A FRAMEWORK FOR LEAF DISEASE DETECTION

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1. INTRODUCTION

"Image processing is a form of signal processing for which input is an image, video frame or photograph". It deals with the computerized images with the assistance of an advanced PC. It additionally concentrates on execution preparing the image by building up the PC framework. Framework acknowledged the contribution as a computerized image and utilizing effective calculations the framework will handle the image, and gives a image as a yield.. Plant diseases are the primary wellspring of plant harm which bring about financial and generation misfortunes in agrarian ranges. Inferable from troubled climatic and ecological conditions, event of plant illnesses is on the ascent.

There are different sorts of diseases in plants, assortment of side effects, for example, spots or smirch emerging on the plant leaves, seeds and stanches of the plant. Keeping in mind the end goal to deal with these elements viably, there is a need to present a programmed strategy for plant observation that can examine plant conditions and applied information-based answer for recognized and group different infections. Machine Learning is a characteristics proper structure to bolster this issue.

2. PROPOSED METHODOLGY

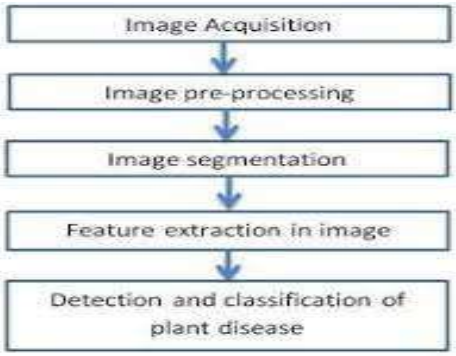

Figure.2.1 Proposed Methodlogy

2.1 Image acquisition:

Performing image acquisition is always first step in image processing, because without an image further any processing is not possible. In proposed method the images are collected from database. This database is publicly available.

The database contains the disease affected leaf and healthy leaf. The leaf has four different diseases. They are Alternaria, Anthracnose, bacterial blight, Cercospora..

2.2 Image Enhancement:

The foremost target of enhancement is to process an image so that the original image for a particular application. The word particular is vital, in light of the fact that it builds up at the start that the procedures examined are especially issue arranged. Regardless the strategy utilized, in any case, image improvement is a standout amongst the most fascinating and outwardly engaging zones of image processing

2.3 Segmentation:

In segmentation stage the preprocessed image is given as an input. The segmentation means subdividing the whole image region into small regions. In proposed method the k-means clustering algorithm is utilized for the segmentation process. It is useful to extract the image structures.

In the proposed system the k-means clustering is technique for vector quantization, initially from signal processing, that is famous for cluster analysis is data mining. K-means clustering intends to partition n perceptions into k-clusters in which every perception has a place with the cluster with the nearest mean, serving as a model of the cluster.

Clustering is the process of portioning a group of data points into a small number of clusters. For instance, the pixels in the image are clustered. Of-course, this is qualitative kind of portioning. The following figure shows the example of the k-means clustering.

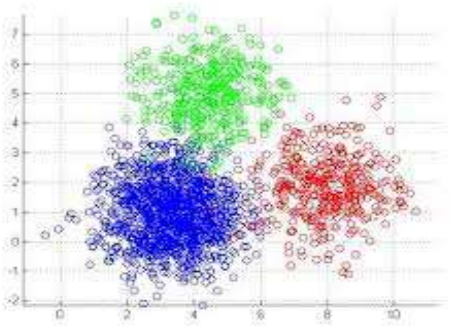

Figure.2.2 K-Means Clustering

2.4 Feature extraction:

To extract the region of interest the feature extraction is one of the essential and basic step. The proposed strategy clarifies the essential elements of mean, standard deviation, skewness, kurtosis and higher request minutes are fifth and sixth central moments, "The features are extracted from the segmented images. These features are utilized for the classification. The mean determines the average value of the array or matrix. Features are calculated using the mathematical formulas. Where, c(i, j) pixel intensity value at point(i, j). and a and b represents the number of rows and columns respectively."

Mean: It figures out where the center of the dataset is.

