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Convolutional Neutal Network For Plant Disease Detection

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Abstract— *In INDIA agriculture is plays the important role. Health of plants or crops is most important in agriculture field. Mainly loss of food is because of infected crops, which is reduces production rate in agriculture. Agriculture productivity is that thing on which Indian Economy highly depends. This is the one of the reasons that disease detection in plants plays an important role in agriculture field, as having disease in plants are quite natural.*

Keywords—*Plant disease detection, convolutional neural network, image analysis, computer vision*

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I. INTRODUCTION

In INDIA agriculture is the most important and also agriculture is back bone for country development in early stage. Now a day's technology plays important role in the all fields. In the agriculture field identifying the leave disease is wrongly leads to huge loss of yield, time, money and quality of product.

In old days identification is done manually by the experimental changes the prediction is becoming tough. Most of the farmers do not have proper knowledge of those disease and actual cure for the disease. So we can use image processing techniques for identification of plant disease. Generally we can observe the symptoms of disease on the leaf, stems, flowers etc. So here we use leafs for identification of disease affected plants. Infected parts from the images and those images are put into image processing techniques. So that we develop a leaf disease detection system that is detected the disease and display were plant is healthy or not.

Deep learning techniques are very effective for classification of plant disease. It has made accuracy of image analysis for detecting and classifies plant illness. Utilizing computer image processing and deep learning technology this is to get quick and accurate result. Accuracy and speed are the two main factors that will be decide the success of the model.

Artificial Intelligence now makes it possible to make automatic leaf disease detection from raw images. The advantage of deep learning is that it can extract features from images automatically. CNN is feed-forward multilayer neural network and is the popular deep learning model.

II. LITRATURE SURVEY

Melike Sardogan,Adem Tuncer,Yunus Ozen et. al. Published "Plant Leaf Disease Detection and Classification Based On CNN and LVQ Algorithm". In this paper, implement the leaf disease detection model using CNN technique. They are implement the module for tomato leaf disease detection using the ImageNet dataset. They detect the bacterial spot, healthy leaf and also curl leaf.[1]

Pushkara Sharma,Pankaj Hans,Shubash Gupta et. al. Proposed "Classification Of Leaf Diseases Using Machine Learning And Image Pre-processing Techniques". In this paper , They Implement the automatic Leaf Disease Detection Module using SVM technique. They are also work on Accurancy and Speed of this module. They are scanning the image and detect the disease of leaf.[2]

Poojan Panchal,Vignesh Raman,Shamala Mantri et. al. Proposed "Plant DiseaseDetectionUsing Maching Learning Models". In this paper they used SVM, K-Means techniques. They are implement the Plant disease detection system that detect the early blight, late blight, bactorial spot on leaves.[3]

Vijay Singh,Varsha,Prof. A. K. Mistra et. al..In this paper , They Implement the Leaf Disease Detection Using the image processing and genetic algorithm technique. They implement the module to detect unhealthy and infected part of leaves. [4].

Suma V.,Sunku Rohan,Rishab Taled et. al. In this paper the system which is use the CNN technique. They are implement the leaf classification and disease detection system. Disease detection is helps that resolving issues with plants. [5].

III. POPOSED SYSTEM

In this system architecture, the training images are provided to Convolutional Neural Network(U-Net Model), after that convolutional model provides prediction of leaf disease.

A. A. System Architecture

Using the training image, the convolutional neural network model is trained after the training completed. The testing set of image is provided to trained Convolutional Neural Network model which is provided output of detected leaf disease image. The proposed system architecture is shown in above fig. 1

B. B. DATA COLLECTION

After the process of data collection finished, the process of preparing the data is performed, the raw data contained instances that were not applicable. This was due to errors and anomalies that had to be discarded. The dataset contains 54,309 images. It contains images of which is contains healthy, infected leafs.

