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DISEASE DETECTION OF POMEGRANATE PLANT USING IMAGE PROCESSING

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Abstract: This paper describes the techniques used to detect the plant disease using image processing. This paper describes image acquisition, image pre-processing, image segmentation, and feature extraction. In this paper spatial filter, K means clustering, GLCM and SVM are discussed. This paper gives the implementation results of plant disease detection. This present the 90 precent accurate results in disease detection. Detecting plant disease manually is difficult hence image processing is used.

Keywords: Segmentation, Feature extraction, Pre-processing, K means, GLCM, SVM, Spatial filter.

I. INTRODUCTION

India is an agricultural country, where most of the people depend on agriculture [3]. The purpose of Agriculture is not only to feed ever growing population but it's an important source of energy and a solution to solve the problem of global warming [1]. Research in agriculture is aimed towards increase of productivity and food quality at reduced expenditure and with increased profit, which has received importance in recent time [5]. The naked eye observation of experts is the main approach adopted in practice for detection and identification of plant diseases [2]. The classification and recognition of crop diseases are of the major technical and economic importance in the agricultural Industry [8]. Diseases of the plants are inevitable, detecting disease plays a major

role in the field of Agriculture. The term disease may be defined as the destruction of plant leaf. It can be bacterial, fungal and virus [7]. Plant disease is one of the crucial causes that reduces quantity and degrades quality of the agricultural products [4].

II. SYSTEM ARCHITECTURE

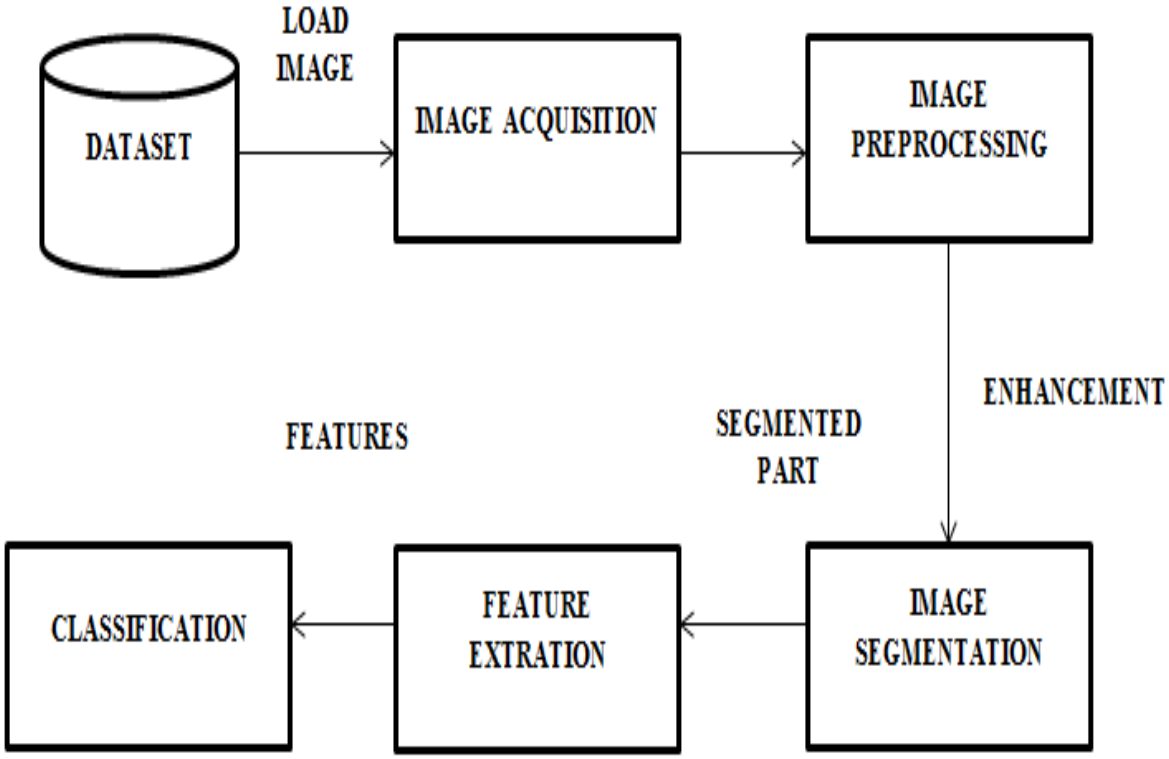


Figure 1: Block diagram of plant disease detection

The figure 1 describes the block diagram of plant disease detection. In this the pomegranate leaf image is taken as input. The input image is given for spatial filter for pre-processing. Pre-processing is used to enhance the image. After pre-processing the image is given for segmentation. Segmentation is used for partitioning. Partitioning is done using K means clustering. The segmented part is given to GLCM for feature extraction. The Region of interest is given for classification. Classification is done using SVM (support vector machine).