Standard deviation: "The standard deviation, s is the mean square deviation of the computed pixel value c(i, j) from its mean value m".

Entropy: Entropy is a statistical measure of randomness that can be utilized to characterized the textual value of the input image.

RMS(Root-Mean-Square):J=rms(I) returns the root-mean-square level of the input image I. if I is arrow or column vector. J is a real valued scalar. For matrices J contains the RMS level computed along the first dimension.

Variance: V=var(M) returns the variance of m for vectors.

Skewness: "Asymmetry in measurable conveyance is called skewness"

Kurtosis: "Kurtosis decides the peakness of dispersion identified with the ordinary appropriation".

Contrast: The contrast function enhances the contrast of an image.

Correlation:

The correlation block computes the cross correlation of two n dimension input arrays. The block computes the correlation column wise, so both input must have same number of columns.

2.5 Classification:

In proposed strategy Support Vector Machine (SVM) classifier is utilized.

In support vector the data points are near to the isolating hyper plane. By definition "x" representing to the data points of sort 1 and "-" representing the data points of 2. For a given training set, every value is named as having a place with one of class. It builds a model and new cases will be dispensed to one of the classifications. The illustrations are represented to as points in space

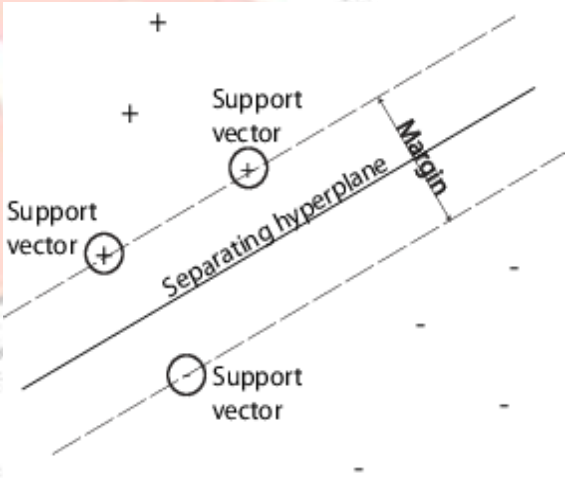

Figure.2.3 Support vector machine

The SVM classifier is utilized to distinguish the classes, which are firmly associated with the known classes. The ideal hyper plane builds the edge of the shut information focuses. On the off chance that hyper plane is having the biggest separation to the closest preparing components of any class is considered as great detachment. Edges and Maximum edge hyper plane for SVM classifier with from various examples present in two classes. The SVM tests present on the edge are called as bolster vector. SVM isolates the given information into choice surface. Choice surface is further isolated the information into hyper plane of

two classes. Preparing focuses characterizes the supporting vector which characterizes the hyper plane. The essential thought of SVM is utilized to expand the edges between the hyper plane of two classes. Essentially, SVM can just resolve issues which are identified with double characterization. Presently they have been extended to prepare multi class issue. It utilizes the one after one strategy to fit all paired sub classifiers furthermore to locate the right class by choosing component to concede the multi class order.

