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Detection of Plant Leaf Diseases in Image Prosesssing Using Matlab

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Abstract
About 70% of India's GDP comes from the agricultural sector. Drastic shifts in weather patterns, both in terms of temperature and precipitation, can have a profound effect on crop production. Phaseolus vulgaris L. is an important food legume crop, relied on by millions of people around the world. There are several diseases affecting it, the most serious of which being anthracnose. Anthracnose is caused by a fungus called Colletotrichum. Camellia asemia is a popular crop used to make non-alcoholic beverages. In reference to (J. W. Mast.) Wight is one of the most frequently grown plants in the world for use in non-alcoholic drinks. When the leaf is infected with the fungus Alternaria alternative, it suffers extensive harm. Farmers can be assisted in early disease identification and control with the use of state-of-the-art computer technologies like image processing used to construct automatic detection systems. As a result, the current research was conducted to automatically detect diseases in the leaves of the plants Phaseolus vulgaris (beans) and Camellia asemia (tea) using image processing techniques. There is a requirement for picture acquisition.
Keywords: Phaseolus vulgaris L, Colletotrichum, Image processing, Acquisition.

1.INTRODUCTION

Agriculture is the backbone of the economies of the vast majority of countries. The agricultural sector is vital to India's economy. Technology helps to achieve the desired results more efficiently and effectively. Agribusinesses can utilise image processing fields to boost plant output. The human body has limited abilities for early disease detection. As a result, it's important to develop a system that can identify different types of leaf diseases and identify them automatically. To a great extent, this depends on image processing. The system allows for input, using image processing to generate the desired outcomes from the photos. Photographs can be uploaded into the system, and the programme will employ image processing to produce the desired outcome.

2.RELATED WORK, RESEARCH

Agriculture is the backbone of the economies of the vast majority of countries. The agriculture sector is essential to India's economy. Technology allows us to get things done faster and better. Business agriculturists can use advancements in image processing to improve crop yields. The body's capacity for early illness detection is restricted. Therefore, it is crucial to create a system that can automatically detect and diagnose various leaf diseases. To a great extent, this depends on image processing. The system allows for input, using image pro-

cessing to generate the desired outcomes from the photographs. Photographs can be entered into the system, and the programme will utilise image processing to achieve the desired effect.

3.WORKING

A. Proposed model

To begin, pictures of adjacent farmland will need to be collected as input. In order to continue processing, the images must have the appropriate features extracted from them. The procedures of the suggested image processing system are presented in Figure 1. It serves as an illustration of the proposed system's sequential operation.

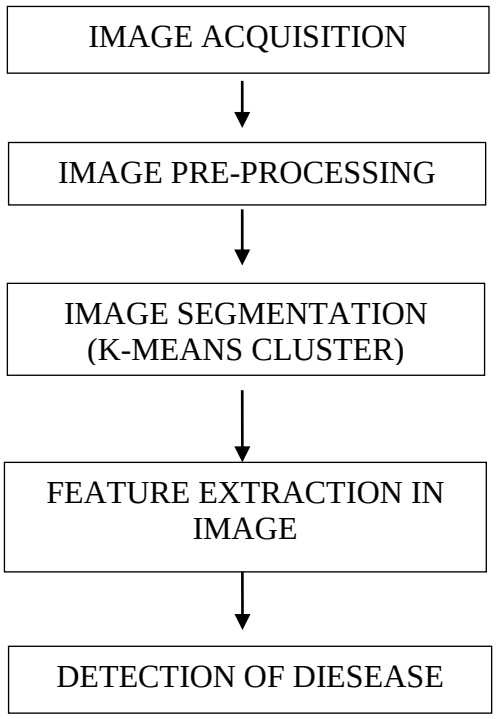


Figure 3.1 Steps for proposed image processing system

Algorithm:

Step1. Scan input image

Step2. Input pictures converted regenerate to grayscale images.

Step3. Apply enhancement.

Step4. Resize the image.

Step5. Apply a K-Means clustering operation.

Step6. Find the centroid of the pixels.

Step7. Divide the pixels into clusters.

Step8. Represent the clustered image.

Step9. Segmented output.

1. **Image Acquisition:** The first thing that is done is to take images for the purpose of detection. After that, it is put to use in the processing step.

2. **Image pre-processing:** Image pre- processing is achieved by contrast enhancement method.

3. **Image Segmentation:** Image processing techniques are used to segment an image into its component parts, each of which is determined to have its own unique information. The K-means clustering technique is utilised in the method that was suggested.

