DETECTION AND PREVENTIVE MEASURES OF LEAF DISEASES USING MATLAB AND IoT

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Abstract:

Most of the Indian economy is generated from the agricultural sector. There is a vast need of developing this sector in many ways in today's hi-tech world. The diseases in the crops are mainly due to the fungi, bacteria and a lot of the viruses. Even farmers somehow manage to control them, they can't get sufficient yielding from the crop. This is only due to lack of supplying the nutrients to the plants, lack of estimating the requirements of the plant and incorrect diagnosis of the diseases. Most of the times farmers give excess nutrients. All these make a lot of loss to farmer. If the exact diagnosis of the plant disease is made, then we can give the sufficient fertilizers and can save the farmer from wasting the money. Image processing is the best way to make the diagnosis of the diseases in leaves. We collect the photos of various plant diseases and make them as a data base. Here we are using the SVM classification technique to classify the diseases. The diseased region on the leaf will be known using K-means clustering and finally the disease is detected by applying the classification technique. Here we are also using region based segmentation technique, so that

exact precise details are given. In this paper apart from detecting the image, we also like to provide the preventive measures to the plant diseases by connecting this matlab tool with the IoT, so that this data about the diseases and the methods to prevent them and solutions to them, can also seen in an android app . By using the app and IoT, we can provide information to all.

Keywords: SVM classification, K-means clustering, region based segmentation, IoT, android app.

I.Introduction

Nowadays, the use of image processing has become so important that in every aspect we are using this. The usage of the image processing mainly involves in manufacturing sector, processing of unfinished goods, medical diagnosis and also in many of the sectors.

In our project, we would like to find out, whether the leaf is healthy or not and give the complete diagnosis of the leaf like the percentage of the diseased area, the accuracy of result and also others like mean, variance, energy, smoothness, skew, RMS value etc.,. To make this processing, we take lot of diseased plant leafs images and make them into a database. We take two types of diseased leaf images and made a database. A matlab coding algorithm is written such that our needs are fulfilled and the diseases are detected. In this section we have just given introduction to what we are doing. In the next sections we discuss about the literature survey, existing methodology, proposed methodology, results etc.

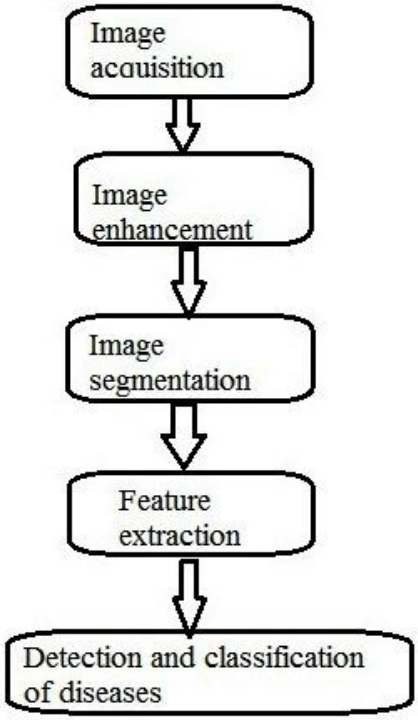
II.LITERATURE SURVEY

- Guyer et al.(1993) implemented an algorithm to extract plant/leaf shape features using information gathered from critical points along object boarders.(Based on location of angles along boarders and centroid)

- Tian et al.(2000) developed a machine vision system to detect and locate Tomato seedlings and weed plants in a commercial agricultural environment.(Here Adaptive segmentation algorithm is used)
- Kataoka et al.(2001) developed an automatic detection system for detecting apples ready for harvest, for the application of Robotic fruit harvesting.(XYZ Color system is used)
- Recently in 2016, one of our senior (M.Tech) students did a project on "Automatic disease detection using the feature extraction". He mainly focussed on the colour of the leaf to detect the diseases.

Apart from these, there are several papers we studied and observed a lot of similarities for our project.

III.EXISTING METHOD

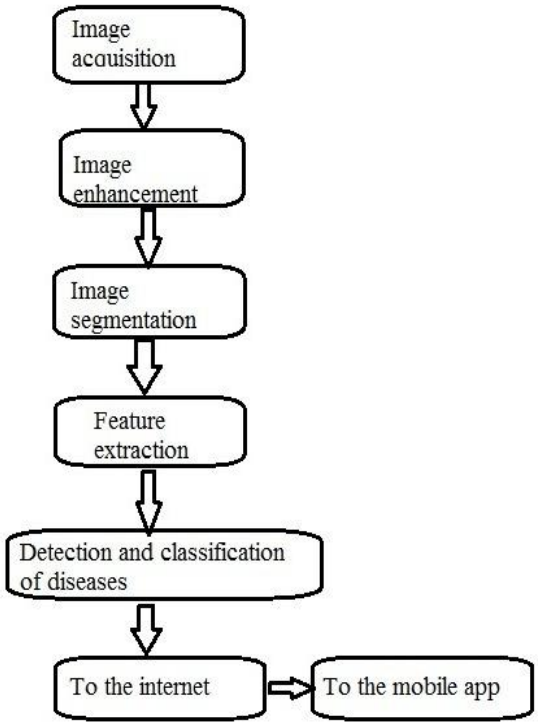


The above algorithm is the previous method used for the detection of the diseases. This method is common for all the image processing techniques. In this, first the image is taken and then the image enhancement is done by placing the filter characteristics and then segmentation is done and clustered and features are extracted based on R,G,B colored basis and the classification of diseases is then given as of the algorithm.

