Smart Agriculture Using Machine Learning

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Abstract- *The main wealth of the India is farming. But damaging rate of that agricultural product is mainly through the natural disasters like floods and storm and second factor is the virus or bacteria affect the plant. For detecting the disease in the plants there are some experts even though it's not easy to approach every time. It may be expensive for knowing the disease of the plant. Finding of the affected once is not enough but the reason for the disease also will be useful to give the pesticides and some of the useful organic materials like fertilizers to increase the resistance of the plants to yield better quality results .As the result the total accuracy of the area affected. This paper presents detection of sugarcane plant diseases by using DWT (Discrete wave length transform) algorithm. By using some popular methods like automatic detection techniques the disease are detected fast.*

Keywords- Automatic detection, Bacteria, Disease detection, DWT, Quality, Virus.

I. INTRODUCTION

The production of crops is normally gets affected by the diseases. Hence, it is vital to use advanced techniques to increase the productivity of agriculture products and thereby increase financial income of farmers. Mostly plant related diseases infect due to pathogens, fungi, bacteria and viruses. In recent years, most of the crop disease detection systems were developed based on image processing. For such systems, input has to be the set of affected plant images that are saved in the database.

These images are captured by the camera by continuously monitoring the field. In this paper we are taking already captured images. The images are given to the system after that using image processing techniques the quality of the image is increased.

Methodology we are using

- Image acquisition.
- Preprocessing.
- Segmentation.
- Classification.

The symptoms of diseases will vary with respect to size, color, shape based on the virus affected and solving problem of feature extraction and preprocessing by enhancing the image quality.

II. EXISTING SYSTEM

Disease detection is done by using the mat lab. Here detection of the sugarcane diseases will be finding by using the set of samples collected in the database. Here in the paper they are taking only yellow leaf disease that is affected to the sugarcane crop severity every crop has some resistance if it is decreased means the crop will effects by some disease and it will spread continuously and causes the damage of the whole crop for improving the production range.

Drawbacks in existing system

- The existing system only focuses on the sugarcane borer diseases and not on bacterial, fungal and viral infections.
- Mostly conventional methods are used for detecting diseases Seeds are used for detection but it prone to give false results.
- Only one disease is identified in most cases.

III. PROPOSED SYSTEM

In our system the detection disease is done by using discrete wavelength transform (DWT) algorithm. There are some set of diseases in the database and check with the already stored input images. Digital camera or similar devices are used to take the pictures and stored in the data set which are different types of leafs and those are used to identify the affected area in leafs. There are different types of techniques used to process those images to get different and useful features needed for the purpose of analyzing later. Algorithm will be written below in step by step approach for the proposed image recognition and segmentation process.

In the initial step, the RGB images of all the leaf samples were picked up. The step-by- step procedure of the proposed system

- RGB image acquisition.

- Convert the input image from RGB to HSI format.
- Masking the green-pixels.
- Removal of masked green pixels
- Segment the components
- Obtain useful segments.
- Evaluating feature parameters for classification.
- Configuring SVM for disease detection.

Image acquisition

Image acquisition is the first point of data entry into a picture archiving and communication system (PACS), and as such, errors generated here can propagate throughout the system, affected leaf image is considered as an input image from the dataset of disease affected leaves.

Pre- processing

Preprocessing is performed to decrease the noise rate and improve the contrast of the image using filters. Spatial filters are operation where each pixel value is changed by function of intensity of pixel of the neighborhood image.

Segmentation

Enhanced image is segmented using edge detection method. To highlight the affected part and mask the green pixels and compares with the part which is turned in to another color. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image.

Feature extraction

Feature Extraction is the process of reducing the size of image data by obtaining necessary information from the segmented image. The visual content of a segmented image can be captured using this process. From the extracted features it is possible to demarcate between normal and abnormal brain MRI. The reliability of the classification algorithm depends on segmentation method and extracted features.

In this work texture features are extracted using Gray Level Co-occurrence Matrix (GLCM) and shape features are extracted using connected regions. Images with malignant tumor, benign tumor and normal brain have different features. This variation in feature values is useful in classification of MR images. The features thus obtained will be given to a classifier for training and testing.

Machine learning

In machine learning, pattern recognition and in image processing, feature extraction starts from an initial set of measured data and builds derived values (features) intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to dimensionality reduction.

When the input data to an algorithm is too large to be processed and it is suspected to be redundant (e.g. the same measurement in both feet and meters, or the repetitiveness of images presented as pixels), then it can be transformed into a reduced set of features (also named a feature vector). Determining a subset of the initial features is called feature selection. The selected features are expected to contain the relevant information from the input data, so that the desired task can be performed by using this reduced representation instead of the complete initial data.

Classification

Here, the diseases are classified based on the type of the fungus, bacteria, pathogen or virus the plant is affected and already predefined constraints given to classify the disease. In machine learning, support - vector machines (SVM) are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis.

Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting).An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible.

