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Recognition of Leaf Using Neural Network

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ABSTRACT: Plant classification based on leaf recognition is a popular trend. Each leaf carries some information that can be used to classify the type of plant. It is used to detect the disease in plant also. Eight different leaves are collected from farmlands. Pre-processing is done by filtering techniques such as average filter, gaussian filter, wiener filter. For segment of leaves, watershed segmentation is used. In post processing, Gray level cooccurrence matrix(GLCM)technique is used to extract the leaf texture features. According to the results, the classifiers succeeds in getting accuracy of 97.3%.

KEYWORDS: Average filter, gaussian filter, wiener filter, watershed segmentation, GLCM technique.

I.INTRODUCTION

Leaf recognition is very important in plant classification and its key subject to distinguish different types of leaves. Leaf recognition using MATLAB to help biologist, agricultural researchers, food engineers and physicians to identify vegetable leaves and its common details in a convenient and reliable way. Images form important data and information in biological sciences. In medical perspective, images have been used by doctors to diagnose diseases and this method has been proven reliable for years. 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 applications in biology (Rastogi and Chadha, 1989). [1] Leaf rot can damage the crop within a week when it attacks the vine.[2] The RGB entrance image is converted into CIELAB (L*a*b*) format.[3] The 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.[4] In this paper digital image processing is a technique used for enhancement of the image. To improve agricultural products automatic detection of symptoms is beneficial.[5]To improve agricultural products automatic detection of symptoms is beneficial.[6]Early and reliable detection of leaf diseases has important practical relevance, especially in the context of precision agriculture for localized treatment with fungicides.[7] Watershed transform is usually adopted for image segmentation in the area of image processing and image analysis because it always generates closed contours for each region in the original image.[8]In agricultural products, it is used to enhance the image.[9]In this paper, Gray level co-occurrence matrix (GLCM) technique is used to extract the features.[10]Neural network pattern recognition is used. There are three general approaches to segmentation, termed thresholding edge- based methods and region-based methods. Each of pixels in a region is similar with respect to some characteristic or computed properly such as color, intensity, or texture.

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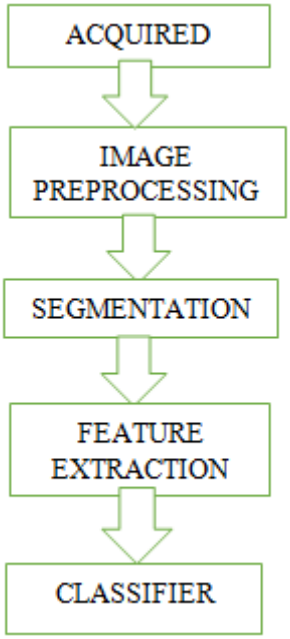
ALGORITHM



II.IMAGE ACQUISITION

Image is acquired from various farmlands by using high quality digital camera. Images are in the JPEG format, with different resolution of pixels. Then image-processing techniques are applied to the acquired images to extract useful features that are necessary for further analysis.

leaf 1 leaf 2 leaf 3

Fig: Acquired images

III.IMAGE PREPROCESSING

Leaf images are taken from leaf image database. Then filtering techniques like average filter, gaussian filter, wiener filter is used in leaf images to remove noise.

IV.IMAGE SEGMENTATION

Segmentation regions or sub images. Images segmentation is the division of an image into region or categories, sharing similar characteristics are identified and grouped together. Every pixel in an image is allocated to one of a number of these categories.

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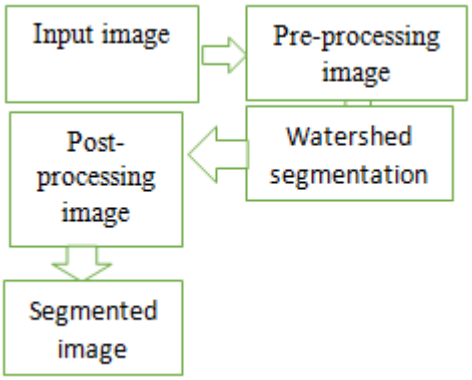
WATERSHED SEGMENTATION

