PLANT DISEASE DETECTION USING CNN

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ABSTRACT:-

Crop production plays a significant role in the agricultural sector.The loss of food is primarily attributed to contaminated crops,which reflexively decreases the rate of development. Plant leaf disease has long and compromises its quality.Conventional methods of plant disease detection in naked eye observation methods and it is non-effective for large crops.Using digital image processing and machine learning the disease detection in plant is efficient,less time consuming and accurate.This technique saves time,efforts,labour and use of pesticides.Hope this approach will becomes a little contribution for agriculture fields.Accurate diagnosis of diseases has been a significant challenge and the recent advances in computer vision made possible by deep learning has paved the way for camera-assisted disease diagnosis for plant leaf. It described the innovative solution that provides efficient disease detection and deep learning with CNN has achieved great success in the classification of various plant leaf diseases.The developed model is able to recognize 38 different type of plant diseases out of 14 different plant diseases out of healthy leaves,with the ability to distinguish plant leaves from their surroundings.

Keywords: Conventional Neural Networks; Disease Classification;Deep Learning

I. INTRODUCTION

Now a days better technologies have enabled people to have adequate nutrition and food needed to meet the needs of the world's growing population.If we talk about India unequivocally. 70% of the Indian people is directly or by the suggestion related to the cultivating territory, which remains the greatest region in the country.If we explore the broader Picture According to Research Conducted by 2050 overall yield creation can augment by at any rate half putting more weight on inside and out pushed cultivating sector.The greater part of the Framers is poor and have no inclination in development which may incite hardships more essentials than half because of pets and sickness of plant. Vegetables and fruits are common items and the principal agricultural things.Powerful dependence on engineered pesticides achieves the high substance content which creates in the air, earth, water, and shockingly in our bodies antagonistically influence the environment. At present, the conventional technique of visual inspection in humans by visual inspection makes it impossible to characterize plant disease.Advances in computer vision models offer fast,normalized,and accurate answers to these problems.Classifiers can also be sent as attachments during preparations.All we need is web association and a camera equipped cellphones.The well known business application "I Naturalist" and "Plant Snap"

show how it is possible.Both apps excel at sharing skills with customers as well as building intuitive online social communities.

1.1 Scope of the Project:

It is an approach to an development of plant disease recognition model based on the leaf image classification by the model it is able to recognze 38 different type of plant diseases out of 14 different plats.Reduce crop diseases which leads threat of food security .Make it easier for all farmers to predict diseases and take remedies immediately.

1.2 Literature Survey:

The deep convolutional neural networks(CNN) models are implemented to identify and diagnose diseases in plants from their leaves. The timely identification and early prevention of crop diseases are essesntial for improving production.In this paper, deep convolutional neural-network models are implemented to identify and diagnose diseases in plants from their leaves, since CNNs have achieved impressive results in the field of machine vision.Standard CNN models require a large number of parameters and higher computation cost.In this paper the developed model is able to recognize different type of plant diseases.

II. PROJECT DESCRIPTION

2.1 Problem Statement:

When the plant has been infected or attacked by some disease the other areas has been exposed to be infected thus,it will decrease plant tilth and it also reduces farmer income.Currently the farmer determines the type of disease manually the error might occur in order to determine the type of Disease. Farmers also have to spend a lot of time to check manually in wide areaa to detect the disease.To

classify diseases on leaves of palnt.Plants are considered as energy supply to mankind.Plant diseases can affect the agriculture which can be resulted in to huge loss on the crop yield.

2.2 Proposed system:

We planned to design the module so that a person with no knowledge about programming can also be able to use and get the information about the plant diseases.It proposed system to predicting leaf diseases.It explains about the experimental analysis of our methodology.Samples of 38 images are collected that are comprised of different plant disease like Tomato,Grape,Apple and Healthy Leaves.Different number of images is collected for each disease that was classified into database images and input images.The primary attributes of the images are based upon the shape and texture oriented features.

III. TECHNOLOGIES A) DEEP LEARNING

Deep Learning, a category of machine learning algorithms which uses various layers to do the extraction of higher-level from the raw input.Deep Learning is a machine learning method taht instruct a compuetr to do filtration of inputs across the layers Deep Learning illustrates the way human brain does the filtartion of information.Many deep learning techniques utilizes the neural network architectures.The term "deep" cite to the various hidden layers present inside neural network.In contrast to his conventional neural network that consists of 2-3 hidden layers,the deep neural networks can have as much as one hundered and fifty.

B) CONVOLUTIONAL NEURAL NETWORKS

One variant of deep neural networks is called as convolutional neural networks(CNN).A CNN combines well-read features with input data, and then it uses 2D convolutional layers,and hence makes this architecture more suitable for processing 2D data,like images,CNNs abolish the demand for manual feature removal and extraction for the classification of the images.The CNN model of its own extracts features straight from images.the features that are extracted aren't pre-trained;they are well-read while the network is trained on few groups of images. The CNN model has numerous of layers which execute the processing of image in convolutional layers include-Input layer,Output layer, convo Layer,Fully,Soft-max layer,Connected layer,Pooling layer.

