Plant Disease Detection System

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Abstract:

Agriculture is the main source of livelihood for many people. Plant diseases caused by bacteria, fungi, viruses collectively cause a significant burden on production in agriculture. Symptoms are seen on the plant either due to character and appearance of the visible pathogen. After identifying the disease, it is required to be prevented and controlled to avoid loss of valuable food. In our proposed system we are collecting sample images of different disease data and using encoding in to array and labeling them using Neural networks. Then we classify the effected plant image. Later, particular remedy for the disease will be provided by the system.

Keywords: *Neural Network, Image processing, Segmentation.*

1. Introduction:

The crops are affected in wide range, if a single plant is affected by a disease rest of all plants are effected and then the entire crop is effected by the disease and give a major loss for the economy, now a days it became a major issue it is necessary to overcome from the loss to protect. The quality and quantity of the product the agricultural land mass is more than just being a feeding sourcing in today's world. Therefore, in field of agriculture, detection of disease in plants plays an important role. To detect a plant disease in very initial stage, we have to use of disease detection technique. Image Segmentation is the process of dividing a digital image into multiple parts or sets of pixels. There are different viruses that attacks to the plants like Lettuce mosaic virus, Tomato bushy stunt virus, citrus psorosis virus etc. These may cause a major loss. We can solve these problems by using proper precautions.

In the existing system, the disease of the plant is analyzed through naked eye. The experienced farmers will predict the disease by analyzing the color of the leaves of effected plant. By following the above method, the disease of the plant is not classified accurately and the prevention can't be predicted. Detection of plant disease using automatic technique is beneficial because it reduces the large monitoring work in large crop farms and detects the

symptoms of diseases at a very early stage. So, the detection and classification of a leaf disease at accurately, will be the key to prevent the agriculture loss.

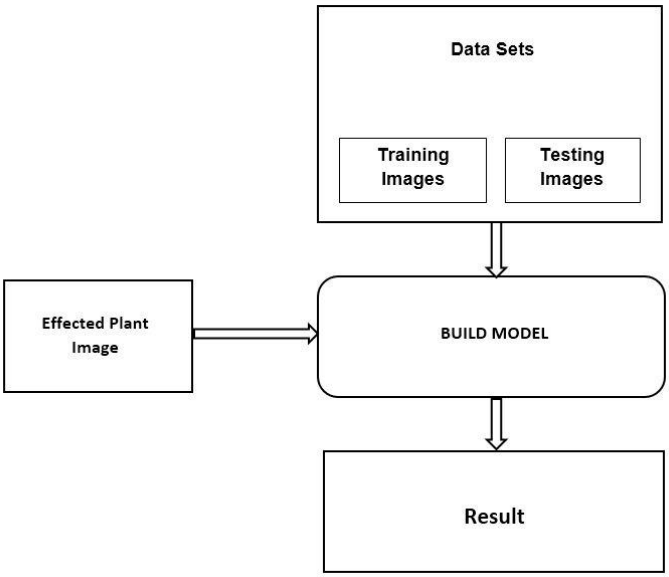

Figure 1: Diagrammatic Representation of Plant Disease Detection System

2. Literature Review:

The Authors Jayamala K. Patil, Raj Kumar, Bharti Vidyapeeth [1] cited that for management of disease, it needs to be detected at early stage so as to treat it properly & control spread of the disease. Because of advances in the technologies now a days it is possible to use the images of diseased leaf to detect the type of disease.

The Authors S. Arivazhagan, R. Newlin Shebiah, S. Ananthi, S. Vishnu Varthini[2] stated that Automatic detection of plant diseases is an important research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detect the diseases from the symptoms that appear on the plant leaves. This enables machine vision that is to provide image based automatic inspection, process control and robot guidance. Comparatively, visual identification is labor intensive, less accurate and can be done only in small areas.

The Authors N. Ghaiwat, Savita and Parul Arora [3] cited that selecting a classification method is always a difficult task because the quality of result can vary for different input data. Plant leaf disease classifications have wide applications in various fields such as in biological research, in Agriculture etc.

The Author Saad Hashim[4] stated that The objective to capture and analysis data from leaf images for classify healthy or unhealthy of the leaves of medicine plants was achieved using image processing method.

