Hevea Brasiliensis Leaf Disease Detection using MATLAB

N.Kanthimathi, N.Saranya, A.Shyamalaprasanna, Guna selvi A, Poojha M

Abstract : Indian economy relies on Agriculture which is the back bone of India. Indian Agricultural sector accounts for 18% of India's GDP and employment to 50% of country workforce. Both quality and quantity of agricultural products are equally important. The conventional human naked eye quality inspection is not significant for large members of leaves as it is unpredictable and inconsistent. Disease identification is the key for decreasing and preventing plant illnesses. Health monitoring and contamination identification on plant is fundamental for feasible agriculture. It is hard to display the plant infections physically because it requires huge measure of labor, expertize inside the plant ailments, and furthermore require the over the pinnacle managing time. Thus the solution overcoming these kind of constraints is image processing. The process of image processing includes acquisition of photo, pre- processing of photo, segmentation of image, function extraction and class. To overcome digital image processing technoques has been implied. This paper proposed technique for evaluation and detection of plant leaf disorder using digital image processing. This paper proposes k clustering algorithm for the detection of the diseases. The major of the leaf diseases is mainly caused in hevea brasiliensis are Birds' eye spot, collectotrichum leaf disease and collectotrium leaf disease. This way of detection have immense potential to classify the diseased leaf among healthy leaves.

Keywords: It is hard to display the plant infections physically because it requires huge measure of labor, expertize inside the plant ailments, and furthermore require the over the pinnacle managing time.

I. INTRODUCTION

Agriculture is the mother of all subculture. Agriculture performs a vital position within the lifestyles of an economy. It is the spine of our economic gadget. Agriculture now not best provides meals and raw cloth however also employment opportunities to a very big proportion of populace.

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The philosophy at the back of precision agriculture isn't always handiest and toughest which is inclusive of an instantaneous inexpensive optimization for agricultural manufacturing, it also stands for a reduction of harmful output into environment and non targeted organisms. Beside food , plants produce products which are essential to humans that include wood and its products, drugs, fibres, oil, pigments ,latex and resins. As 80% to eighty five% of India society lives inside the rural areas (are agrarian), a care must be taken to guarantee the exceptional and quantity as well as the quality of the agricultural products. It is common to look different agricultural plants (plants used as a supply of meals and for several uses) sicknesses in exclusive parts of the Indian states and in distinctive seasons. Plant disorder which is the most important trouble which causes vast diminishment within the quality, quantity, development and amount of plant generation and production. Location and kind of plant illnesses are essential venture to improve plant performance and monetary development. Location and class are one of the enormously fascinating elements and additionally a outstanding deal greater talked about in constructing and IT fields. There are different kinds of assortment of strategies consist of which assist to differentiate the plant ailment, for instance, thresholding , watershed, locale growing, grouping and so on. Henceforth, to understand plant ailment the picture ought to enjoy some tiers like pre-making ready, department, characteristic extraction and type forms. The pre-getting ready is the development method of the photo information to undesirable value or beautify. The automatic system is designed to triumph over the troubles of guide techniques . The image could be captured by means of the ordinary digital digicam or excessive decision cellular cellphone camera .This image is given as enter to an device for acquiring the functions . The machine consists of numerous steps like like segmentation function extraction, identification and classification.

II. LITERATURE SURVEY

[1] Paper for Ground nut plant infection and its illnesses are Early and Late leaf spot utilized the pre-handling procedures which includes the transformation of the RBG leaf into HSV utilizing simultaneousness framework

[1] paper for Ground nut plant infection and its illnesses are Early and Late leaf spot utilized the pre-handling procedures which includes the transformation of the RBG leaf into HSV utilizing simultaneousness framework.

[2] citrus leaf affliction location . The ailments are explicitly Anthracnose, Citrus malignancy, Overwatering and Citrus greening.

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Picture pre- handling concerned tinge territory change by means of applying YCbCr shade machine and L*a*b* shading space moreover shading picture upgrade through utilizing discrete cosine rebuild. Dim Level Co Occurrence Matrix is utilized for work extraction to peer various realities comprehensive of intensity, differentiation, homogeneity and entropy.

[3] offered technique for recognition of Sun burn Orchid Black leaf and spot leaf infection. Preprocessing is gotten with the guide of histogram evening out, power change and sifting for photo improvement. Division stressed thresholding procedure and three morphological methodology which are executed for expelling and safeguarding the little and huge item separately. At last kind is finished with the guide of figuring of white pixels in leaf photograph and ailments are known.

[4] Tomato leaves sicknesses location and ailments are: Powdery shape and Early curse. Picture pre- handling included differing procedures comprehensive of smoothness, push off commotion, picture resizing, photo disconnection and legacy pushing off for picture upgrade. Gabor wavelet change is applied in trademark extraction for work vectors likewise in classification Cauchy Kernel, Laplacian three Kernel and Invmult Kernel are applied in SVM for output choice & schooling for disease identity.

