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LEAF DISEASE DETECTION SYSTEM USING DEEP LEARNING: A REVIEW

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Abstract: Nearly 70% of our population depends on agriculture and agricultural activity so we can say that India is an agriculture country. By recent survey conducted, we concluded that nearly 33.33% of national income comes from agriculture and agricultural activity. Now a day's farmers are facing loss due to problem like environmental changes, heavy rain, various crop disease, shortage of water. As we know farmers income is directly proportional to the quality of crop.

So we decided to mainly focus on problems like crop diseases. Crop diseases affect adversely on crop quality, so early prevention and intervention can reduces loss of crop and reduces the unnecessary fertilizer usage. Detections of crop diseases was preformed earlier by techniques such as image processing. We are using Machine learning mechanism and image processing tools for detections and classification. Image acquisition, Image pre-processing, image feature extraction, Feature classification are the various steps of image processing.

Keywords – *Crop disease, Leaf Disease, Image Processing, Machine Learning, Deep Learning, Grape Leaf disease.*

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I INTRODUCTION

We are proposing a web application. For this problem machine learning technique seems to be better options for identifications and classification of crop diseases. So, objectives of our project is to train classifier based on deep learning algorithm and analysed the results of detection and classification phases. Crop diseases generally target on leaf, stem, seeds, fruits etc.

Support vector machine, homogenous pixel counting technique, neutral network can be used for classification process. Previous proposed works for detecting disease has some disadvantages such as minimum accuracy and minimum number of image as input used to detect. Main part for any diseases is leaf and the fruits. Nearly average of 85% of diseases affects on leaf. There are some diseases like Alternaria leaf spot,Foliar leaf on leaf,insecticide(tudtude, mawa) fungus. Different types of algorithms are used in the application. Image processing is one the important method that helps segment image into objects and background image.

II RELATED WORK

Wan Mohd Fadzil et al. [1], discussed a disease detection method for orchid plant leaves. The algorithm makes use of an aggregate of various strategies inclusive of border segmentation method, morphological processing and filtering technique used for categorizing input images into two disease class as black leaf spot and solar scorch.

Aditya Parikh et al [2] authors 'primary focus is detection of disease and estimate its stage for a cotton using images. Mostly diseases or its symptom are observed on the leaf. This works uses cascaded classifiers with the use of local statistical data, first classifier is trained for detecting disease and find its stage.

Bhumika S.Prajapati et al [3], this paper presents an overview on characterization and identification of cotton leaf illnesses. For distinguish the cotton leaf infections precisely the picture handling and AI procedures can be valuable. In pre-handling strategies, foundation expulsion technique is applied on the picture to eliminate foundation from the picture.

P. R. Rothe et al [4], Leaf diseases on cotton plant must be diagnosed earlier and with accuracy as it can prove detrimental to the yield. This paper speaks to an example acknowledgment framework for arrangement and recognizable proof of three cotton leaf infections for example Alternaria, Myrothecium,Bacterial Blight.

Melike Sardogan et al [5], This work represents a Learning Vector Quantization (LVQ) algorithm and Convolutional Neural Network (CNN) calculation based technique for tomato leaf infection order and recognition. They have used a CNN for automatic feature extraction and classification.

Norfarahin Mohd Yusoff et al [6], It incorporate constant edge location strategy for recognizing Hevea leaves illnesses (elastic tree leaves) in pictures and its execution in equipment. There are three Hevea leaves sicknesses which are Corynespora Leaf Spot, Bird's Eye Leaf Spot and Colletotrichum Leaf Disease utilized in this investigation for picture correlation.

Indumathi.R et al [7], This paper finds the zone of leaf which has been influenced and furthermore the sickness that assaulted the leaf which is accomplished by utilizing Image Processing

method and there are a few frameworks which predicts the infections in the leaf. The framework utilizes Random Forest calculation and K-Medoids grouping to create exact yield in the identification of infection.

Gayatri Kuricheti et al [8], This paper presents an algorithm for preventing and detecting the diseases to the whole crop and its productions high quality crop. The k-means image segmentation is used for creating and processing the databases different leaf image. The GLCM is used for leaf image textural. The SVM classifier is used to classify the feature extracted images.

Chaowalit Khitthuk et al [9], This work represents disease diagnosis system from colour imagery using unsupervised neural network. The colour and texture features are used for processing image. The system execute disease classification and disease feature extraction. Four types of grape leaf disease images are used to test which are rust, scab, downy mildew and no disease.

PENG JIANG et al [10], In this paper, the apple leaf infection dataset (ALDD), which is comprise of complex pictures and research facility pictures under genuine field conditions, is first developed through picture explanation and information increase advancements. Another apple leaf illness discovery model that utilizes profound CNNs is proposed by presenting the Rainbow connection and Google Net Inception structure.

III PROPOSED APPROACHES:-

The methodology involve several phases such as image pre-processing, image acquisition, image feature extraction, leaf diseases classification which is based on image feature that is texture feature , shape feature, colour feature etc . The main stage is the picture obtaining stage, It included picture is transferred from the pictures of the different leaves dataset. In the subsequent stage picture pre-handling is done. In the picture include extraction for the contaminated piece of the leaf which depends on explicit properties among pixels in the picture or their surface. After this stages, factual examination undertakings are done to order the highlights that speak to the given picture using machine learning to compare image features. Finally, classification output shows the identified leaf disease.

Advantages of proposed system:

1. It involve two algorithms for feature extraction and classification which able to extract disease from image and gives the actual final outputs.
2. Able to extract all the spatial characteristics of an image.
3. Try to improve detection accuracy using machine learning.

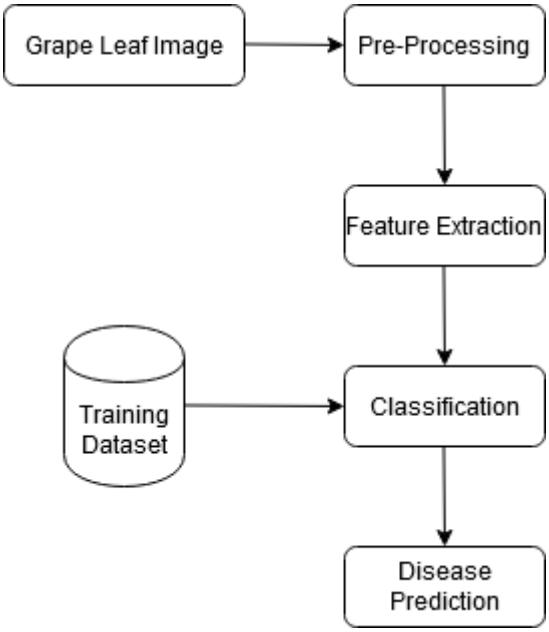

Fig. System Architecture

1. Input Image: Here we will upload the Input leaf Image.

2. Image Pre-processing: In this step we will applying the image pre-processing methods likegray scale conversion, image noise removal.

3. Image Feature Extraction: in this step we will apply the image thresholding and edge detection methods to extract the image features from image.

4. Image Classification: in this step we will apply the image classification methods to classify the infected area and healthy area from features

5. Result: In this step will show the final leaf disease detection result.

IV CONCLUSION

In this paper, tended to how the illness examination is workable for the leaf sicknesses discovery, the investigation of the different infections present on the leaves can be successfully distinguished in the beginning phase before it will harm the entire plant. Here the method introduced can ready to identify the illness all the more precisely, we can say that, we can chronicle great profitability by forestalling the different sicknesses present on the leaves of plant utilizing climate dataset and picture handling. The use of grouping and highlight extraction measures has improved the presentation of the framework which gives better outcomes.

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