The Authors Sharada P. Mohanty, David P. Hughes and Marcel Salathe [5] stated that Crop diseases are a major threat to food security, but their rapid identification remains difficult in many parts of the world due to the lack of the necessary infrastructure. The

combination of increasing global smartphone penetration and recent advances in computer vision made possible by deep learning has paved the way for smartphone-assisted disease diagnosis.

3. Proposed System:

Neural networks are parallel computing devices, which are basically an attempt to make a computer model of the brain. The main objective is to develop a system to perform various computational tasks faster than the traditional systems. Artificial neural network is a machine learning technique that is used in current generation.

The presented system is a neural network model that takes the images as input from the particular location in the memory and resizes the image into specific dimensions.

As the images are acquired from the real field it may contain dust, spores and water spots as noise. The purpose of data preprocessing is to eliminate the noise in the image, to adjust the pixel values. It enhances the quality of the image. The preprocessing step is important for improving the contrast of an input image. The image, which is captured from sensors, and cameras have a lot of noises including poor background, which affect the segmentation accuracy.

In this project we took plant images and converted in to image array and labelling output data with corresponding image coding.

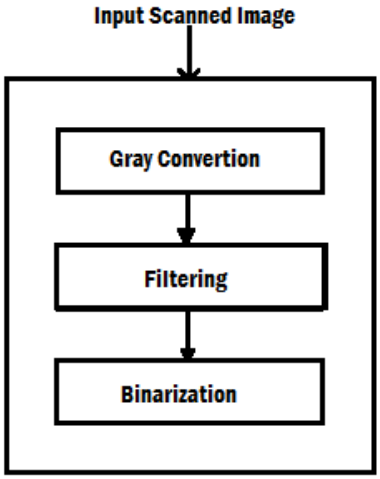

Figure 2: Pre-processing input image

Using “Keras” API from Tensor flow, we are predicting and assigning a disease label to the processing image, by using the array code of specific working image.

Later, the remedy for the predicted disease is displayed according to the label. The diseases that we chose for the system are some bacterial diseases and viral diseases. These are some sample images from our collection, once the processing has done the images are like:

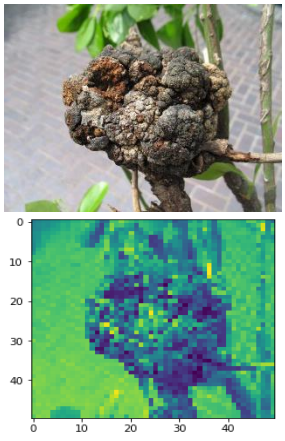

Figure 3: Crowngall

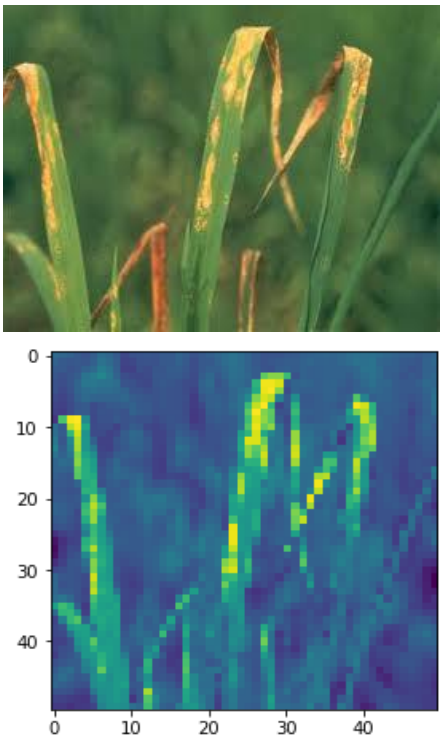

Figure 4: Rice Bacterial Blight

4. Conclusion:

The objective is to capture and classify the plant images and process them for detecting the disease that occurred to the plant. In this system the accuracy of the result is based upon the training and the better processing of both training images and testing images. By including the advanced techniques, system can be made very effective and powerful. The scope of this project can be improved by covering all types of crops. So, that ultimately it will be beneficiary to all the farmers.

5. References:

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