Leaf Disease Detection Using Image Processing

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Abstract **- Plant disease automation in agriculture science is the primary concern for every country, as the food demand is increasing at a fast rate due to an increase in population. Moreover, the increased use of technology today has increased the efficacy and accuracy of detecting diseases in plants and animals. The detection process marks the beginning of a series of activities to fight the diseases and reduce their spread. Some diseases are also transmitted between animals and human beings, making it hard to fight them. For many years, scientists have researched how to deal with the common diseases that affect humans and plants. However, there are still many parts of the detection and discovery process that have not been completed. The technology used in medical procedures has not been adequate to detect all diseases on time, and that is why some diseases turn out to become pandemics because they are hard to detect on time. Our focus is to clarify the details about the diseases and how to detect them promptly with artificial intelligence. We discuss the use of machine learning and deep learning to detect diseases in plants automatically. Our study also focuses on how machine learning methods have been moved from conventional machine learning to deep learning in the last five years. Furthermore, different data sets related to plant diseases are discussed in detail. The challenges and problems associated with the existing systems are also presented.**

Index Terms **- Disease, leaf , processing, virus.**

1.INTRODUCTION

Identification of the plant diseases is the key to preventing the losses in the yield and quantity of the agricultural product[1]. The studies of the plant diseases mean the studies of visually observable patterns seen on the plant. Health monitoring and disease detection on plant is very critical for sustainable agriculture. It is very difficult to monitor the plant diseases manually. It requires tremendous amount of work, expertise in the plant diseases, and also require the excessive processing time. Hence, image processing and Machine learning techniques are used for the detection of plant diseases. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification.

2.LITERATURE SURVEY

Pathologists focus on diseases in different parts of the plant like roots, kernel, stem and leaf. As discussed earlier, the present paper concentrates, particularly on leafs. A large amount of the information on the identification of disease and classification field can be found in the various papers . It usually includes preprocessing stage, selection of segmentation techniques followed by the identification and classification stage using selection of proper techniques. The work is divided into two subsections. The first sub-section emphasizes on the contribution of researchers with respect to the technical explanations considered in their algorithm and a summarizing table which contains the information regarding technical culture. In the subsequent sub-sections, a concluding segment is presented with remarks on the contribution of researchers. Certain features common in mostly used methods are offered in this section: the images are acquired via consumer level cameras in a suitable laboratory situation, and the format used for the images are RGB, CIELAB etc. All the methods apply some kind of preprocessing to avoid the noise, segmentation process to select the region of interest (disease) and so on. Therefore, unless stated otherwise, these are the situations under which the described methods operate. Also, practically all the methods mentioned in this paper apply some kind of preprocessing to clean up the images but we are not focusing much on these techniques.

3.EXISTING SYSTEM

Leaf shape description is that the key downside in leaf identification. Up to now, several form options are extracted to explain the leaf form. In plant leaf classification leaf is classed supported its completely different morphological options.

A number of the classification techniques used are:

- Fuzzy logic
- Principal component Analysis
- k-Nearest Neighbours Classifier

4.PROPOSED SYSTEM

The main purpose of proposed system is to detect the diseases of plant leaves by using feature extraction methods where features such as shape, color, and texture are taken into consideration. Convolutional neural network (CNN), a machine learning technique is used in classifying the plant leaves into healthy or diseased and if it is a diseased plant leaf, CNN will give the name of that particular disease. Suggesting remedies for particular disease is made which will help in growing healthy plants and improve the productivity. First the images of various leaves are acquired using high resolution camera so as to get the better results & efficiency. Then image processing techniques are applied to these images to extract useful features which will be required for further analysis. The basic steps of the system are summarized as:

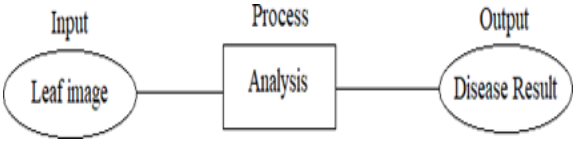

Fig3.1 Proposed System

The advantages of proposed algorithm are as follows:

- Use of estimators for automatic Initialization of cluster centres so there is no need of user input at the time of segmentation.
- The detection accuracy is enhanced with proposed algorithm.
- Proposed method is fully automatic while existing methods require user input to select the best segmentation of input image.
- It also provides environment friendly recovery measures of the identified disease.

5.SYSTEM IMPLEMENTATION

This part of the report illustrates the approach employed to classify the leaves into diseased or healthy and if the leaf is diseased, name of the disease is mentioned along with the remedies.[5] Our methodology primarily revolves around the following five steps.

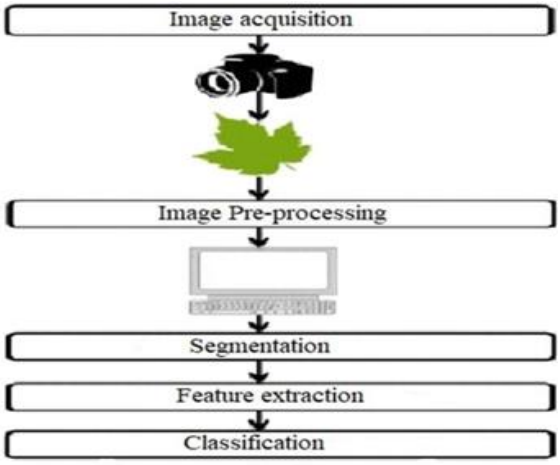

Fig.5.1 System architecture

Algorithm written below illustrated the step by step approach for the proposed image [4]recognition and segmentation processes:

1 Image acquisition is the very first step that requires capturing an image with the help of a digital camera.

2 Pre-processing of input image to improve the quality of image and to remove the undesired distortion from the image. Clipping of the leaf image is performed to get the interested image region and then image smoothing is done using the smoothing filter. To increase the contrast Image enhancement is also done.