III.RELATED WORK

Shantanu Phadikar and Jaya Sil uses pattern recognition techniques for the identification of rice disease. This paper describes a software prototype for rice disease detection based on infected image of rice plant [9]. The FPGA and DSP based system is developed by Chunxia Zhang, Xiuqing Wang and Xudong Li, for monitoring and control of plant diseases. The FPGA is used to get the field plant image or video data for monitoring and

diagnosis. The DSP TMS320DM642 is used to process and encode the video or image data [9]. P. Revathi M. Hemalatha detected Cotton leaf spot diseases by using Homogenous Segmentation based Edge Detection Techniques [1]. Ms. Kiran R. Gavhale1, Prof. Ujawalla Gawande proposed the diagnosis system for leaf diseases [3]. Zulkifli Bin Husin and Abdul Hallis Bin Abdul Aziz developed fast and accurate method in which the chilli leaf diseases are detected using colour clustering method. Here graphical user interface is used [6].

IV. MODULES

The modules in plant disease detection are image acquisition, image pre-processing, image segmentation, feature extraction, classification.

Image acquisition:

Image acquisition is the step where the pomegranate leaf image is taken as input.

Image Pre-processing:

The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhance some image feature important for further processing [3].

Image Segmentation:

Image segmentation is the process of partitioning a digital image into multiple segments [3]. Partitioning is done by k means clustering. Steps for K mean clustering:

- Randomly select *'c'* cluster centers.
- Calculate the distance between each data point and cluster centers.
- Assign the data point to the cluster center whose distance from the cluster center is minimum of all the cluster centers.
- Recalculate the new cluster center.
- Recalculate the distance between each data point and new obtained cluster centers.
- If no data point was reassigned then stop, otherwise repeat from step 3.

Feature Extraction:

The aim of feature extraction is to find out and extract features that can be used to determine the meaning of given sample [3].

Classification:

In this phase to detect and classify the plant leaf diseases, we are using the classifier that is support vector machine [3].