K-**Means Cluster:** K-means Clustering, which is a type of unsupervised learning, can be utilised even when the data in question has not been labeled. The purpose of this algorithm is to recognize groups within the data, with the value of the variable K functioning as a stand-in for the total number of groups.

4. **Feature Extraction in image:** The GLCM function is used in order to complete the feature extraction process. The Grey Level Concurrence Matrix (GLCM) method is the name given to the statistical texture feature extraction method that corresponds to the second order. Consider the higher orders of texture, such as the third and higher. Computationally speaking, their implementation is difficult to accomplish.

5. The number of grey levels, denoted by the letter G, in the image is the factor that decides the number of rows and columns in a GLCM matrix. The matrix element P I j | d,) contains the second order statistical probability values for changes between grey level I and 'j' at a particular displacement distance d and at a particular angle (). This element represents the frequency with which two pixels, separated by a pixel distance (x, y), one with intensity I and the other with intensity "j," appear in a particular neighborhood. One of the pixels has intensity I, and the other pixel has intensity "j

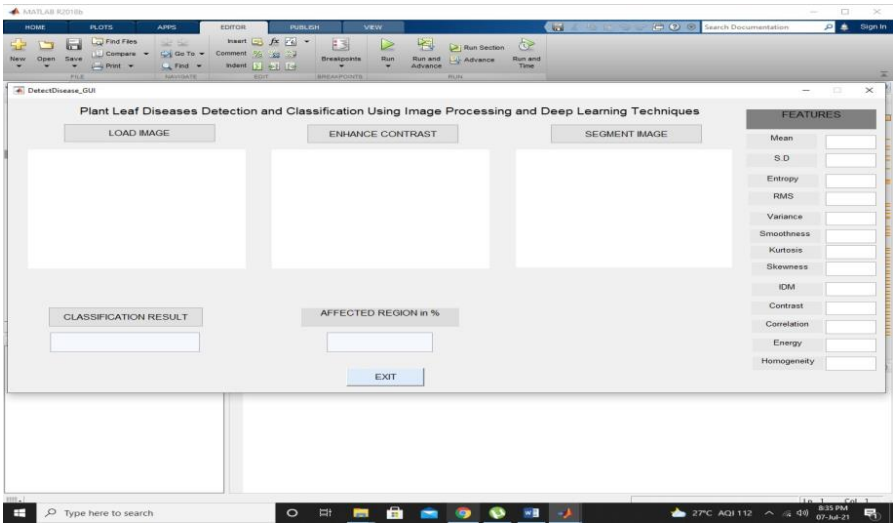
6. **Detection of diesease:** The Support Vector Machine Classifier is used to identify the diseases.

B. Simulation Software

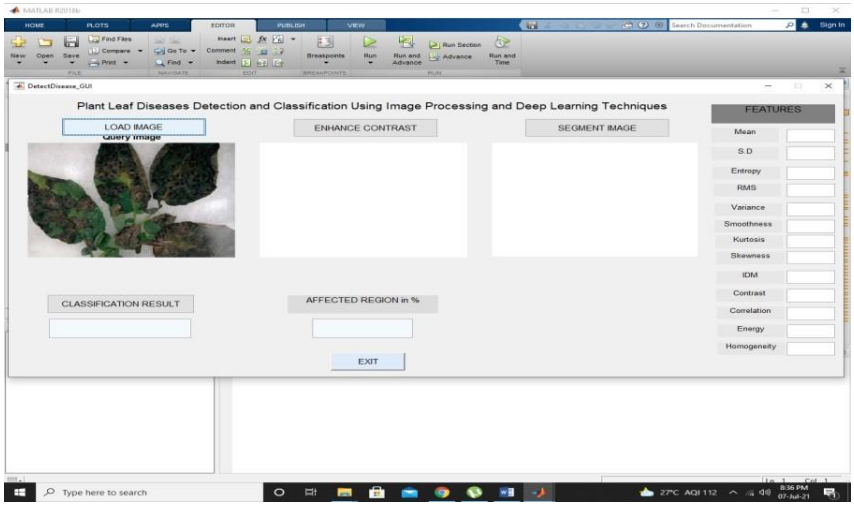
MATLAB® is a programming environment that allows scientists and engineers to analyse, design, and test new systems and technologies that have the potential to alter the course of human history. The heart of MATLAB is comprised of the MATLAB language, which is a matrix-based language that allows for the most natural expression of computer mathematics. MATLAB was developed by MathWorks.

In order to execute the code, we used the MATLAB software, and it was necessary for us to perform the execution in a well-defined method.

