Analysis of Fruit Infection Detection Using Image Processing and Cloud Computing

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ABSTRACT : In this paper, it mainly focus on detection and analysis of plant infections which is present in crop fields and storage of information about the agricultural land and details about farmers in database and retrieving the information using Cloud computing. There are lot of plant diseases which occur due to the environmental conditions, mineral specifications, and insects in the farm land and many other miscellaneous factors. The detected information from the crop field is identified by image processing and stored in the database. It also aims to provide the farmer with required inputs for the fields at correct period of intervals by continuous sensing of plants.

KEYWORDS: Image Processing, Segmentation, Feature Analysis, K-Means algorithm, MATLAB.

I.INTRODUCTION

Agriculture has been the base for society and livelihood of the people. According to an estimate more than 60% of people are dependent on agriculture for their livelihood. The percentage of cultivable land is very high in India. This technique is to identify the infections in plants based on leaf, fruit and stem of the plant. In order to develop an automated technique to analyze the infections, a database is created. The database contains data related to plant leaf condition, minerals in the soil and the symptoms of disease to be affected.The plant details and the identification of disease from the feature variation are stored in the Cloud database. The entire database is viewed and compared on capturing the image. The mobile application is developed for accessing the data and providing intimation to the farmers. Thus the variation in image from the database and the test image indicates the disease in the plant.

II.METHODOLOGY

The technique identifies the infections at the initial stage by processing the images using MATLAB and provides the required information about the diseases. The cloud database contains the details of leaf, fruit and stem infections and they can be utilized by the farmers at any time using mobile application. And it improves the production and helps the farmers by direct usage.

III.BLOCK DIAGRAM

Here the infection in plant is detected using MATLAB simulation and the corresponding result of disease name and details is given to the cloud database. The complete block diagram infection detection is shown in figure 1.1
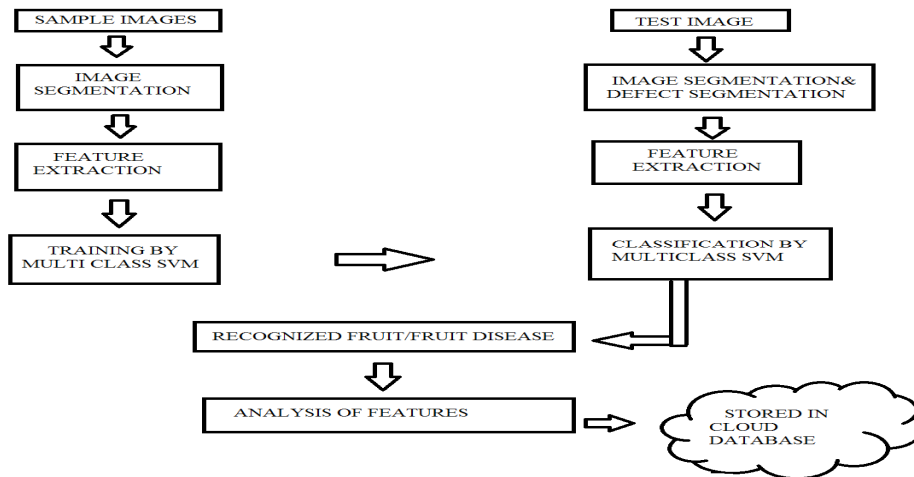
Fig 1: Block Diagram of Infection Detection Using Image Processing

IV. INFECTION DETECTION USING MATLAB

A. Image Processing

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image.

B. Image Acquisition

Image acquisition in image processing can be broadly defined as the action of retrieving an image from some source, usually a hardware-based source. Here the image is acquired from the camera or normal camera image from the database.

C. Preprocessing

The process of enhancing the image, which should be used for further processing, is called preprocessing. This process involves five steps of noise elimination, edge detection, and shape refinement to enhance the image.

D. Segmentation

Image segmentation is the process of partitioning a digital image into multiple segments. The goal of segmentation is to simplify or change the representation of an image into something that is more meaningful and easier to analyse. It is used to locate objects and boundaries in images.