3 Mostly green colored pixels, in this step, are masked. In this, we computed a threshold value that is used for these pixels. Then in the following way mostly green pixels are masked: if pixel intensity of the green component is less than the pre-computed threshold value, then zero value is assigned to the red, green and blue components of this pixel.

4 In the infected clusters, inside the boundaries, remove the masked cells.

5 Obtain the useful segments to classify[6] the leaf diseases[3].

6.RESULT

The first look of our front end. We have a text message called “click below to choose picture for testing” so that a user can understand to click the below button[8].It has a button called “Get Photo” which can be used to browse the images on the system’shard disk.

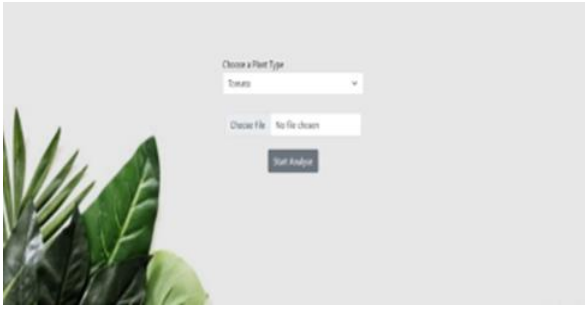

Fig.6.1.Homepage

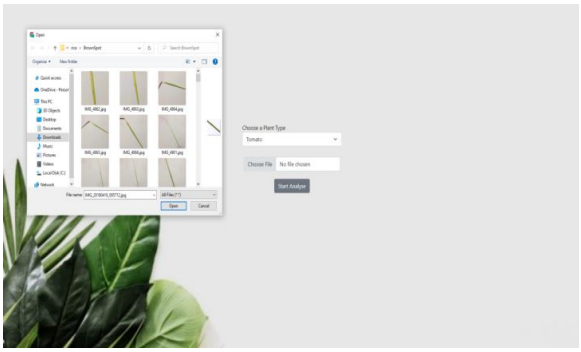

Fig.6.2.Selecting input from dataset

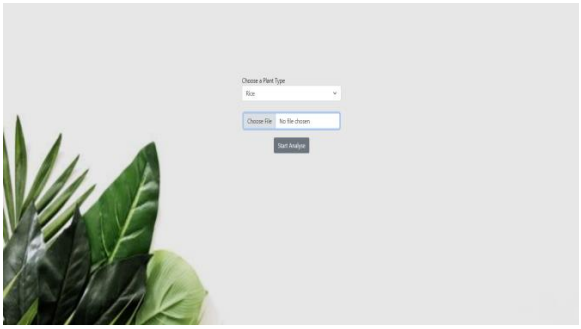

Fig.6.3Analysing input data

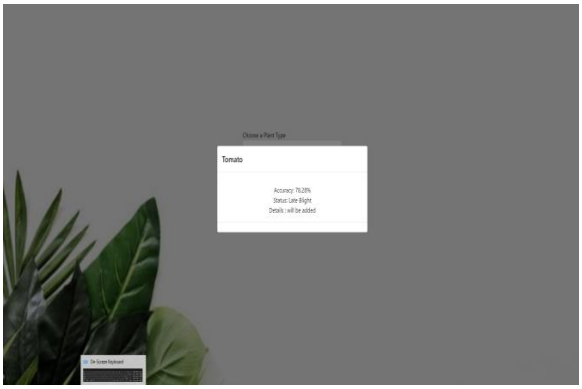

Fig.6.4 Result after analysis of input data

7.CONCLUSION

There are number of ways by which we can detect disease of plants and suggest remedies for them. Each has some pros as well as limitations .On one hand visual analysis is least expensive and simple method, it is not as efficient and reliable. Image processing is a technique which is most spoken for very high accuracy and least time consumption are major advantages offered. The applications of K-means clustering, and Neural Networks (NNs) have been formulated for clustering and classification of diseases that effect on plant leaves. Recognizing the disease accurately and efficiently is mainly the purpose of the proposed approach.[9] The experimental results indicate that the proposed approach is a valuable approach, which can significantly support an accurate detection of leaf diseases in a little computational effort. Alongside the supply of cultivation tools, the farmers also need access to accurate information that they can use for efficient crop management and there is no better way than providing them a service that they can use through the software.

8.FUTURE SCOPE

- To improve recognition rate of final classification[7] process hybrid algorithms like Artificial Neural Network, Bayes classifier,[10] Fuzzy Logic canal so be used.
- Mobile application can be developed which is handy and easy to use.
- An extension of this work will focus on automatically estimating the severity of the detected disease.
- As future enhancement of the project is to develop the open multimedia(Audio/Video) about the diseases and their solution automatically once the disease is detected.

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