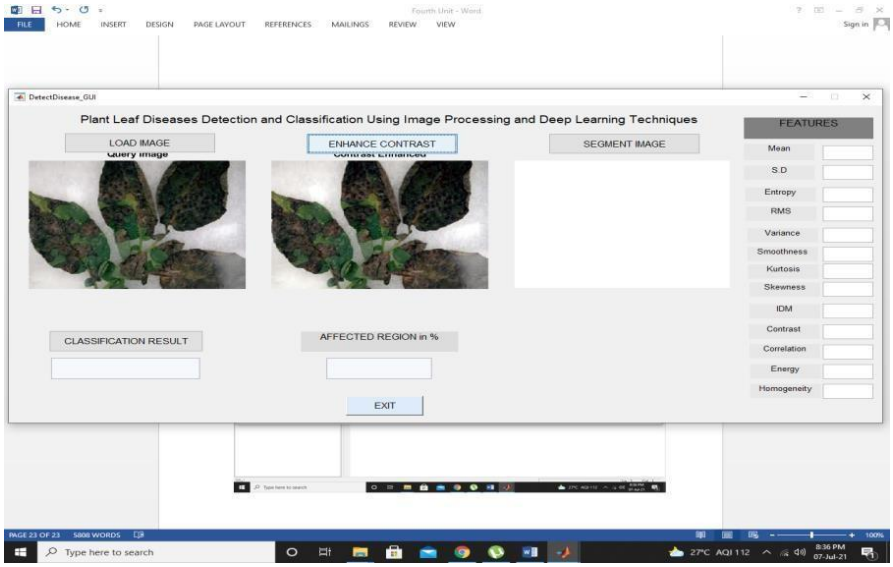
7.RESULTS



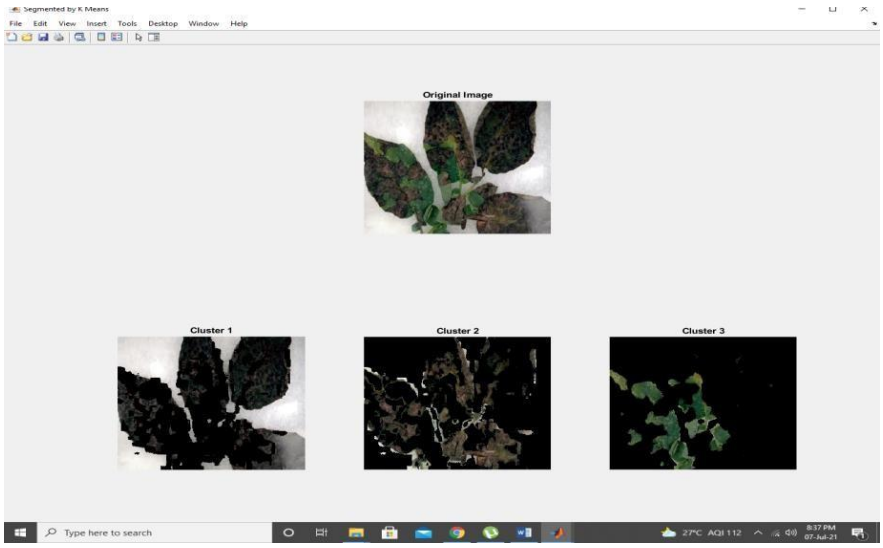
a) Inputs of the images of the diseased leaf