[5] Sugarcane leaf issue identification and afflictions are: Brown Spot, Downy shape, Sugarcane Mosaic, Downy Fungal, Red stripe and Red decay. Pre-handling included transformation of RGB picture to grayscale and undesirable parts are wiped out. Sound locale and conceivably contaminated spot are situated by division. Direct, Non straight and Multiclass SVM are executed for affliction discovery.

[6] Rice infection ID and thought about the two disorders, explicitly Leaf Blast and Brown Spot. Limit location and spot recognition strategies are utilized for work extraction of the kindled pieces of plant's leaves. Creators presented SOM (Self Organizing Map) neural network in zooming set of rules for kind of rice unhealthy photos. Technique for making of information vector in SOM is cushioning of zeros and insertion of missing focuses, zooming calculation offers incredible outcome

III. PROPOSED MODEL

INPUT IMAGE → PREPROCESSING → SEGMENTATION → FEATURE SELECTION → CLASSIFICATION
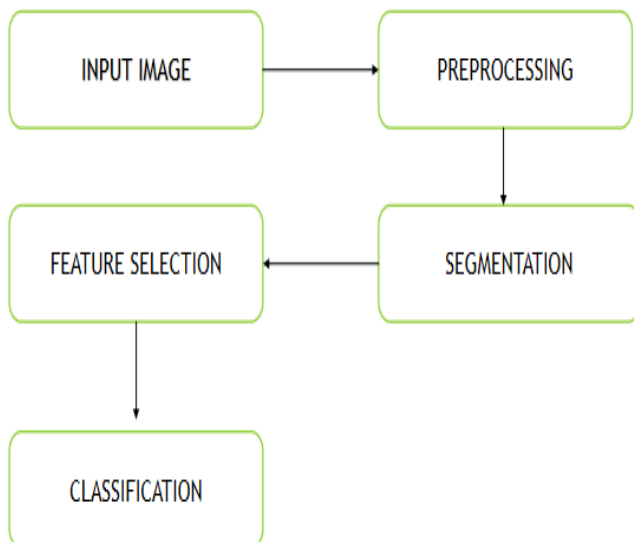
IV. TYPES OF HEVEA BRASILEINSIS LEAF DISEASE

A. Corynespora leaf disease

Symptoms

The first manifestation can be lesions at the top floor of leaves. These are spherical, reddish-red spots that, with favorable conditions, will increase and spread abruptly. When they expand, the useless center turns into brown because of the fact the leaf dies. The infection can spread thru leaves to stems and buds, stop cease end result, and vegetation. On quit result, the lesions will appear more lightly colored and will typically unfold extra slowly.

Management

The leaves are badly damaged and regularly fall from the plant while the leaf spot kills them. Plant growth can be stunted and fruiting can be light and beneath-evolved. Flowering vegetation will often have vegetation destroyed fast via the fungus.

B.Bird's leaf spot

Symptoms

Disc-shaped spots with centre as grey and having brown border stand up in massive extensive variety in more youthful plants in the state of affairs. Disorder of flora characterised through round darkish spots with lighter surrounding tissue suggesting the advent of a hen's eye: which incorporates

a : a disorder of tea leaves because of a fungus (Cercospora theae) b : hevea brasiliensis rubber tree having leaf spot due to a fungus.

Management

Spray with 1% Bordeaux mixture .

C.Collectrium

Symptoms

Collectrium reasons the wilting, withering, and demise of tissues. It usually infects the developing shoots and leaves. The causative fungi (typically Colletotrichum or Gloeosporium) commonly produce spores in tiny, sunken, saucer- original fruiting our our bodies referred to as acervuli. Symptoms encompass sunken spots or lesions (blight) of various solar sunglasses in leaves, stems, stop result, or flora, and a few infections shape cankers on twigs and branches. The severity of the infection is primarily based upon on each the causative agent and the inflamed species and can range from mere unsightliness to loss of life.

Management

Anthracnose can be avoided with the useful resource of destroying diseased factors, using sickness-free seed and sickness-resistant kinds, making use of fungicides, and controlling bugs and mites that unfold anthracnose fungi from plant to plant.

V.   SOFTWARE IMPLEMENTATION

A.   Microscopic image

The images of the blood cells are taken as the input image in the image processing technique. The collected input images are used for further processing in the blood cancer detection using image processing techniques.

B.   Enhancement

The enhancement can also be called as pre-processing. During the process, the images that are taken may be disturbed by noise. So, there is a need for removing this noise before further proceedings. These noises can be removed by using enhancement or pre-processing techniques. For removing noise, we use various kinds of operators

Image Acquisition:

Sample hevea leaf pictures are obtained from the plant dataset. The photograph pre-processing, RGB picture is changed into LAB image. LAB which is helpful for coloration space gap is defective leaf like Luminance at a special position and fluorescence of different kinds of spots on leaf.