The data was divided into two data sets. The first dataset was used for training the model, the second dataset was used for testing the model. 80 percentage of the dataset is used for training and 20 percentage for validation. We will use pre-trained resnet34 model to solve the issue with training. We can custom train resnet34 classification model.

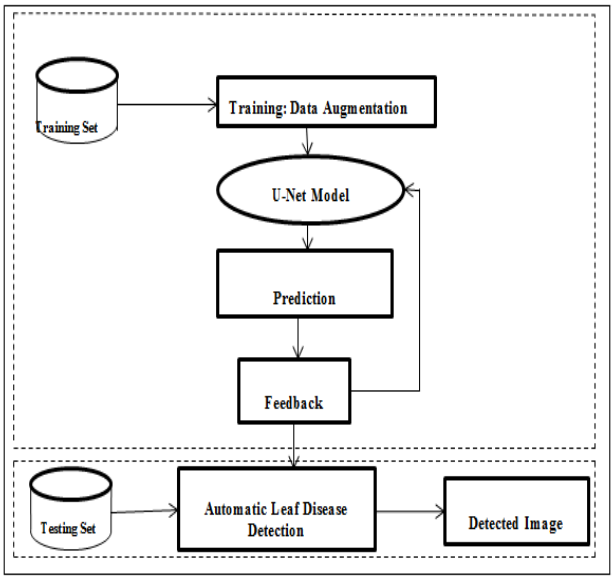

Fig. 1. Proposed System Architecture.

C. DATA PREPROCESSING

After the process of data collection finished, the process of preparing the data is performed, the raw data contained instances that were not applicable. This was due to errors and anomalies that had to be discarded. The dataset contains 54,309 images [11]. It contains images of which is contains healthy, infected leafs.

The data was divided into two data sets. The first dataset was used for training the model, the second dataset was used for testing the model. 80 percentage of the dataset is used for training and 20 percentage for validation. We will use pre-trained resnet34 model to solve the issue with training. We can custom train resnet34 classification model.

IV. RESULT AND CONCLUSION

From selected paper for literature survey, we reviewed literature plant disease detection and after that we proposed CNN [Convolutional Neural Network] for Plant disease detection. The Fig. 2 shows the result after disease detection with label and Fig. 3 shows the learning rate and loss of proposed model.

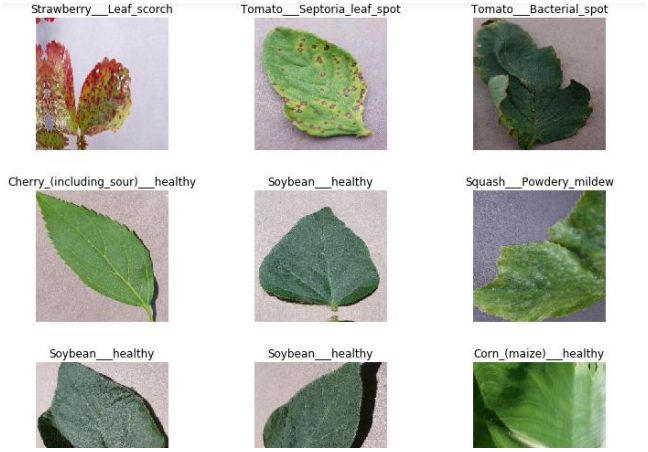

Fig 2. Result of Proposed System

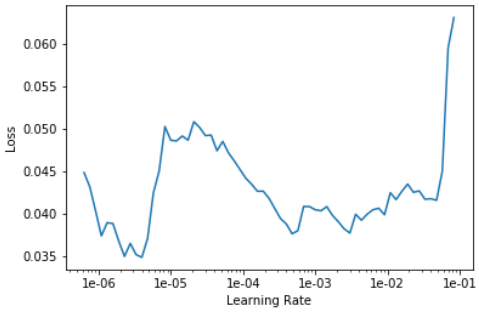

Fig 3. Learning Rate and Loss

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