A Survey on Leaf Identification System

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Abstract- *In humid regions, leaf recognition is a demanding job, along with the whole organ which are utilized in plant recognition, leafs are possibly the mainly used ones when contrast to other organ. For example, taxonomists can depend on leaves to investigate for patterns that can be used to recognize a plant species. Color and Texture features were integrated for the recognition of the leaf; the proposed approach consists of four phases such as pre-processing, segmentation, feature extraction and classification. The pre-processing phase involves color transformation and resize. In arrange to remove leaf shape we are using DWT algorithm and shape features, leaf has to be segmented. Hence the DWT is used for segmentation. For feature extraction phase the color and texture features are derived. SVM classifier is used to classify and identify the kind of leaf.*

Keywords- Discrete wavelet transform, SVM classifier and Shape features.

I. INTRODUCTION

Numerous methods have been proposed to recognize plant leaves in a mechanical fashion. A huge percentage of such works consume figure identification techniques to representation and represent the curve shapes of leaves, however additionally, color and texture of leaves have also been taken into consideration to progress recognition accuracies. In humid regions, amongst the whole limb which are utilized in plant recognition, leafs are possibly the mainly used ones. Mainly because they're commonly present when compared to flower and fruits. So far, several researchers have proposed various approaches in identifying leaves in order to extend a organization that can assist normal community to recognize plants based on a leaf. The features used in the recognition systems can be classified into shape or morphological features, texture features, edge features, vein features and color features. An existing approach that combines Fourier descriptors with additional shape features was investigated to categorize 100 hundred kinds of leaves. They used Bayes's classifier to categorize the image. The outcome shows that the arrangement of Fourier descriptors and numerous other shape features can be used to recognize leaves. In this scheme they just identified the kind of the leaf using shape and other features such as convexity, irregularity, roundness aspect of the image. This advance might lags in terms of competence or correctness. To conquer all these restriction a novel approach is proposed in this paper, which consists of four phases such as pre-processing, segmentation, feature extraction and classification. The pre-processing stage involves color alteration and resize. In array to dig out leaf shape and border features, leaf has to be segmented. Hence the adaptive clustering algorithm is used for segmentation. For characteristic withdrawal phase the color and texture features are resultant from a trained SVM to information base and SVM classifier will classifies the kind of leaf according to the extracted characteristic properties.

II. RELATED WORK

Smita Patil et.al [1] has proposed a scheme on classification of enlargement Rate of Plant Based on Leaf Features using Digital Image Processing Techniques. In arrange to dig up leaf shape and boundary features; leaf has to be segmented from a plant. Hence the division algorithm is used for segmentation. For feature extraction phase the color and texture features are derivative. Total of 141 features are extracted in which 121 color features are taken using histogram and 20 surface features using Discrete Wavelet Transform and Fast Fourier Transform and are given as contribution vector to the Support Vector Machine classifier. The eventual goal of this job is to extend a system where a user in the field can obtain a picture of a plant leaf, nourish it to the machine visualization system carried on a convenient computer, and have the coordination to categorize and recognize the expansion rate. The categorization accuracy of 94.73% is experimental. Jyotismita Chaki et.al [2] has projected a system on Plant Leaf gratitude using Gabor Filter. This development addresses the trouble of segmenting an image into dissimilar regions. They investigate two unconfirmed learning algorithms namely the K-means and EM and evaluate it with a chart based algorithm, the Normalized Cut algorithm. The K-means and EM are clustering algorithms, which divider a data set into clusters according to some definite detachment measure. The Normalized Cut principle takes a measure of the resemblance between data elements of a collection and the dissimilarity among dissimilar groups for segmenting the images. Abdul Kadir et.al [3] has planned a planning on presentation enhancement of Leaf classification arrangement Using Principal constituent examination. This classification involved amalgamation of features resultant from shape, vein, color, and texture of leaf.

PCA was incorporated to the cataloging system to convert the features into orthogonal features and then the results were inputted to the classifier that used Probabilistic Neural Network (PNN). This advance has been tested on two datasets, Foliage and Flavia, that enclose assorted color leaves (foliage plants) and green leaves correspondingly.

III. DIFFERENT TECHNIQUES OF IDENTIFICATION

Classification is the method by which numerous leaf diseases are detected and then the suitable achievement can be taken for the control of leaf disease in the plants. There are numerous techniques current for this recognition purpose amongst which should be taken into version is a deadly mission.

