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PLANT DISESASE DETECTION BY USING IMAGE PROCESSING TECHNIQUES

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Abstract

In agriculture research of automatic leaf disease detection is an essential research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detects symptoms of the disease as soon as they appear on plant leaves. The term disease is usually used only for the destruction of live plants. This paper provides various methods used to study of leaf disease detection using image processing. The methods studies are for increasing throughput and reduction subjects arising from human experts in detecting the leaf disease [1].digital image processing is a technique used for enhancement of the image. To improve agricultural products automatic detection of symptoms is beneficial.

Keywords: Leaf disease, Image processing

1. INTRODUCTION

India is an agricultural country. Farmers have wide range of diversity to select suitable fruit and vegetable crop. Research work develops the advance computing system to identify the diseases using infected images of various leaf spots. Images are captured by satellite and processed using image growing, then the part of the leaf spot has been used for the classification purpose of the train and test. The technique evolved into the system is both Image processing techniques and advanced computing techniques.

Image Analysis Can Be Applied For The Following Purposes:

1. To detect diseased leaf.

2. To quantify affected area by disease.

3. To find the boundaries of the affected area.

4. To determine the color of the affected area.

5. To determine size & shape of leaf.

6. To identify the Object correctly.

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Figure: 1 Image analysis.

Disease management is a challenging task. Most diseases are seen on the leaves or stems of the plant. Precise quantification of these visually observed diseases, pests, traits has not studied yet because of the complexity of visual patterns. Hence there has been increasing demand for more specific and sophisticated image pattern understanding [1].

Various Types Of Leaf Spot Diseases:

– Bacterial

– Fungal
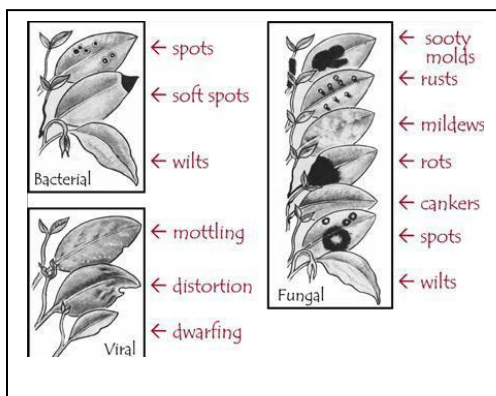
Figure: 2 Various types of diseases

Most leaf diseases are caused by fungi, bacteria and viruses. Fungi are identified primarily from their morphology, with emphasis placed on their reproductive structures. Bacteria are considered more primitive than fungi and generally have simpler life cycles. With few exceptions, bacteria exist as single cells and increase in numbers by dividing into two cells during a process called binary fission viruses are

extremely tiny particles consisting of protein and genetic material with no associated protein [9]. In biological science, sometimes thousands of images are generated in a single experiment. There images can be required for further studies, like classifying a lesion, scoring quantitative traits, calculating area eaten by insects, etc. Almost all of these tasks are processed manually or with distinct software packages. It is not only a tremendous amount of work, but also suffers from two major issues: excessive processing time and subjects arising from different individuals. Hence, to conduct high throughput experiments, plant biologist need efficient computer software to automatically extract and analyze significant content. Here image processing plays an important role [1]. This paper provides a survey to study in different image processing techniques used for studding leaf diseases.

2. LITERATURE REVIEW

Clustering is a classification technique. Given a vector of N measurements describing each pixel or group of pixels (i.e., region) in an image, a similarity of the measurement vectors and therefore their clustering in the N-dimensional measurement space implies similarity of the corresponding pixels or pixel groups. Therefore, clustering in measurement space may be an indicator of similarity of image regions, and may be used for segmentation purposes.

The vector of measurements describes some useful image feature and thus is also known as a feature vector. Similarity between image regions or pixels implies clustering (small separation distances) in the feature space. Clustering methods were some of the earliest data segmentation techniques to be developed.

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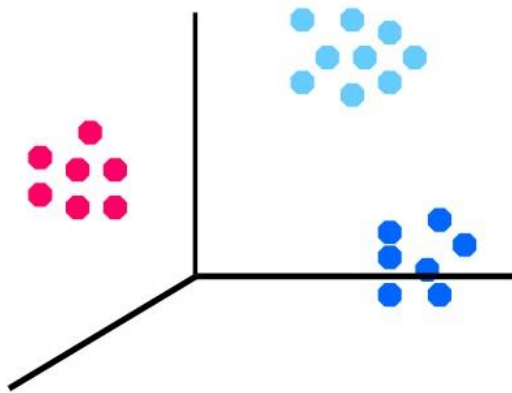
Figure: 3 Similar data points grouped together into clusters

Most popular clustering algorithms suffer from two major drawbacks

First, the number of clusters is predefined, which makes them inadequate for the batch processing of huge image databases

Secondly, the clusters are represented by their centroid and built using an Euclidean distance therefore inducing generally an hyperspheric cluster shape, which makes them unable to capture the real structure of the data.

This is especially true in the case of color clustering where clusters are arbitrarily shaped.

2.1 Algorithms

There are some methods that describing detection the plant leaves diseases by using automatic detection and classification of diseases. The most popular approaches for classification are K-means and fuzzy algorithm which based on their clustering efficiency. Fuzzy clustering algorithm is clustering algorithm that is widely applied wide range of problems connected with feature analysis, clustering and classify design. Fuzzy clustering techniques are mainly based fuzzy behavior and they provide a technique which is producing a clustering. Another popular method is K-means that basically partitioning method applied to analyze and treat observation of data as object based on location and distance between

various data points. Partitioning the object into manual cluster (K) is done by it in such a way that object within each cluster remain as close to each other but far from object in other cluster.

Plant disease spots are different in color. The color transform of RGB image is used for better segmentation of disease spots. RGB color feature segmentation is consisting with disease spots. The proposed approach is composed of four steps such as segmentation, feature extraction and classification & solution. The image segmentation uses the K-means clustering technique. The features objects are extracted from the segmented image and that segmented images are classified based on a (hue saturation value) Machine (HSV). The input image of grape leaf is complex at background. The preprocessing is used to improve image data suppress unwanted distortion. Then segmentation is done through K-means clustering technique.

The diseased portion is identified by using segmentation. K-means clustering is used for segmentation and is also used for classification of features.

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Then segmentation is done through K-means clustering technique.

The diseased portion is identified by using segmentation. K-means clustering is used for segmentation is also used for classification of features to implement and fast, robust and flexible.

2.2 K-Means Algorithm Properties

There are always K clusters.

1.There is always at least one item in each cluster.

2.The clusters are non-hierarchical and they do not overlap.

3.Every member of a cluster is closer to its cluster than any other cluster because closeness does not always involve the center of clusters.

3. SUMMARY OF LITERATURE SURVEY

From above literature survey found that the methods are used by different researchers for leaf disease detection & analyses are following:

1. Image acquisition by satellite.

2.Clustering process in segmentation, K-Means clustering & Support Vector Machine.

3. Applying HSI and RGB color space.

4. Color transformation, segmentation, computing texture features & Support vector machines for developing classification and regression.

5.Clustering in hue-saturation space

6. Image clipping, filtering & threshoulding thresholding.

7. Comparison of two techniques: Euclidean distance and K-Means clustering

4. CONCLUSION

This paper provides the survey of different techniques for leaf disease detection. There is main characteristics of disease detection are speed and accuracy. Hence there is working on development of automatic, efficient, fast and accurate which is used for detection disease on unhealthy leaf. Work can be extended for development of clustering & SVM algorithm in order to increase the recognition rate of the final classification process. Further needed to compute the amount of disesase present on the leaf.

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