V. USE CASE DIAGRAM

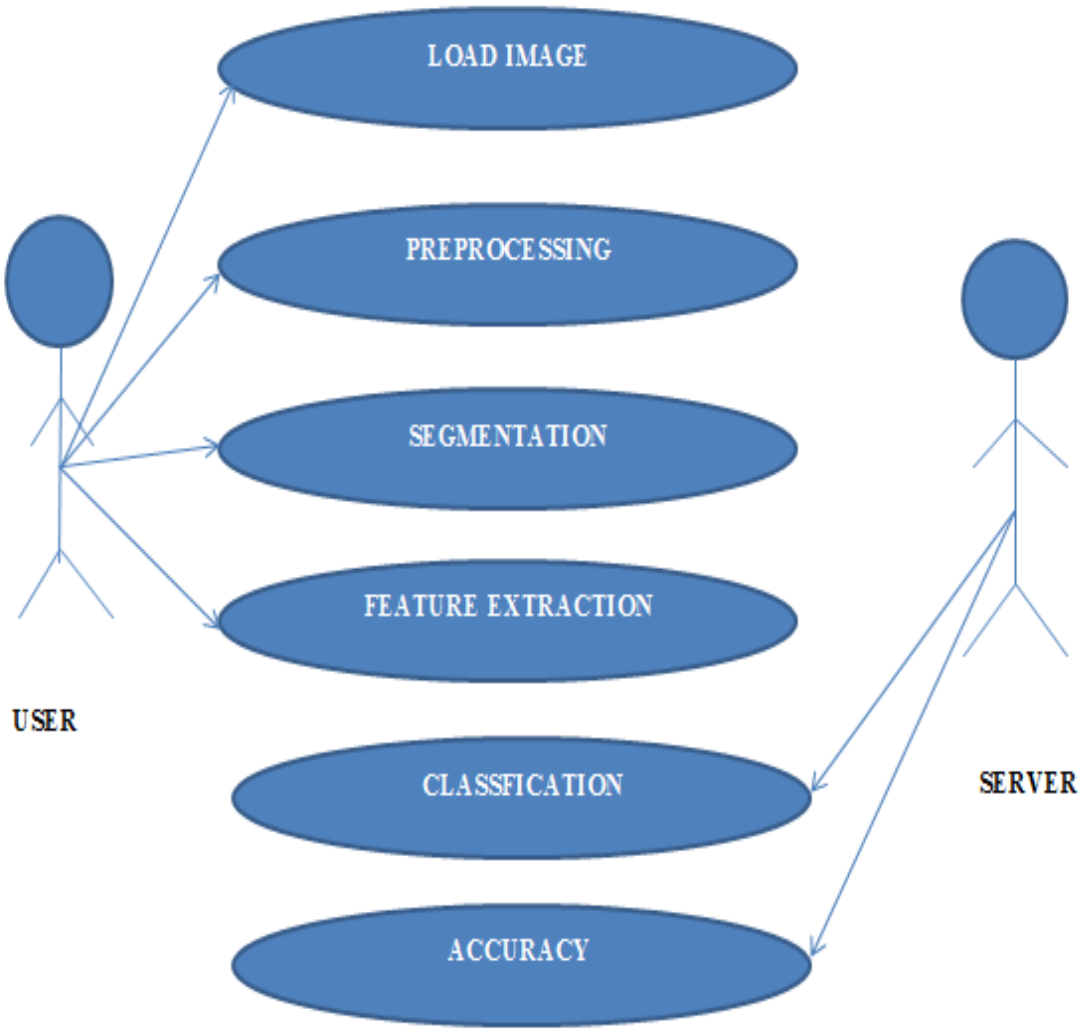
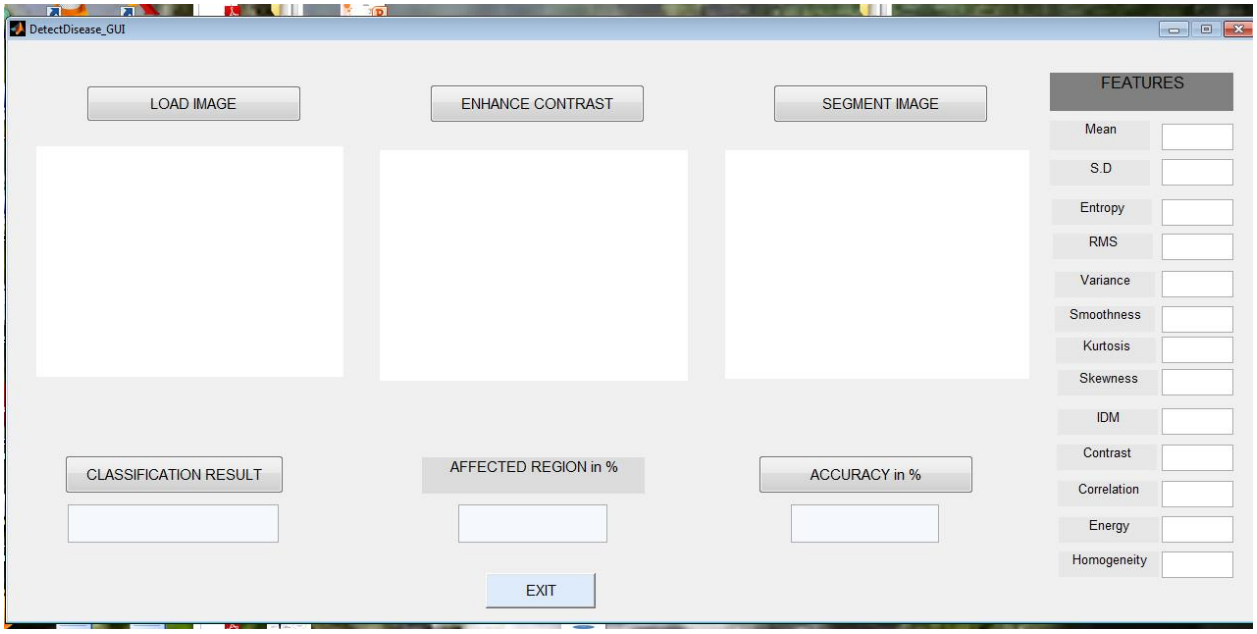