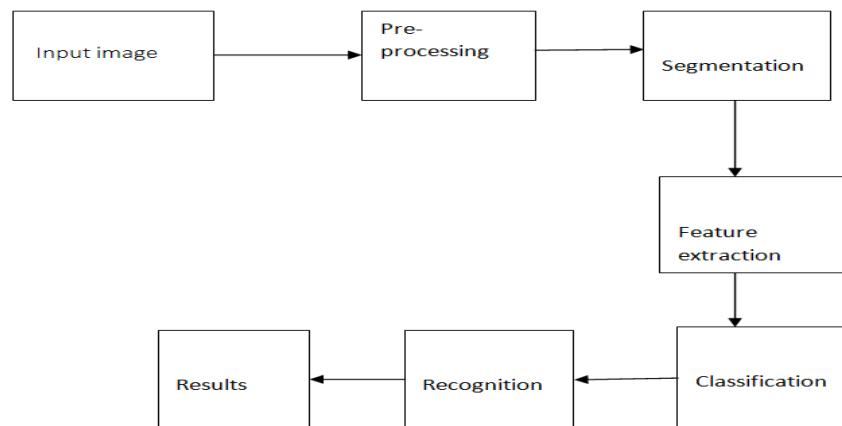The block diagram of infection detection is shown in figure 1.2

Fig 2: Flow Chart for Infection Detection

E. Feature Extraction

Feature extraction is a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. When the input data to an algorithm is too large to be processed and it is suspected to be redundant, then it can be transformed into a reduced set of features. Here the features of color, spots and shape of the fruit are considered.

F. Classification

The images are classified and numerical properties of various features are analyzed and classified into categories based on K-Mean classification technique. This technique involves the feature classification form the image features extracted.

G. Recognition

The image features are recognized and the infection in the leaf are identified by the feature variation. It refers to distinguishing the objects in an image by the specified features.

V. SOFTWARE DESCRIPTION

A. MATLAB

MATLAB is a high-level language and interactive environment for numerical computation, visualization, and programming. Using MATLAB, to analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java. You can use MATLAB for a range of applications, including signal processing and communications, image and video processing, control systems, test and measurement, computational finance, and computational biology. More than a million engineers and scientists in industry and academic use MATLAB.

B. CLOUD COMPUTING

Cloud computing describes the act of storing, managing and processing data online as opposed on your own physical computer or network. Cloud computing applies traditional supercomputing, or high-performance computing power, normally used by military and research facilities, to perform tens of trillions of computations per

second. In consumer-oriented applications such as financial portfolios, to deliver personalized information, to provide data storage or to power large, immersive online computer games.

Cloud computing uses networks of large groups of servers, typically running low-cost consumer PC technology with specialized connections to spread data-processing chores across them. This shared IT infrastructure contains large pools of systems that are linked together. Often, virtualization techniques are used to maximize the power of cloud computing.

Resulting Images of MATLAB

Here, the resulting images of MATLAB are shown in fig. Initially the natural image of fruit is provided as the input for the system. The image is segmented and the features are identified from the image. If the features of the test image varies from the original image, the disease detection is performed. The values of number of samples, True & False Positives, True & False negatives, Accuracy and Specification are analysed and displayed as output along with exact disease name.
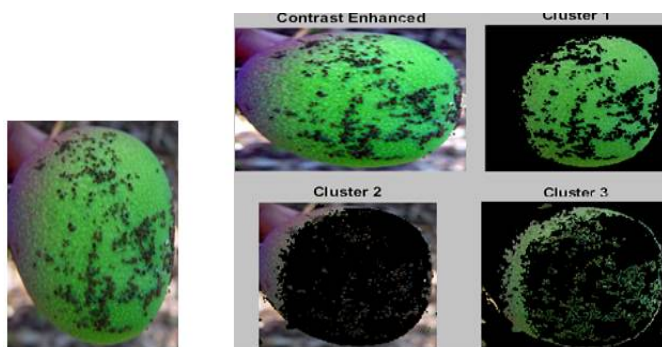

Fig 4.1.Input Image   Fig 4.2. Clustered Image

The infection in the fruit is identified by clustering the fruit image and disease is identified as Powdery Mildew.
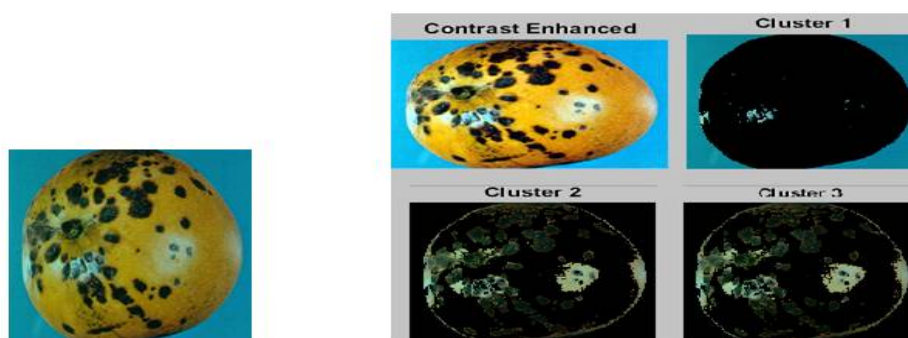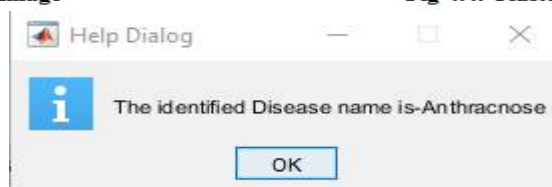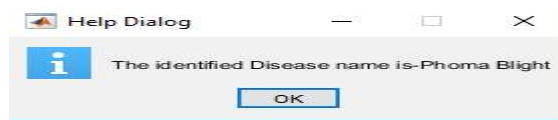

Fig 4.3. Input Image   Fig 4.4. Clustered Image

The infection in the fruit is identified by clustering the fruit image and disease is identified as Anthracnose.