3. IMPLEMENTATION

3.1 Preprocessing

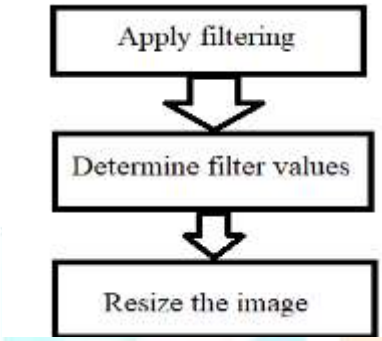

Figure 3.1 : Stages of pre-processing

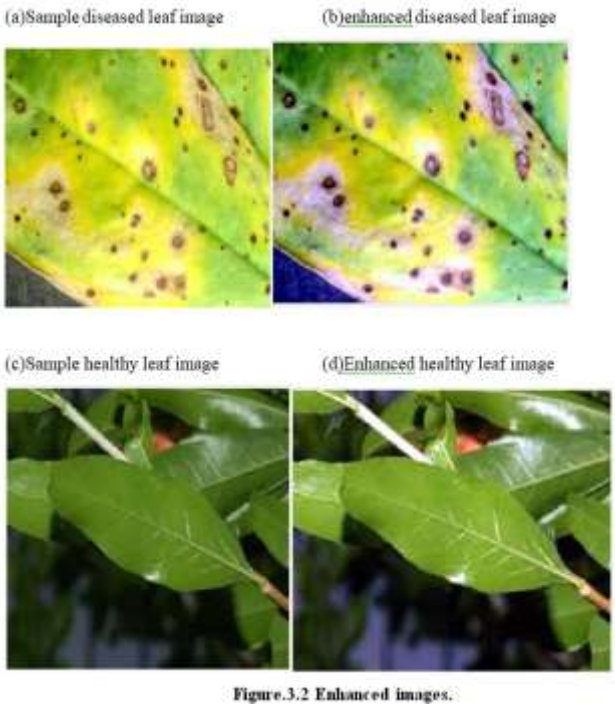

Figure.3.2 Enhanced images.

3.2 Segmentation

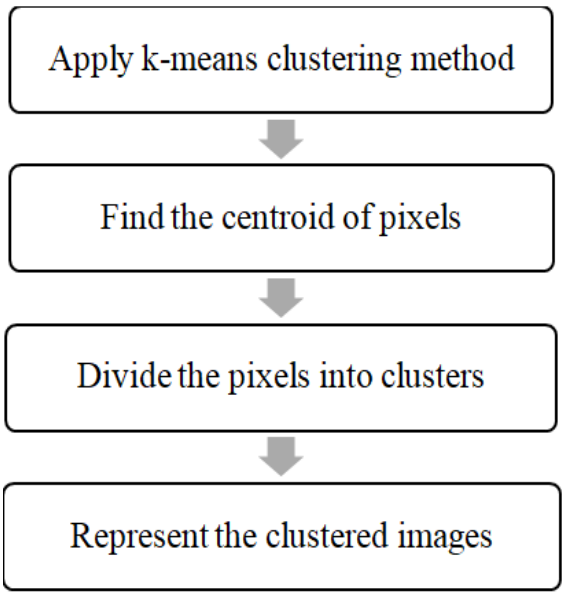

Figure.3.3 Stages of segmentation

Figure.3.4 Segmentation operation of diseased leaf image.

Figure.3.5 Segmentation operation of healthy leaf image

3.3 Feature extraction:

Algorithm 3.1 Statistical feature extraction

Input: Leaf image

Output: statistical features

Start

Step 1:read the image of segmented leaf image.

Step 2:calculate the features.

Step 3:generate feature vector.

Stop.