Figure 2: Use case diagram

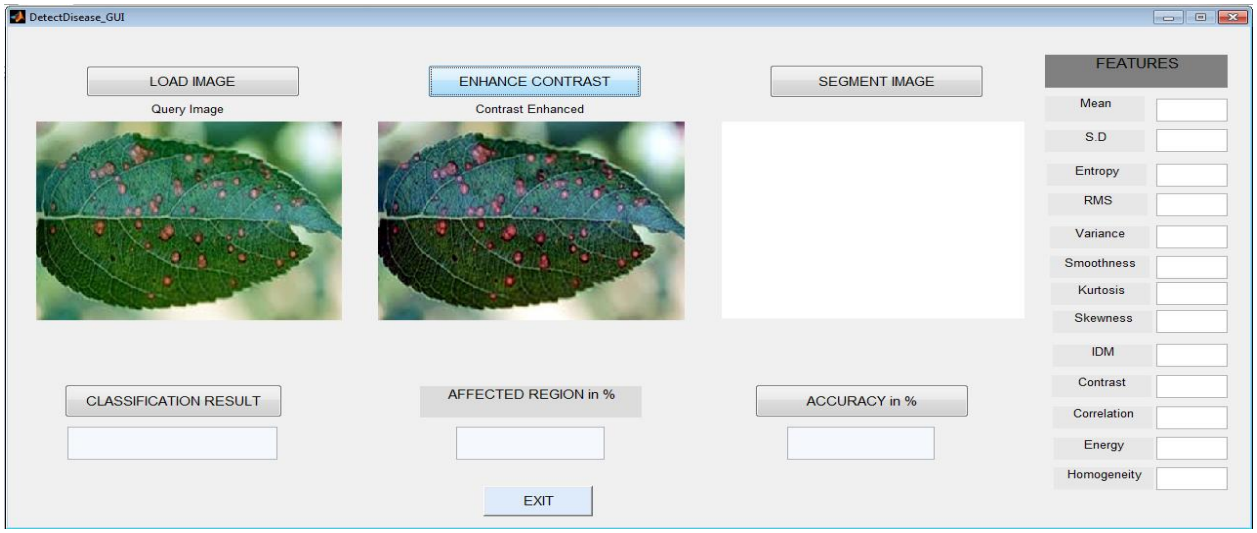
The figure 2 describes the use case diagram of plant disease detection. First pomegranate leaf image is loaded. Then the image is processed. The processed image is segmented. Features are extracted from segmented part. Then the segmented part is classified and accuracy is detected.

VI. SNAPSHOTS

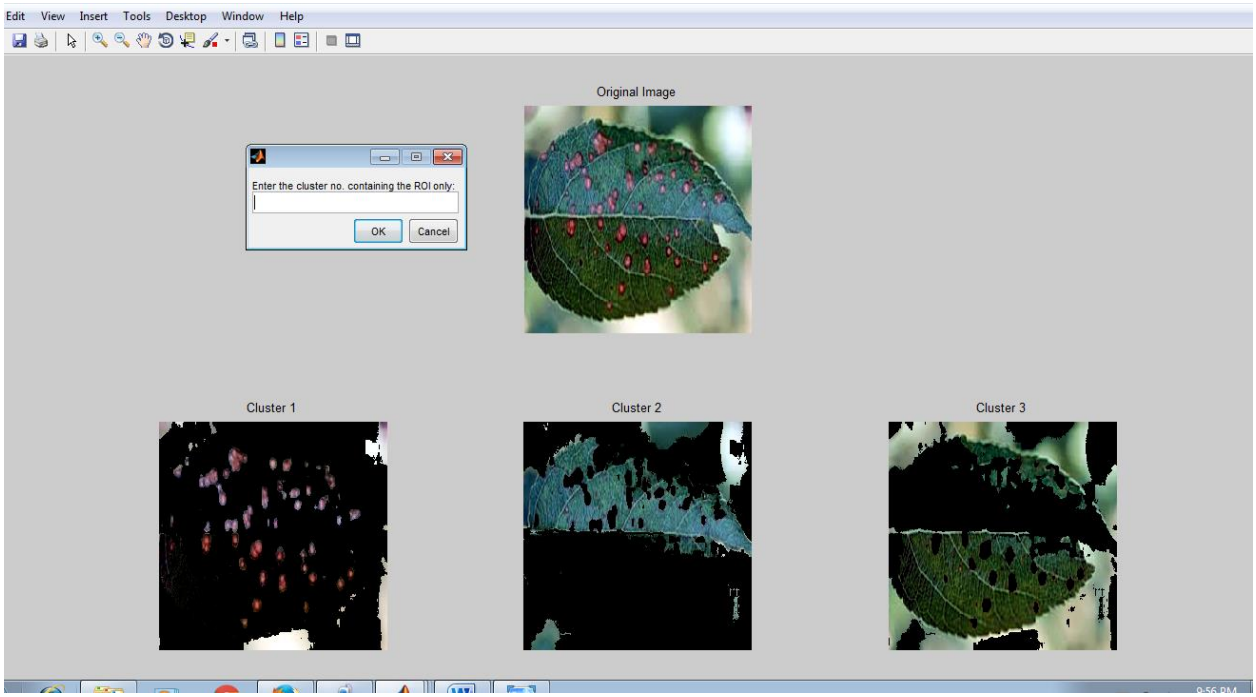
The snapshots show the output of the project. The snapshots give the output of each stage of the plant disease detection.



