Bacterial foraging optimization based Radial Basis Function Neural Network (BRBFNN) for identification and classification of plant leaf diseases: An automatic approach towards Plant Pathology

Abstract

- The contribution of a plant is highly important for both human life and environment. Plants do suffer from diseases, like human beings and animals. There is the number of plant diseases that occur and affects the normal growth of a plant. These diseases affect complete plant including leaf, stem, fruit, root, and flower. Most of the time when the disease of a plant has not been taken care of, the plant dies or may cause leaves drop, flowers and fruits drop etc. Appropriate diagnosis of such diseases is required for accurate identification and treatment of plant diseases. Plant pathology is the study of plant diseases, their causes, procedures for controlling and managing them. But, the existing method encompasses human involvement for classification and identification of diseases.

- This procedure is time-consuming and costly. Automatic segmentation of diseases from plant leaf images using soft computing approach can be reasonably useful than the existing one. In this paper, we have introduced a method named as Bacterial foraging optimization based Radial Basis Function Neural Network (BRBFNN) for identification and classification of plant leaf diseases automatically. For assigning optimal weight to Radial Basis Function Neural Network (RBFNN) we use Bacterial foraging optimization (BFO) that further increases the speed and accuracy of the network to identify and classify the regions infected of different diseases on the plant leafs. The region growing algorithm increases the efficiency of the network by searching and grouping of seed points having common attributes for feature extraction process. We worked on fungal diseases like common rust, cedar apple rust, late blight, leaf curl, leaf spot, and early blight. The proposed method attains higher accuracy in identification and classification of diseases.

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- Computers have evolved to be a vital device in a number of applications like defense, medical, agriculture, engineering etc. with its ability to process multimedia information like images captured from some computing devices.

- An image contains important information that can be retrieved by using some computational method. Image segmentation is a task for partitioning an image into smaller parts that are more meaningful.

- Interestingly, it can be stated as identification and classification of some region of interest. The segmentation is performed based on some common properties of the objects present in an image like color, texture and, shape etc.

- Image segmentation is a preprocessing step for image processing generally performed by using two methods (i) Traditional method and (ii) Soft computing method.

EXISTING SYSTEM-PROBLEM

- There is the number of plant diseases that occur and affects the normal growth of a plant. These diseases affect complete plant including leaf, stem, fruit, root, and flower. Most of the time when the disease of a plant has not been taken care of, the plant dies or may cause leaves drop, flowers and fruits drop.

- Appropriate diagnosis of such diseases is required for accurate identification and treatment of plant diseases. Plant pathology is the study of plant diseases, their causes, procedures for controlling and managing them. But, the existing method encompasses human involvement for classification and identification of diseases.

PROPOSED SYSTEM

- we have introduced a method named as Bacterial foraging optimization based Radial Basis Function Neural Network (BRBFNN) for identification and classification of plant leaf diseases automatically.

- For assigning optimal weight to Radial Basis Function Neural Network (RBFNN) we use Bacterial foraging optimization (BFO) that further increases the speed and accuracy of the network to identify and classify the regions infected of different diseases on the plant leafs.

- The region growing algorithm increases the efficiency of the network by searching and grouping of seed points having common attributes for feature extraction process.

Hardware requirements

- Processor   -   Pentium –III
- Speed   -   1.1 Ghz
- RAM   -   256 MB(min)
- Hard Disk   -   20 GB
- Floppy Drive   -   1.44 MB
- Key Board   -   Standard Windows Keyboard

- Mouse   -   Two or Three Button Mouse
- Monitor   -   SVGA

Software requirements

- Operating System   -   Windows 7/8

- Application Server   -   Tomcat 5.0

- Front End   -   JAVA

- IDE   -   NETBEANS 7.1

- Back-End   -   HEIDISQL 3.5

Screen short

BRBF FOR IDENTIFICATION AND CLASSIFICATION

TRAINING SESSION:

IMAGE LOAD OPEN:

FEATURE EXTRACT:

TEST HERE:

K-MEANS:

CHANGE IMAGE:

Conclusion

- The plant serves as the basic need for any living organisms. They are the most important and integral part of our surroundings.

- Just like a human or other living organism does plant do suffer from different kind of diseases. Such diseases are harmful to plant in a number of ways like can affect the growth of the plant, flowers, fruits, and leaves etc. due to which a plant may even die. So in this work, we have proposed a novel method named as Bacterial foraging optimization based Radial Basis Function Neural Network (BRBFNN) for identification and classification of plant leaf diseases.

- The results, when compared with other methods, show that the proposed method achieves higher performance both in terms of identification and classification of plant leaf diseases.