Watershed transformation also called as watershed method is a powerful mathematical morphological tool for the image segmentation. It is more popular in the fields like biomedical and medical image processing, and computer vision. In geography, watershed means the ridge that divides areas drained by different river systems. If image is viewed as geological landscape, the watershed lines determines boundaries which separates image regions. The watershed transforms computes catchment basins and ridgelines (also known as watershed lines), where catchment basins corresponding to image regions and ridgelines relating to region boundaries. The first class contain the flooding-based watershed algorithm and it is a traditional approach whereas the second class contains rain falling based watershed algorithms. Many algorithms have been proposed in the both classes.

leaf 1 leaf 2 leaf 3

Fig: Segmented images

BLOCK DIAGRAM FOR WATERSHED SEGMENTATION



V. GRAYLEVEL CO-OCCURRENCE MATRIX (GLCM)

It can provide useful information about the texture of an image but cannot provide information about shape. The GLCM is a tabulation of how often different combinations of pixel brightness values occurs in an image.We can obtain the values of features in leaves by using matlab coding is illustrated in table as shown**.**

TABLE 1

S.No	Content	Leaf 1	Leaf 2	Leaf 3
1.	Auto correlation	101376	76166	72096
2.	cluster performance	5968267	5501205	317457936
3.	Cluster shade	2435905	938848	32362
4.	contrast	1279	9752	21458

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5.	correlation	7	6	5
6.	Difference entropy	10	10	11
7.	Difference variance	379	2880	6012
8.	Dissimilarity	36	88	129
9.	Energy	6	5	5
10.	Entropy	17	17	17
11.	Homogeneity	6	5	5
12.	Information measure of correlation 1	6	5	5
13.	Information measure of correlation 2	7	6	6
14.	Inverse difference	6	5	5
15.	Maximum probability	6	5	5
16.	Sum average	600	518	525
17.	Sum entropy	13	12	12
18.	Sum of squares variance	13665	16507	16039
19.	Sum variance	53959	51471	39912

VI. CLASSIFICATION IN NEURAL NETWORK

A Neural network can be trained to recognize patterns, classify data and forecast future events. It breaks down our input into layers of abstraction. It consists of input layer, one or more hidden layers, and an output layer. The layers are interconnected via nodes, or neurons.

