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Agriculture Crop Leaf Disease Detection using Image Processing

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Abstract: ***As we all know that the Agriculture plays an important role in the Indian economy and majority of the individuals depends upon it and offers huge amount of the crops through the worldwide. The Illnesses in these crops are generally on the leaf's influences on the decrease of both quality and number of horticultural items. We should know the disease of the crop correctly to solve the problem. There will be a huge loss if we do not find the disease and treat properly. The view of natural eye isn't so a lot more grounded in order to watch minute variety in the contaminated piece of leaf. In this report, we are giving a programming answer for naturally identify and arrange plant leaf diseases. In this we are utilizing picture preparing methods to characterize alignments and rapidly finding can be completed according to infection. This methodology will upgrade the efficiency of yields in a efficient way and can get us the accurate disease which helps us to find the solution for the diseased crop. It observes a few stages with the help of these pictures obtaining, picture pre-handling, division, highlights extraction and genetic algorithm-based grouping. Relating to the cultivation of land, efficiency is something on which economy exceptionally depends. This is the one of the reasons that sickness identification in plants assumes a significant job in the agriculture business field, as having the illness in plants are very normal. In an event that legitimate consideration isn't taken here, at that point it causes true consequences for plants and because of which quality of each and every item, amount or efficiency is being influenced. The recognition of plant infections through some programmed step is gainful as it avoids a huge work of checking in huge homesteads of harvests. At the beginning of the crop harvesting step itself, it shows the side effects or the symptoms of the diseases. This proposed method surfaces into a new programmed manner by distinguishing the effects of the crop plant diseases. We are using some image processing techniques for the identification of the disease. Additionally, it watches the review on the various diseases order strategies which also can be utilized for plant leaf alignment. Picture division, which is a significant viewpoint for sickness identification in a plant leaf alignment, is finalized by the input RGB mask images.***

Keywords*: *This Methodology Will Upgrade TheEfficiency Of Yields In A Efficient Way And Can Get Us The Accurate Disease Which Helps Us To Find The Solution For The Diseased Crop.

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I. INTRODUCTION

In India, agriculture business is the foundation and Major source of economy. Half of the population is associated with the cultivating exercises legitimately or by implication. Numerous assortments of natural products, grains and vegetables are delivered here and sent out to different nations. Subsequently it is important to create top notch items with an ideal yield.

As maladies of the plants are unavoidable, recognition of plant infections is basic in the field of Agriculture. In plants, infections can be found in different parts, for example, natural products, stems and leaves.

The primary illnesses of plants are viral, parasite and bacterial infection like Alternaria, Anthracnose, bacterial spot, ulcer, and so forth.,. The viral infection is because of natural changes, parasite malady is because of the nearness of organism in the leaf and bacterial sickness is because of essence of germs in leaf or plants.

The proposed system can be used to detect the leaf diseases. The Programmed method to discover the plant diseases is a unique research since it can automatically identify the infections from the side effects that appears up on the plant leaves.

The proposed strategy is a programmed technique for sickness manifestations division in computerized photos of plant leaves, in which shading channel control and Boolean activity are applied on paired cover of leaf pixels.

The technique for self-loader division of plant leaf illness side effects in which the histograms of the H and shading channels are controlled and the strategy for programmed division of yield leaf spot sickness pictures by incorporating nearby edge and seeded district developing.

A technique has been introduced with the help of the genetic algorithm (GA).

Here we are performing in step by step process which includes the first step is that for the RGB image which we take as a input image, the structure of the colour transformation is being created and Histogram is been created for each and every mask image such as for red, green, blue masks and the next step is by using the observation of the pixels in each masks the green pixels are marked and removed.

Then the following step is pre-computing the threshold level, removal of the green pixels has been marked and removed for the further step processing and finally the segmentation is done for the input image and displays or results in the particular disease of the plant leaf's of the crops.

II. RELATED WORKS

1) Sanjay B. Patil, et al.Leaf disease severity measurement using image processing:- Order of illness is finished by computing the remainder of leaf region and sore region. As per the exploration done, the given technique is quick and exact for computing leaf illness seriousness and leaf zone figuring is finished by utilizing limit division.

