysis and target recognition. The clusters are formed according to the distance between data points and the cluster centers are formed for each cluster.

IV. CONCLUSIONS

Image processing techniques for several plant species that have been used for recognizing plant diseases. The major techniques used are K-means clustering, KFCM and C-means clustering. Some of the challenges in these techniques are optimization of the technique for a specific plant, effect of the background noise in the acquired image and automation technique for a continuous automated monitoring of plant leaf diseases under real world field conditions. The proposed approach is a valuable approach, which can significantly support an accurate detection of leaf diseases in a little computational effort.

REFERENCES

[1] Savita N. Ghaiwat, Parul Arora. Detection and Classification of Plant Leaf Diseases Using Image processing Techniques: A Review. International Journal of Recent Advances in Engineering & Technology. ISSN (Online): 2347 - 2812, Volume-2, Issue - 3, 2014

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 5 , May 2017

[2] Prof. Sanjay B. Dhaygude, Mr.Nitin P.Kumbhar. Agricultural plant Leaf Disease Detection Using Image Processing. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering. Vol. 2, Issue 1, January 2013

[3] Mrunalini R. Badnakhe and Prashant R. Deshmukh. An Application of K-Means Clustering and Artificial Intelligence in Pattern Recognition for Crop Diseases. International Conference on Advancements in Information Technology. 2011 IPCSIT vol.20 (2011)

[4] S. Arivazhagan, R. Newlin Shebiah, S. Ananthi, S. Vishnu Varthini. Detection of unhealthy region of plant leaves and classification of plant leaf diseases using texture features. Agric Eng Int: CIGR Journal, 15(1): 211－217 2013

[5] Anand.H.Kulkarni, Ashwin Patil R. K. Applying image processing technique to detect plant diseases. International Journal of Modern Engineering Research. Vol.2, Issue.5, Sep-Oct. 2012 pp-3661-3664

[6] Sabah Bashir, Navdeep Sharma. Remote Area Plant Disease Detection Using Image Processing. IOSR Journal of Electronics and Communication Engineering. ISSN : 2278-2834 Volume 2, Issue 6 2012, PP 31-34

[7] Smita Naikwadi, Niket Amoda. ADVANCES IN IMAGE PROCESSING FOR DETECTION OF PLANT DISEASES. International Journal of Application or Innovation in Engineering & Management. Volume 2, Issue 11, November 2013

[8] Sanjay B. Patil et al. LEAF DISEASE SEVERITY MEASUREMENT USING IMAGE PROCESSING. International Journal of Engineering and Technology. Vol.3 (5), 2011, 297-301

[9] Piyush Chaudhary et al. Color Transform Based Approach for Disease Spot Detection on Plant Leaf. International Journal of Computer Science and Telecommunications. ,Volume 3, Issue 6, June 2012

[10] Arti N. Rathod, Bhavesh Tanawal, Vatsal Shah. Image Processing Techniques for Detection of Leaf Disease. International Journal of Advanced Research in Computer Science and Software Engineering. Volume 3, Issue 11, November 2013

[11] S.Beucher, F.Meyer. The morphological approach to segmentation: The watershed transforms. Mathematical Morphology Image Processing, E. R. Dougherty, Ed. New York Marcel Dekker, 1993, vol. 12, pp. 433–481.

[12] B. Bhanu, S. Lee, J. Ming. Adaptive image segmentation using a genetic algorithm. In IEEE Transactions on Systems, Man and Cybernetics, volume 25, pages 1543–1567, Dec 1995.

[13] B. Bhanu, J. Peng. Adaptive integrated image segmentation and object recognition. In IEEE Transactions on Systems, Man and Cybernetics,Part C. volume 30, pages 427–441, November 2000.

[14] Keri Woods. Genetic Algorithms: Colour Image Segmentation Literature Review. July 24, 2007.