IV. DISEASE TO BE DETECTED

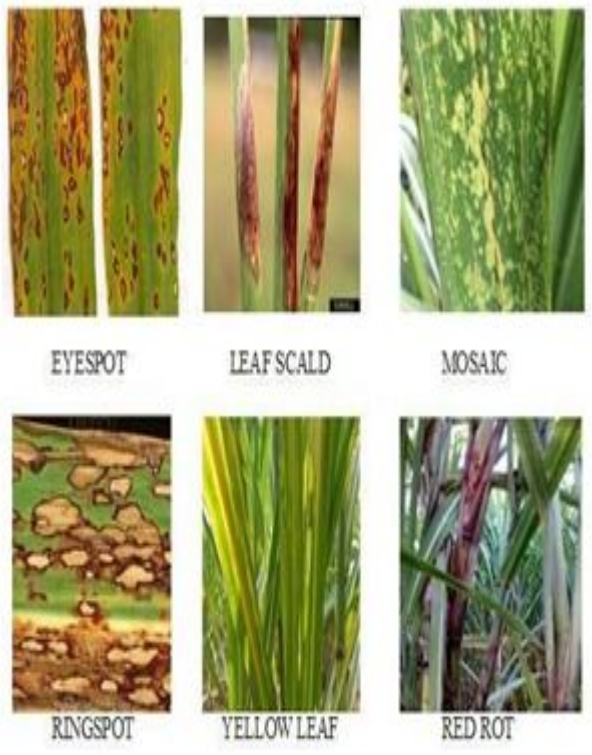

Fig 4.1 Types of Disease to be detected

V. FLOW DIAGRAM

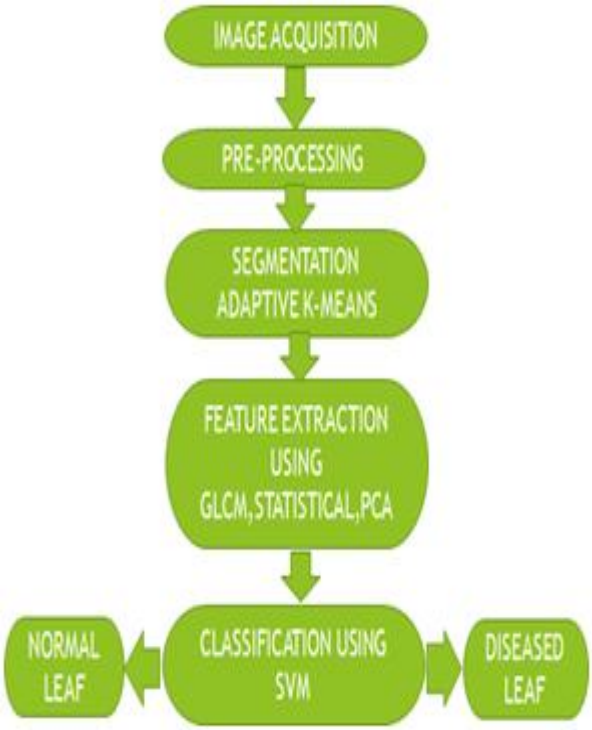

Fig 5.1 Flow Diagram of Process

VI. SYSTEM ARCHITECTURE

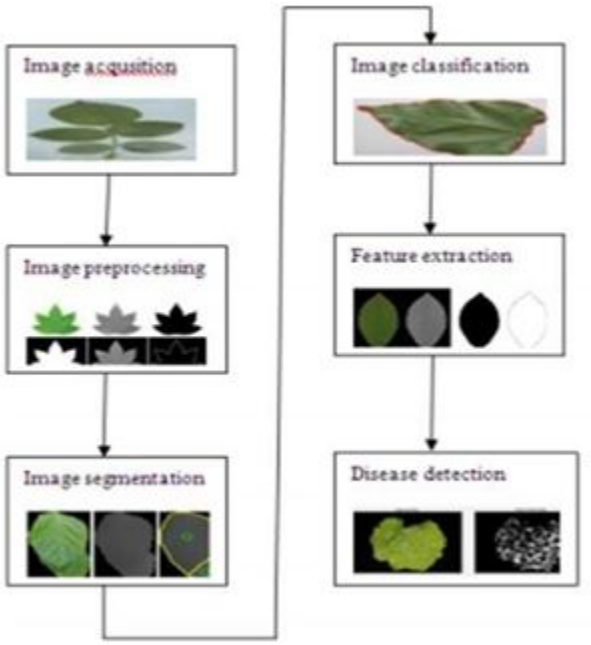

Fig 6.1 System Architecture

VII. ADVANTAGES

- 6 major diseases of sugarcane to be identified using this technique.
- Each technique in is implemented using algorithm which is in current trend.
- Sugarcane leaf is used for detecting all the diseases. More number of data sets is going to be given.
- The output is fast & accurate. The proposed method detects the disease in earlier stage and helps to eliminate the affected plant from the field.

VIII. CONCLUSION

In this paper, approach based on image processing to first detect and then classify leaves according to diseases is used. Here, image acquisition is performed by considering RGB color disease affected leaf image. Pre-processing of an image is done to enhance the image using filtering. Image segmentation is performed by making use of threshold value. Image feature extraction is performed to obtain the features of leaf disease symptoms. Image classification is performed using Decision tree (DT). Dataset of plant leaf affected from the diseases of Brown stripe, Ring Spot, Leaf scald and downy mildew are considered. These diseases are mainly of fungal, viral and bacterial diseases. In existing concept, SVM is implemented with ACO to improve the disease detection results.

In proposed system we are using DWT algorithm to improve the disease detection by improving the pixel range of the image. So, we say that proposed image processing concept is efficient enough to determine the plant diseases.

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