2) Piyush Chaudhary, et al.Color transformbased approach for disease spot detection on plant leaf:- For Image alleviating Median channel is utilized. By applying Otsu technique on shading segment, count of edge should be possible to discover the illness spot. There is some clamor in light of foundation which is camera glimmer and vein.

3) Arti N. Rathod, Bhavesh Tanawal, Vatsal Shah Image processing techniques for detection of leaf disease:- The current techniques reads are for expanding throughput and decrease abstraction which comes because of unaided eye perception through which distinguishing proof and location of plant infections is finished.

4) Venkatesh Vijayaraghavan, Akhil Garg, Chee How Wong, Kang Tail, Yogesh Bhalerao :- Some of the soft computing methods such as artificial neural networks (ANN), genetic programming, and fuzzy logic. These algorithms require input preparing information for tackling issues. These registering strategies create significant answers for muddled enhancement issues dependent on the information. In numerous models feed-forward system of three layers can be utilized.

5) Vijayaraghavan et al. :- In their work they expressed that with a help of support vector machine is a potential Artificial intelligence plan and can apply broadly to tackle the arrangement issues. The SVM which is utilized to take care of relapse issues is known as help vector relapse (SVR). SVR is exceptionally well known among scientists for giving speculation capacity to the arrangement model.

6) Bernardes et al Identification of foliar diseases in cotton crop:- Here they elevated the technique for the programmed order of cotton infections dependent on the component extraction of the side effects of the leaf's from the computerized pictures. This strategy uses the Support vector machine for the accurate result.

A. *Restriction of existing work:-*

- The usage despite everything needs exactness of result at times. More advancement is required.
- Priority data is required for division.
- Database augmentation is required so as to arrive at the more exactness.
- Not many diseases have been secured. Thus, work should be stretched out to cover more number of these diseases.
- The potential reasons that can prompt misclassifications can be as per the following: sickness side effects shift's starting with one plant then onto the next, highlights enhancement is required, all the more preparing tests are required so as to cover more cases and to anticipate the malady
  all the more precisely.

III. PROPOSED SYSTEM

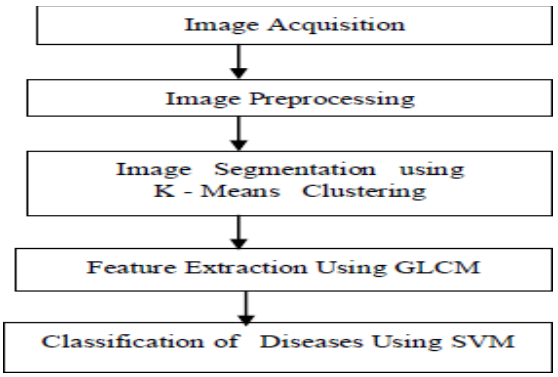
Automatic recognition and classification of leaf disease using image segmentation with SUPPORT VECTOR MACHINE (SVM) Binary Classifier is proposed. In this system, the various images of affected leaves are collected from web and some captured using camera. These images are used to detect the diseases on them. An image processing method would be helpful to detect the disease present.

A. The Algorithm is written below for the proposed system processes:

i. Image acquisition/collection is done at the very first step by collecting pictures of leaves.
ii. Then the image pre-processing is applied to the leaf pictures for enhancing the resolution of image. The aim of this process is to suppress the unwanted distortions.
iii. Mainly, the green coloured pixels are masked. The thresholding value computed, has to be used to the pixel. If, intensity of pixels of green component is appeared to be less than given threshold value, then value zero has to be assigned to red, blue and green parts of pixels.
iv. Then the cells under the masked portion where infected clusters are present are removed.
v. Genetic algorithm is used to segment the components which helps in classification of leaf diseases.

For doing the clustering properly, capability of searching the plant disease have to be used. For the unlabled points of the B-D in to K based clusters. Population is diminished in every round and the best chromosome is chosen to survive for the coming round of processing. Advantages are as follows:

- Estimators are used for the auto initialisation of cluster centres so there is no need of manual input during segmentation process.
- The accuracy of disease detection is improved in proposed system.
- Main advantage in proposed method is the system is as it is totally auto whereas the present systems want manual input by user to select suitable process of segmentation of the given image.