3.4 Classification:

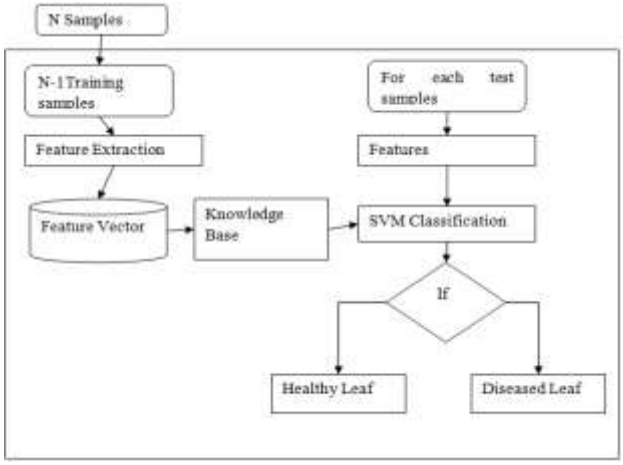

Figure.3.6.Stages of classification

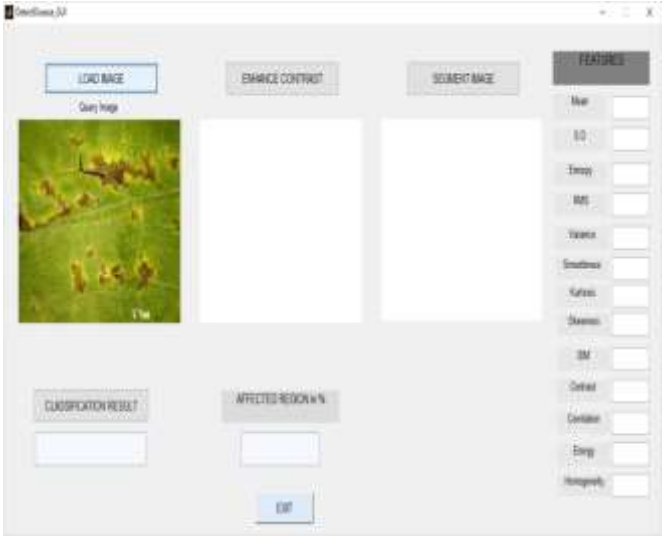

Figure.4.2 Loading Image

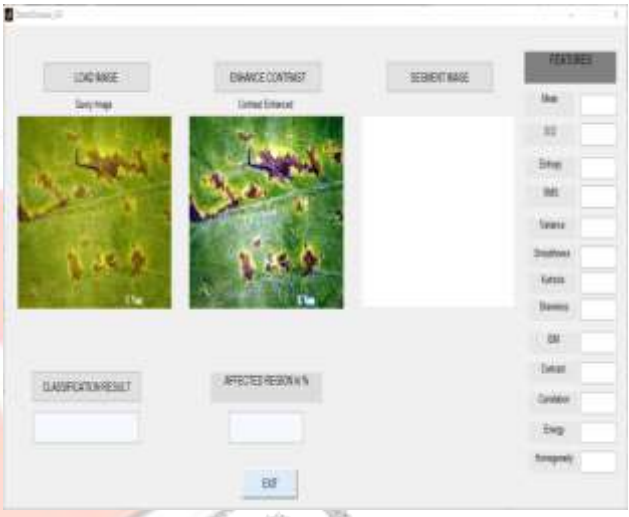

Figure.4.3 Loaded Image

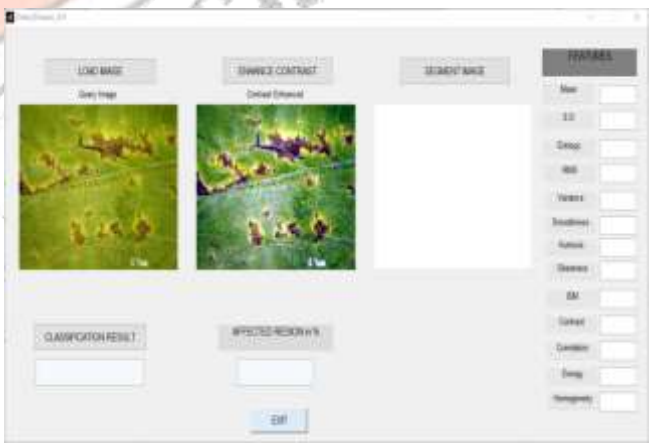

Figure.4.4 Enhancement of image

4. RESULTS

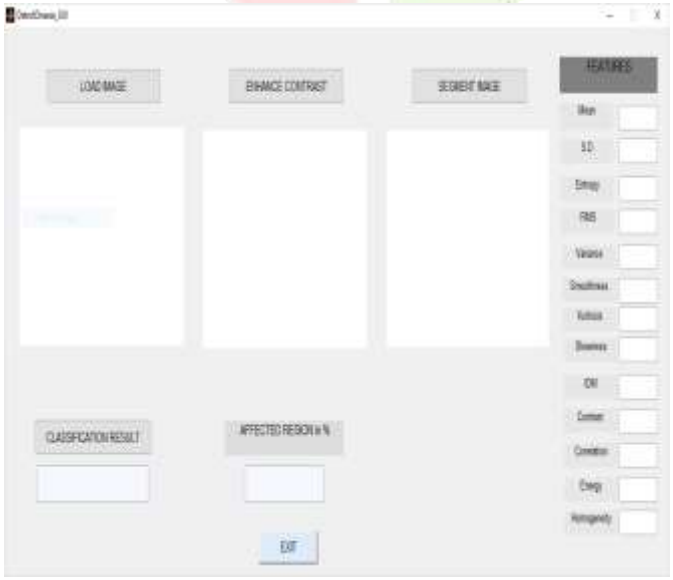

Figure 4.1 GUI of the project

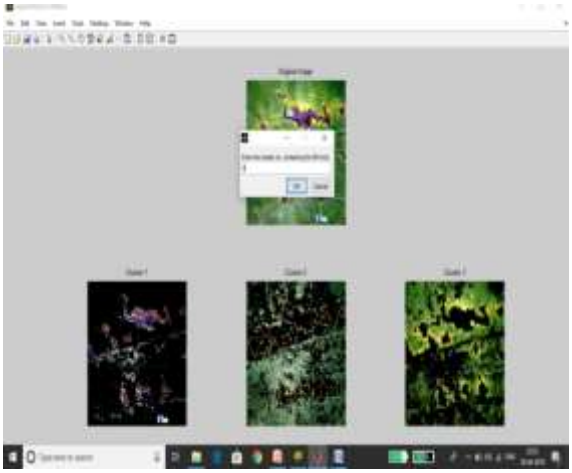

Figure.4.5 Segmentation of original image.

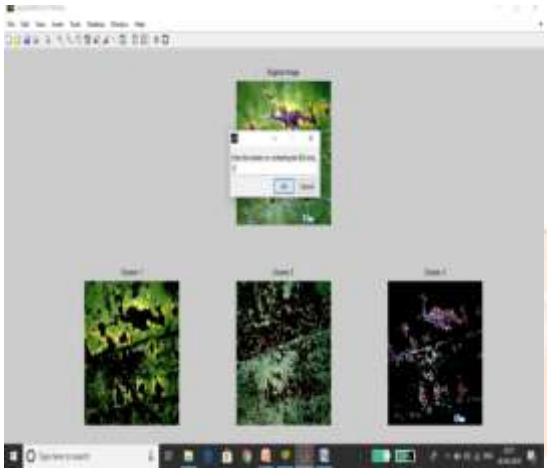

Figure.4.6 Selecting the cluster

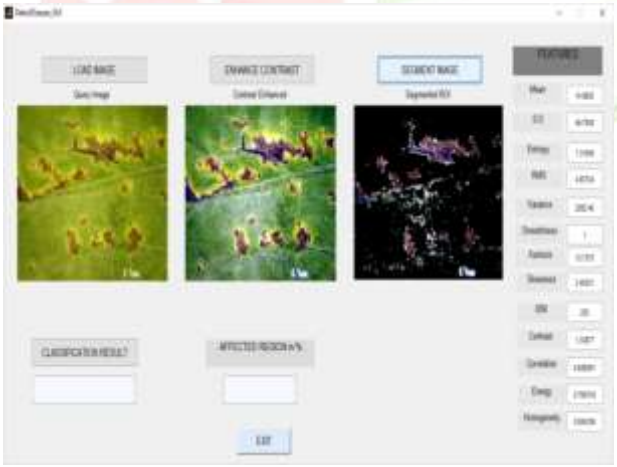

Figure.4.7 Features of the image

Figure.4.8 Result of Anthracnose diseased leaf.

5. CONCLUSION

This paper proposes the development of diagnostic classifier for leaf images of plant. Usually plant images are having the noise. Therefore, it is necessary to improve the contrast and suppress the noise present in the image for identification of diseased leaf of plant. The enhancement technique is used to improve the contrast of the images, it removes the noise present in the image. After enhancement technique the images are segmented using k-means clustering algorithm. The segmented images are used for the feature extraction. It extracts the relevant data about the segmented images. We have utilized the segmented images for the classification. Support Vector Machines are utilized to analyse data and recognize patterns with the assistance of algorithms, and it is used for regression analysis and classification.

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