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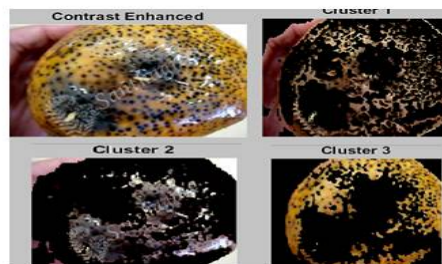**Vol. 6, Issue 2, February 2018**

Fig 4.5. Input Image

Fig 4.6. Clustered Image

The infection in the fruit is identified by clustering the fruit image and disease is identified as Phoma Blight.
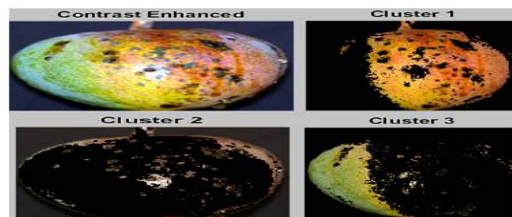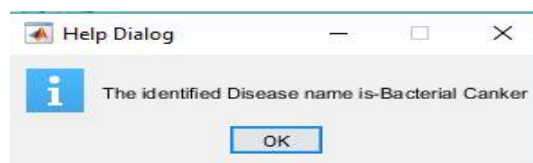
Fig 4.7. Input Image

Fig 4.8. Clustered Image

The infection in the fruit is identified by clustering the fruit image and disease is identified as Bacterial Canker.
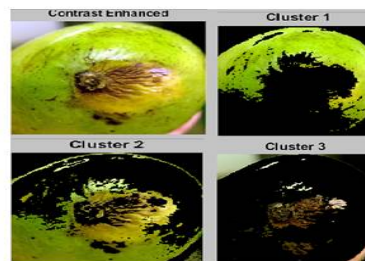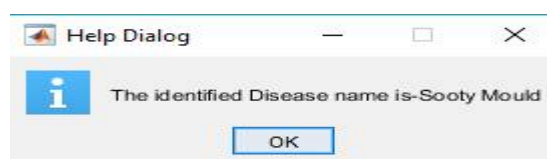
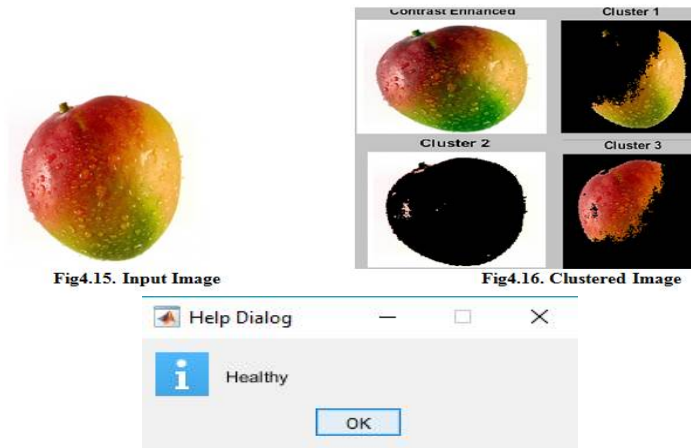Fig4.11. Input Image

Fig4.12. Clustered Image

The infection in the fruit is identified by clustering the fruit image and disease is identified as Sooty Mould.

Fig4.15. Input Image   Fig4.16. Clustered Image

The images of fruits are clustered and the fruit is found to be healthy without any infections.

VI. CONCLUSION

The classification and segmentation of fruit images were performed using K-Means Algorithm and SVM technique. The various features of the fruit were initially extracted and sent for segmentation of the respective images. After comparison with various disease names, the optimal disease for the image is analyzed, identified and the disease is indicated by an alert box. The total number of samples provided, the true and false positions, the true and false negativities, the accuracy and the specificity are also indicated in an alert box.

VII. FUTURE WORK

The infection in the fruit and leaf images are identified and the entire database of infection and its effects are stored in Cloud Database. The cloud database is accessed to view the infections through Mobile Application.

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