IV. IMPLEMENTATION

The following are the modules used in this system and all are listed below:

- Image Gathering/Acquisition
- Image Pre-processing
- Image Segmentation
- Feature Extraction using GLCM feature

Plant Disease Classification

4.1 Image Gathering and Input: The process of collecting the pictures from various fields like through camera and also some pictures from the web. The images acquired are saved in jpg. Format. The images should be of all kinds like normal, merely infected and largely infected.

4.2 Image Pre-processing: The process of Image Pre-processing is applied to the leaf pictures for enhancing the resolution of the image. This process is done to suppress the unwanted distortions. In this process, first, the image is re-sized to 300 x 300 and then the image thresholding is processed to obtain all the green colour components. Using Gaussian Filtering, the unwanted noise is removed from the image.

4.3 Image Segmentation: Image segmentation is that the method to alter the illustration of a picture into significant kind, like to focus on object that is liked from background. K-means clustering segments by diminishing addition of squares of distance in between intensities of image and cluster centroides. This algorithm spots out k no. of centroides and then arrange every data point to the possibly nearest cluster.

4.4 Feature Extraction using GLCM: feature GLCM features to be distinguished from picture. The GLCM function describe the surface of pictures by registering the spatial relationship in between the pixels in the picture. The statistical measures are extricated from its matrix. SVM is kernel based algorithm utilized as a classification device. The SVM train algorithm expands the edge between training info. and class limit. The subsequent choice capacity relies just upon the training info. called as support vectors that are most near to decision perimeter.

4.5 Plant Disease Classification: The GLCM function describe the surface of pictures by registering the spatial relationship in between the pixels in the picture. The statistical measures are extricated from this matrix. SVM is kernel based algorithm utilized as a classification device. The SVM train algorithm expands the edge between training info. and class limit. The subsequent choice capacity relies just upon the training info. called as support vectors that are most near to decision perimeter.

Plant diseases affects each bulk and quality of agricultural product. Typically, differing kinds of diseases viewed at completely various stages during the development of crops. Speed of unfold change and also the kind of chemical. Also, this needs continuous watching by consultants which could be prohibitively costly. Further, in cases, people need to go long routes only to contact suitable consultants, which is too costly and also time waste. This classification method is employed to discover the kind of plant disease. In the given proposed system, SVM is used to classify the disease affected to the leaf.

V. RESULTS AND ANALYSIS

Fig (1) the original colour of infected leaf and the input for the GA based image processing technique, which is differentiated into three different pixels such as red, green, blue using an RGB image tool. An RGB image is a true colour image which is stored in the form of array in matlab that describes the colour of red, blue and green for the respective pixels.

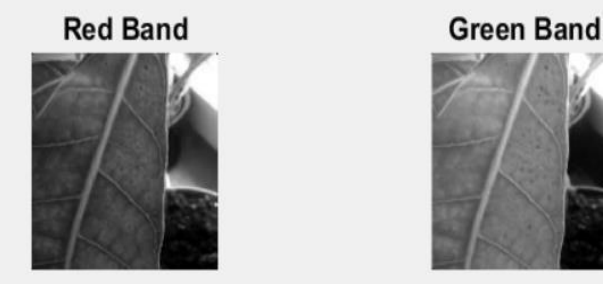
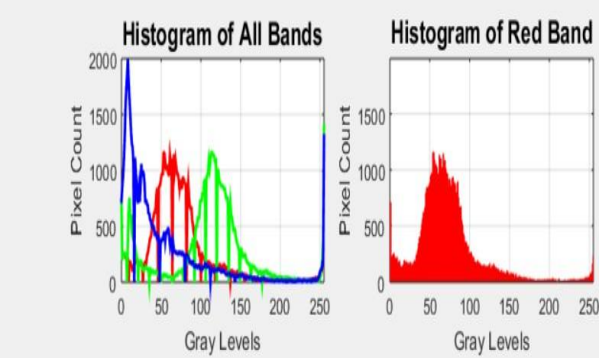


Figure (2) describes after using the RGB image, it classifies the original image to three different pixels according to their bands such as green band, red band, blue band.



Figure(3)image is classified into their respective bands, the histogram tool is used to plot the pixel count according to the grey levels. histogram displays the data in the graphical form . All the three bands are displayed in the different graphs and then submerged into a single graph data.