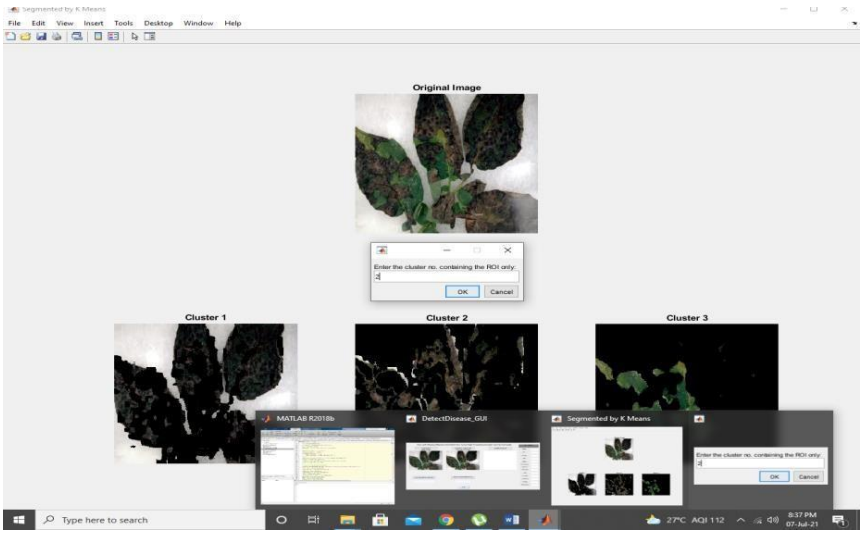
b) load image of the diseased leaf



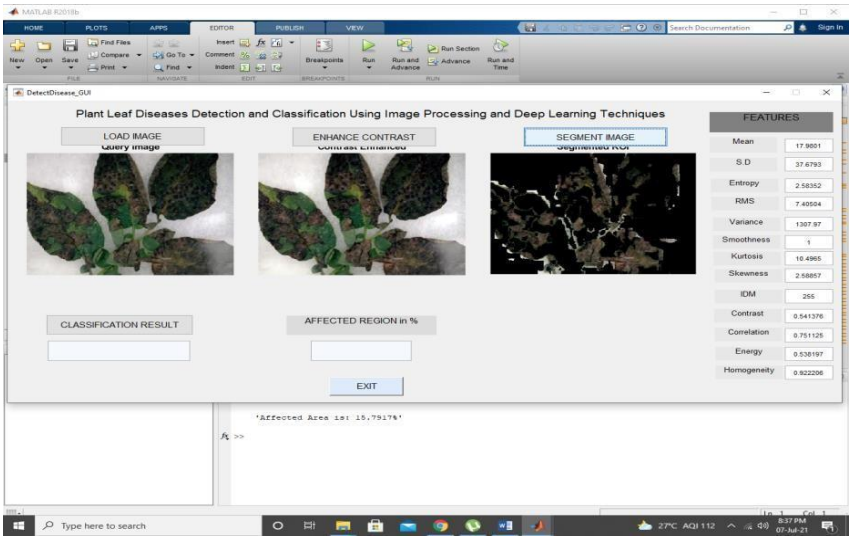
c) Enhance contrast of the diseased leaf



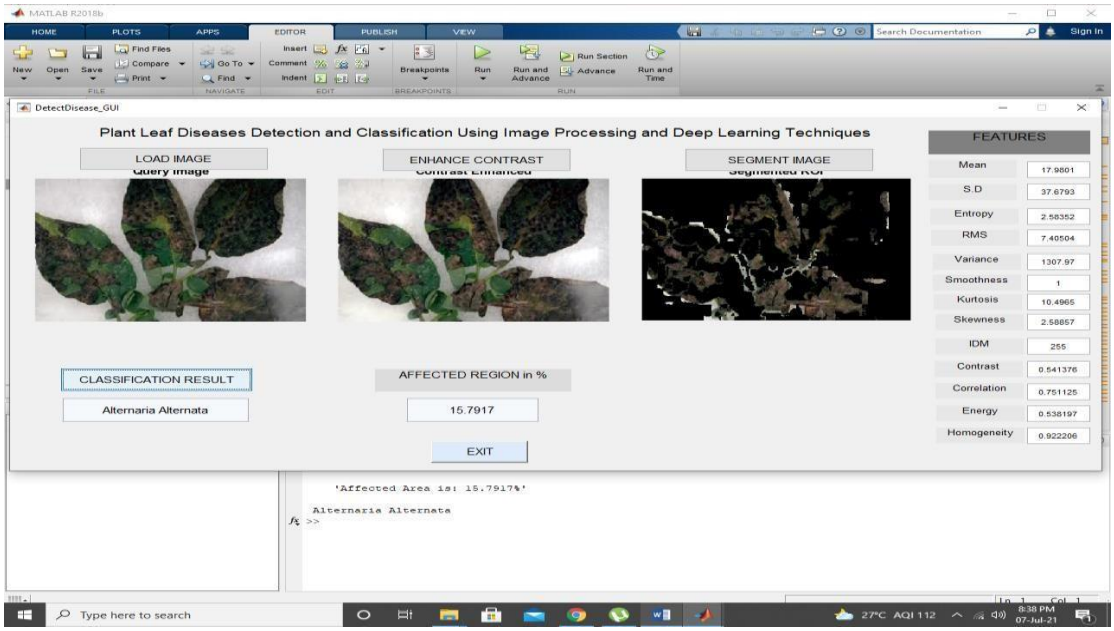
d) Original image of the diseased leaf



e) Clusters of the diseased leaf



f) Segment image of the diseased leaf



g) classification result of the diseased leaf

8. CONCLUSION

Detecting and naming plant diseases is the biggest challenge in plant management. Infections on plants are most noticeable on their leaves. Diseases of the leaves, caused by bacteria, fungi, or viruses, are a common cause of plant death. Accuracy in diagnosing diseases is crucial. In this study, we locate and name four diseases. The efficiency of the proposed system is 98.3 percent.

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