PERFORMANCE

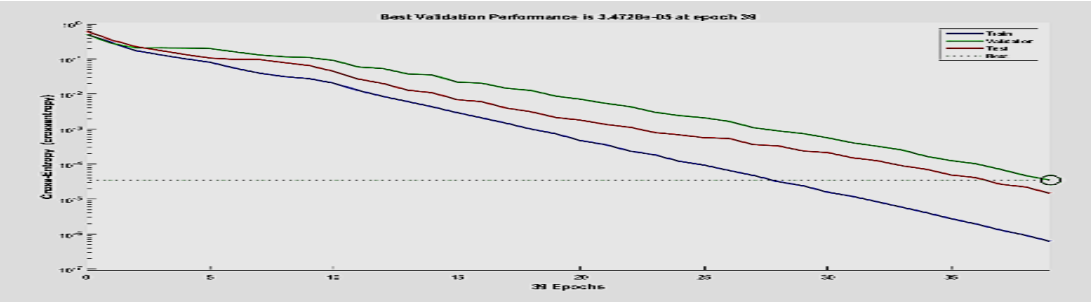

Fig 1

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ERROR HISTOGRAM

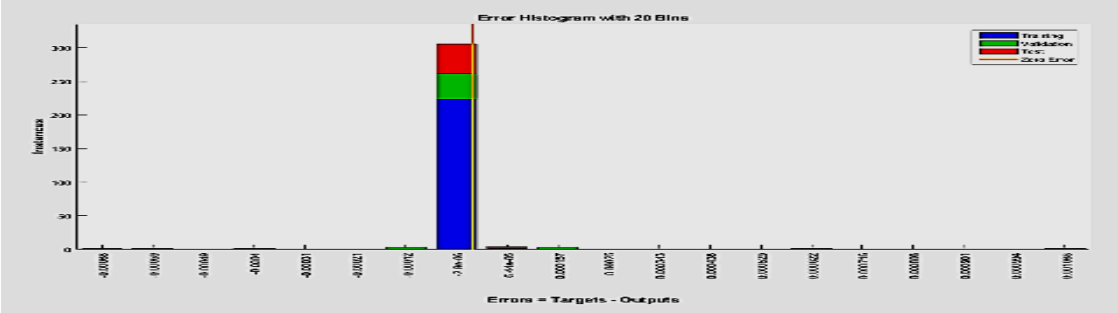

Fig 2

TRAINING STATE

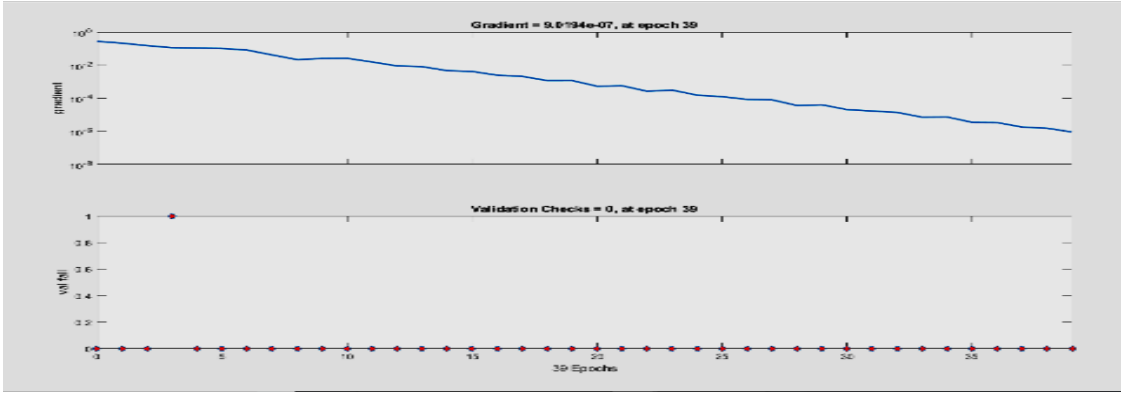

Fig 3

VII. CONCLUSION

From the above discussion, we have come up with the following conclusion. In the experimental results, the best validation performance is about 3.4728e-05 at epoch 39. Accuracy of feature extraction of leaf is 97.3%. we can conclude that recognition rate of the proposed leaf recognition system was more better than that of the existing leaf recognition system.

REFERENCES

[1] Mrs. Anupama, Notandum (2014), 'Review of study of different diseases on betel vine plant and control measure', IJAIEM, volume3,issue 3.
[2] Antonio Cezar de Castro lima, Camila Bacilli, (2014), 'Segmentation of somatic cells in goat milk using color space CIELAB', Journal of agricultural science and technology.
[3] S. Aryabhata, R Newlin Shebaa, (2013), 'Detection of unhealthy region of plant leaves and classification of plant leaf diseases using texture features', Agric Engift: CIGR Journal, Volume 15, No.1 211.
[4] Bhavesh Tawana, Arti N. Rathod, (2013), 'Image Processing Techniques for Detection of Leaf Disease', IJARCSSE, Volume 3, Issue 11.
[5] G Jabber, Murali Krishnan, (2013), 'Pest Control in Agricultural Plantations Using Image Processing', IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), p- ISSN: 2278-8735. Volume 6, Issue 4, pp 68-74.
[6] B Haygood, Prof. Sanjay, (2013), 'Agricultural plant Leaf Disease Detection Using Image Processing', International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Volume 2, Issue 1.
[7] M Brik, S Bani-Ahmad, Deed Al Hairy, (2010), 'A Framework for Detection and Classification of Plant Leaf and Stem Diseases', pp. 113-118, IEEE.
[8] Anand K. Chaudhari, Dr. A. N. Sheeran, (2012), 'Color Transform Based Approach for Disease Spot Detection on Plant Leaf', IJCST, 3(6), pp. 65-70.
[9] Anup Vibhute, S K Bodhi, (2012), 'Applications of Image Processing in Agriculture: A Survey', International Journal of Computer Applications (0975 – 8887), Volume 52– No.2.

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[10] A Fakhri, A Nasir, M Norden a Rahman, (2012), 'A Study of Image Processing in Agriculture Application under High Performance Computing Environment', International Journal of Computer Science and Telecommunications, Volume 3, Issue 8.
[11] R K Ashwin Patel, Ananth. Kulkarni, (2012), 'Applying image processing technique to detect plant diseases', International Journal of Modern Engineering Research (IJMER), Volume 2, Issue.5, pp-3661-3664.
[12] Anand K. Chaudhari, Dr. A. N. Sheeran, Piyush Chaudhary, Sharda Gadara, (2012), 'Color Transform Based Approach for Disease Spot Detection on Plant Leaf', IJCST, 3(6), pp. 65-70.