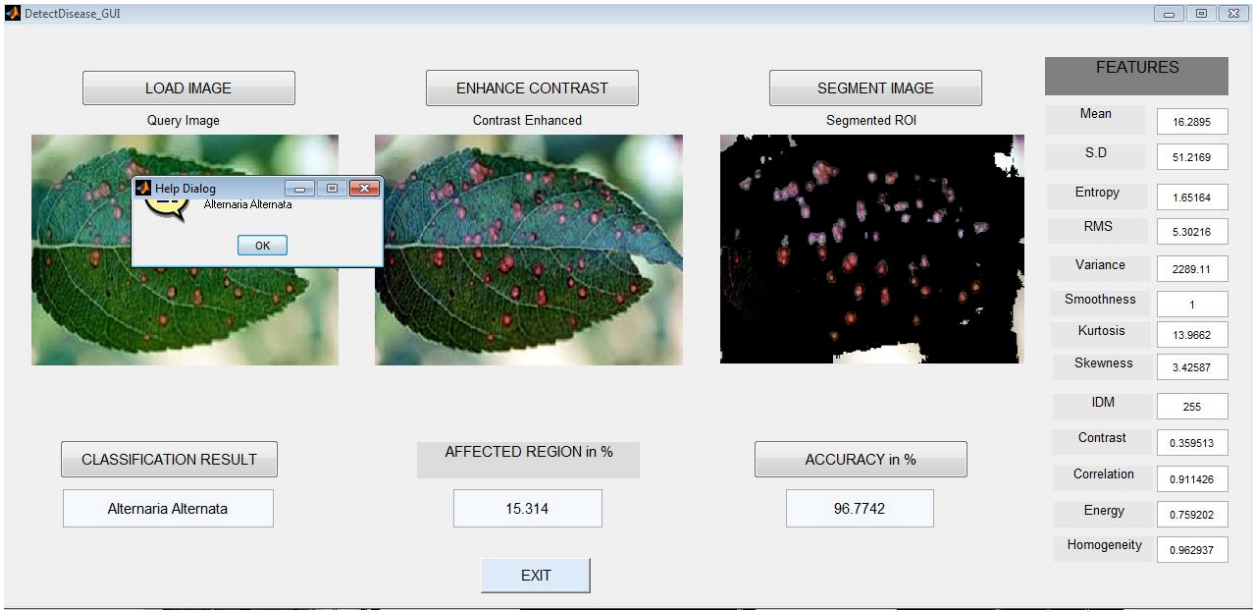
Snapshot 1: Snapshot of GUI window



Snapshot 2: Snapshot of load image and enhancement



Snapshot 3: Snapshot of clustering



Snapshot 4: Snapshot of feature extraction, classification and accuracy

Snapshot 1 shows the GUI window. Snapshot 2 shows the load image and enhancement part. Snapshot 3 shows the clustering part. Snapshot 4 shows the features, classification and accuracy part.

VII. CONCLUSIONS

This paper describes the steps used to detect the plant disease. It shows the implementation of plant disease detection. It provides better accuracy in detecting plant disease. Detecting plant disease manually is very hence image processing technique is used.

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