IV.PROPOSED SYSTEM

In our project there will be a change in the segmentation process, where we consider the gray scale images which are given a certain threshold levels. According to this we set a particular gray scale level for each type of disease and then the diseases are classified

accordingly.



In our project apart from the previous method and the thresholding of the grays scale levels, we are proving our processed image details to the mobile application using the IoT. For this we created an account in the "thingspeak.com" for the connectivity of the matlab code to the internet. We also created a small app where its displays the disease name and the remedies to that particular disease.

For this purpose we used the "MIT app inventor2" platform. Using this we can create any kind of apps which can be connected to the internet.

V.WORKING

As shown in the figure, the image is acquired, which is to be found whether it is affected with disease or not.

Fig: Acquired image

Then the image acquired is enhanced for the by the contrast enhancement.

Fig: Enhanced contrast

In this image it was looking better than previous one.

SEGMETATION:

The enhanced image is then made into clusters and we select a particular one, which looks better. Since we are using the thresholding we can take cutoff values of the gray values.

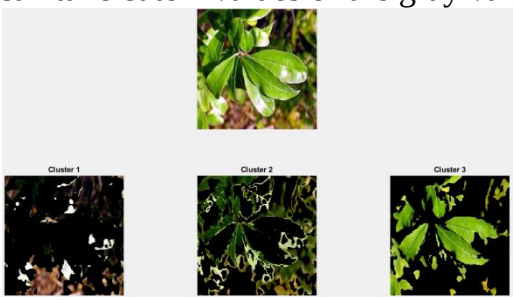


Fig showing segmentation

Here the clusters are considered and one of them is chosen for the segmentation. Then the segmentation is done based on the SVM (State Vector Machine) classification techniques in which, first training is given to machine based on the database we kept in the system.

MIT APP INVENTOR2:

In our project we are using the MIT App Inventor 2 platform, which is a internet based platform .We need to create an account in this and can create any app.

Fig showing creation of app

Then we need to create the app by entering the environment as shown in below figure.

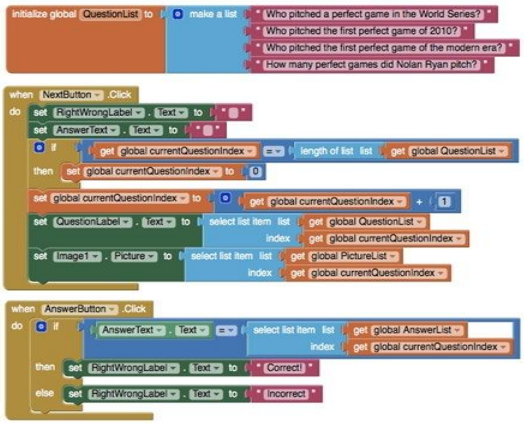
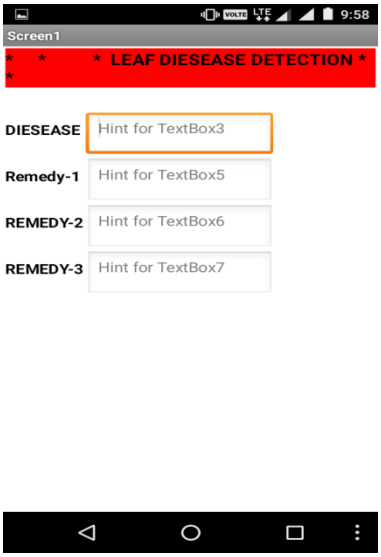


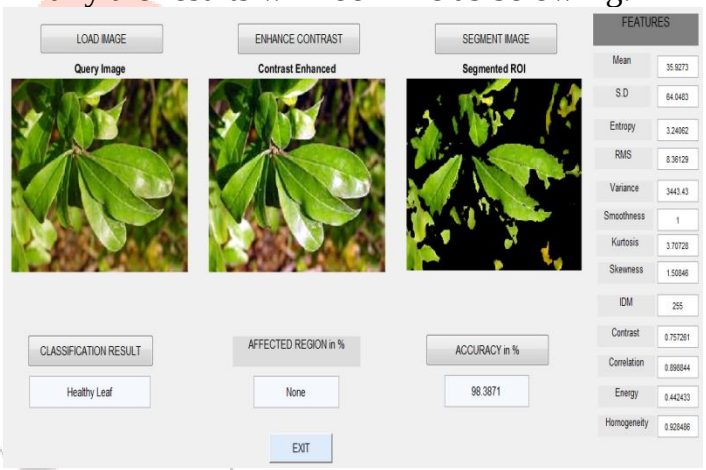
Fig showing app code blocks

Then we can install the mobile app into the phone where it appears as follows



VI.RESULTS:

Finally the results will look like as below fig.



The results can be seen by connecting with the internet and on the mobile also.

CONCLUSION:

Here by using the image processing techniques and classification techniques, the diseases are identified and also remedies for the diseases are also given in the app.

In future we can make this app as a fully developed app and can make better view of the looking of the app.

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