A. Manual

In this process a human being who has the awareness of the plant leaf has been called for examination for the plant and the leaf disease is recognized by the understanding and occurrence of that person and then the suitable insect killer is optional by that person. This all procedure happens manually so it is time consuming and has a lot of chances of being misconception of correct leaf disease identification.

B. Genetic Algorithm

Genetic algorithm (GA) is a group of optimization measures stimulated by the genetic mechanism of imitation Genetic Algorithms are primarily used for characteristic classification and feature collection. The essential reason of genetic algorithms (GAs) is optimization. GAs provide a heuristic technique of searching the participation space for most favorable x that approximates creature force without enumerating all the rudiments and therefore bypasses presentation issues detailed to exhaustive search. Genetic algorithm is used successfully in the progress to find a near-optimal set of association weights globally lacking computing gradient information and with no heaviness connections initialization [1]. Though explanation establish by genetic algorithms is not always finest resolution. It finds “good” solution always. Key benefit of GA is that is flexible and it possess intrinsic parallelism. Genetic Algorithms lever large, complex, non differentiable and multi model [8][17].

C. Back Propagation Neural Network

Artificial neural networks were originally residential according to the straightforward principle of the maneuver of the (human) neural coordination. Since then, a exceptionally huge multiplicity of networks have been constructed. All are self-possessed of units (neurons), and associations connecting them, which jointly decide the performance of the complex. Grape leaf image with complex backdrop is taken as input. Entrance is deployed to mask green pixels and image is processed to receive missing sound using anisotropic dispersal. Then grape leaf illness segmentation is completed using K-means clustering. The diseased segment from segmented images is identified. Greatest results were experimental when supply forward Back Propagation Neural Network was skilled for classification [2][8].

D. Principal Component Analysis

Principal components analysis (PCA) tries to depict the imperative variability in the data in a condensed numeral of dimensions. Principal component analysis (PCA) is a geometric process that uses orthogonal conversion to translate a position of observations of perhaps interrelated variables into a set of values of linearly uncorrelated variables called primary components. The numeral of principal components is fewer than or equal to the figure of unique variables [3][11].

E. Probabilistic Neural Network

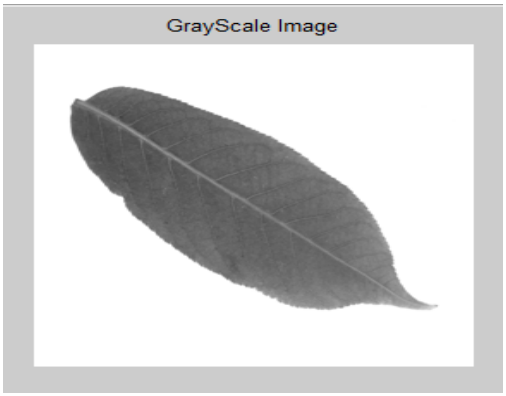
Probabilistic neural networks can be used for categorization harms. It has equivalent disseminated supercomputer that has a normal propensity for storing experimental acquaintance. PNN is resultant from Radial Basis Function (RBF) complex. PNN essentially works with 3 layers. Primary coating is input layer. The input layer accepts an input vector. When an input is presented, first layer computes distances from the input vector to the preparation input vectors and produces a vector whose elements specify how secure the input is to a training input [4]. The succeeding layer arithmetic these contributions for every class of inputs to manufacture as its net output a vector of probabilities. Radial source Layer evaluates vector distances between input vector and row weight vectors in burden medium. These distances are scaled by Radial Basis Function nonlinearly [4]. The last layer i.e. competitive layer in PNN arrangement produces a categorization conclusion, in which a class with greatest probabilities will be assigned by 1 and additional classes will be assigned by 0. A enter advantage of neural networks is that a replica of the organization can be build from the obtainable data. Fig.1 shows structural design of PNN.

IV. EXPERIMENTAL RESULT

Statistics stand for the investigational outcome of the planned system. Initially will believe sampled leaf image as input image, which is shown in Figure (a) later than considering sampled leaf images are pre-processed, and

afterward images are transformed into gray scale images as shown in Figure (b), these pre-processed images are taken for attribute extraction and SVM training will train to acquaintance base. Lastly the SVM classifier classifies the images according to record and product is shown in Figure (c).The successful investigational results shows how efficiently our projected system will exertion.

(a) Input leaf Images



(b) Gray Scale Image

(c) Result

V. CONCLUSION

In this project different leaf identification techniques where used so that we will find the plant. That will be helpful in such a way that the plant is which type of species. By using the plant leaves and shape and structure we will find the type of the plant and as well as if any diseases occur or not that will also we can know.

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