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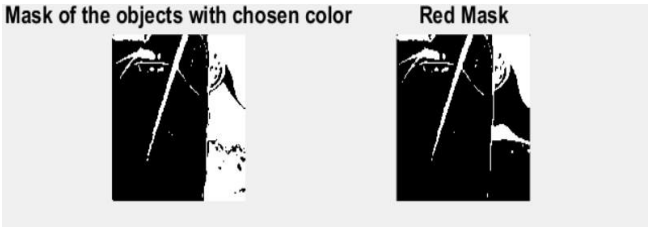
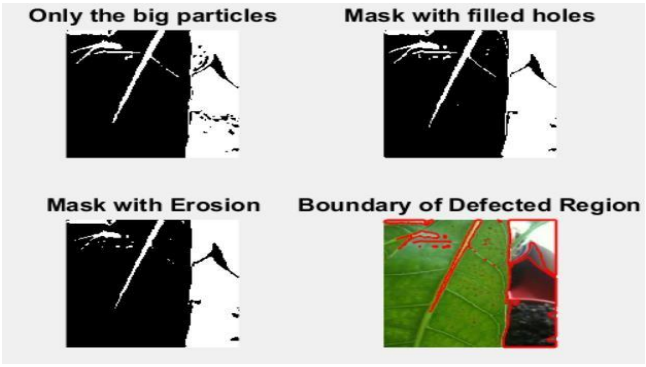
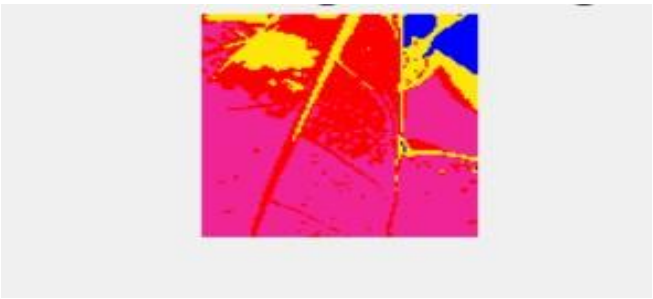


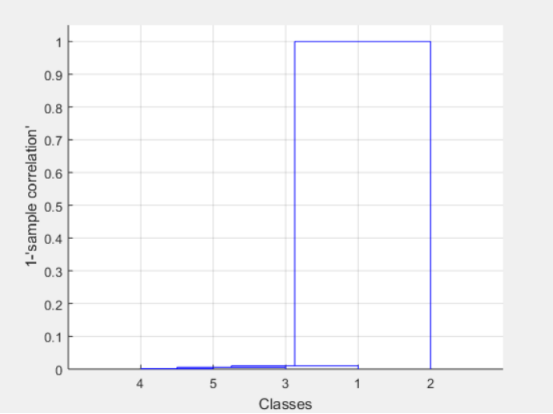
Figure(4)After the histogram data the image is converted into threshold binary images converts the grayscale image I to binary image BW.



Figure(5) Using the threshold binary image we can find the big particles and holes filled on the diseased leaf and also the boundary of the defected leaf.



Figure(6)genetical algorithm based segmented image The boundary of defected region leaf is used as the input for genetic algorithm (GA) to get an segmented image. Running the genetical algorithm in desired options such as create a cluster centre matrix(4(clusters) points in 3(features) dim plane)=[4x3] and create a distance matrix of each data points in input to each centres.



Figure(7) Using genetic algorithm and graycomatrix we can get the statistical and textual feature extraction.

Graycomatrix initiates the glcm for the calculation of grey-level pixels. Diseases such as

- Powdery Mildew
- Red Rust
- Anthracnose
- Leaf Spot
- Sooty Mould

VI. FINAL OUTPUT

Figure(8) using the genetical algorithm and image processing technique we can predict the disease of defected crop

VII. CONCLUSION

By using the above process and algorithms, we have successfully achieved the type of disease. From this we can study and summarize the image processing techniques such as SVM, K-means clustering. The project deals with the different diseases of the plant leaf and the detection of defected crop based on genetical algorithm and image processing technique based on given data some of the plant leaves were taken to examine and distinguish the difference between normal leaf and defected leaf. An advantage of using this technique is to identify the defected crop at initial stages and we can improve their conditions randomly. These arrangements can be successfully incorporated to the devices such as tractor thus we use cloud computing and machine to machine leads to the low cost of solution that help farmers.

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