Image Pre –Processing:

The transformation of the pre-processing is primarily based on K-approach. a Partition clustering technique which   is used to partition 'n' extensive variety of observations into several clusters .In this technique, therange of clusters within the segmented image and colors are found in an photograph are used for the clustering. The benefit of

segmentation is based totally on K-method clustering method is that works on neighborhood records and global information of image. K-approach clustering algorithm is simple to enforce, speedy and bendy than others.

C.   Segmentation

In the process of segmentation the pixels which are green are extracted to stumble on affected part. If the inexperienced aspect is lower in all the leaves than the RGB aspect reset the pixels value would tend to 0.

K -Cluster Algorithm:

The leaves are partitioned into four exceptional clusters. It is beneficial when wide variety of classes are acknowledged prior. The okay approach extract and places the pixel records in the clusters. One of the clusters consists of the inflamed lea. The category of the object is done with the aid of minimising the square of distance between the cluster and the object

### D.   Feature selection

The First and the fore-most step is the computation of the co -occurrence matrix. The second step is the calculation of the texture function which   is primarily based at the co-prevalence matrix. This approach is thus highly beneficial to extensive variety of image processing and analysis packages from bio-medical areas to far flung sensing strategies.

E.   Classification

Neural networks are used inside the automated detection of leaf sicknesses. Neural community is selected as a class device because of its well-known method as a successful classifier for plenty actual packages. The education and validation processes are a number of the vital steps in growing a accurate approach version the usage of ANNs. The information set for schooling and validation processes includes two components; the training   function set which might be used to educate the ANN model; on the identical time as a attempting out functions sets are used to affirm the accuracy of the knowledgeable ANN version.
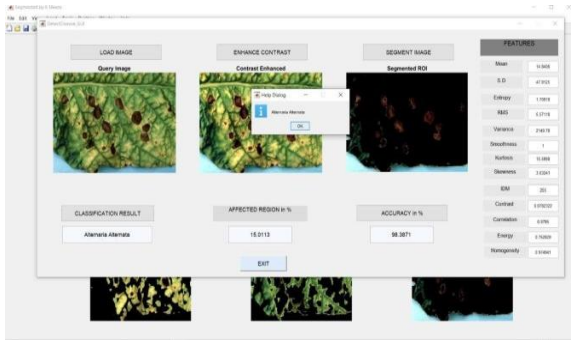
VI.   RESULTS AND DISCUSSION

The output images before and after processing is shown below. The image of the hevea brasiliensis leaf has been enhanced, segmented and partitioned into four clusters**.**
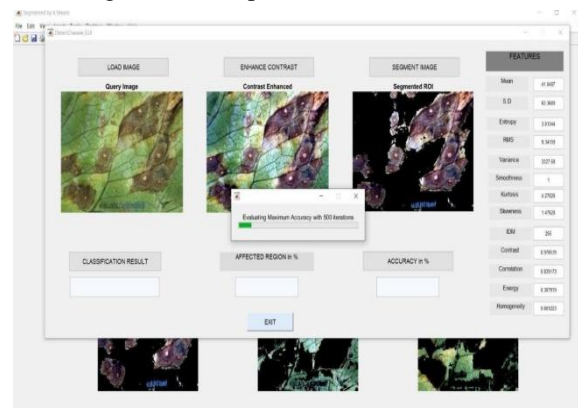
The proposed technique has classified the disease present in the input image as alternata with the percentage of affected region .The values in the below table clearly state that the proposed techniques has given the improved results with the accuracy of 98.38.

Features	Pre processing values	Processed values
Mean	41.0487	14.8406
S.D	63.3689	47.8125
Entropy	3.81344	1.70918
RMS	9.34109	5.57118
variance	3327.68	2149.78
smoothness	1	1
kurtosis	4.27026	15.5998
Skewness	1.47628	3.63241
IDM	255	255
contrast	0.978539	0.0782322
correlation	0.839173	0.9785
Energy	0.387919	0.762828
Homogeneity	0.881223	0.974941

VII. CONCLUSION

The two most important parameter that are required for the plant leaf disease classification and detection are speed and accuracy. Human existence is absolutely established upon the nature and the plants and their well -being. So there could be unique and special techniques to keep plants as well as flora from disease. The lower decrease in crop manufacturing also influences the financial system of the country.

There may be a need for suitable studies and   the appropriate method which can automatically notice and observe the plant leaf sickness. This main primary cause of this detection technique is to enhance the efficiency of the automated plant leaf disease ailment detection. Experimental research of the leaf disease suggests that the proposed technique of the disease can classify and detect the plant ailment with 98.2% accuracy. In the upcoming years we will work to increase our database for lots and lots of plant disorder identity, and use massive range of information as education motive to the system and the training purpose in identification and classification. When we increase the data rate and the data set, and the training to the system, it might be more accurate and speed would be high. Further we could compare the experimental results with the data speed and the accuracy.

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