C) VGG16:

CNN is mainly used for image classification,and also for other corelated fields a CNN can predict the obejcts inside an image by just looking at it like we humans do.It contains many pre trained models VGG16,Resne etc..VGG16 can be classified into three parts conolutional,pooling and fully connected layers.It is also called the Oxford model named after the spatial size to reduce the number of parameters and compuatation in a network.

IV. MODULES

1) Understanding the data:

The dataset is taken "New Plant Disease Data Set".It is a image data set containing iamges of different healthy and unhealthy crop leaves.the data set has aTrain directory and a Valid directory.Once we are done with checking the directory structure we need to craete a data set and load the images.We need to

apply some transforms to the images like resizing them for faster processing.

2) Building the CNN Model Architecture:

Initially we define a base image classification class which will have functions for training,and validation of each batch of data.This will help us to build several CNN models without writing this fuctions again and again.

3) Training and Testing:

Train daa gen flow from directory is the function that is used to prepare data from the traindata set directory.Target size specifies the target size of the image.Test data gen flow from directory is used to prepare test data for the model and all is similar as above.Epochs it tells us the numbe of times model will be trained in forward and backward pass.

4) Prediction:

Validation data is used to feed the validations/test data into the model.validation steps denotes the number of validations/test samples.

V.RESULTS

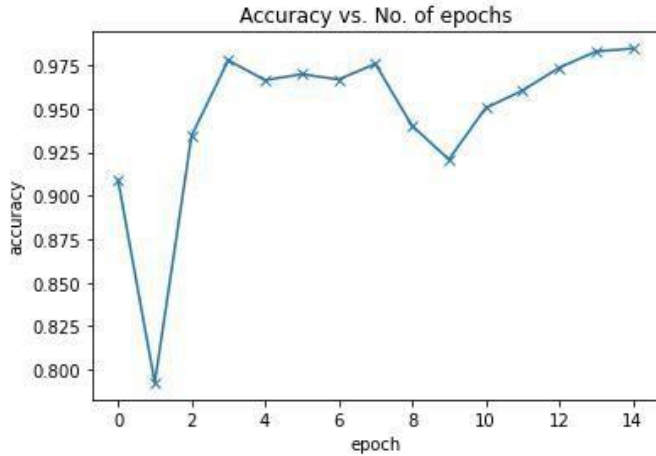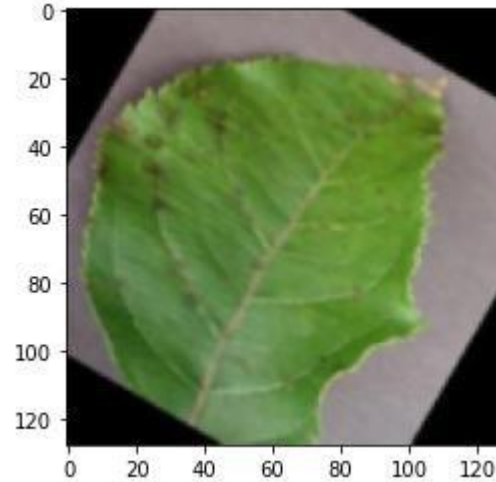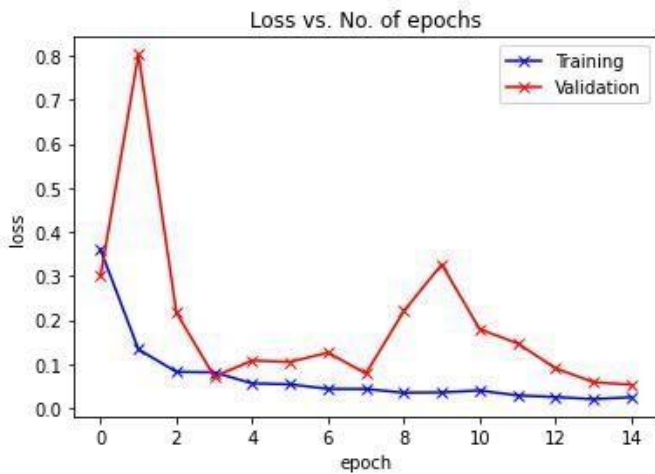Plotting the accuracy and the losses.

Accuracy

FIG.1

Losses:

FIG.2

PREDICTION:

FIG.3

It was the leaf diseased with Apple___Apple_scab

VI.   CONCLUSION

It focused how image from given trained data set in the field and past data set used predict the pattern of plant disease using CNN model.This brings some of the following sights about plant leaf disease prediction.As maximum types of plant leaves will be covered under this system,farmer may get to know about leaf which may never have been cultivated and list out all possible plant leaves,it helps the farmer in decision making of which crop to cultivated.Also,this system takes into consideration the past production of data which will help the farmer get insight into the demand and the cost of various plants in the market.A large part of Indian population relies on agriculture ,hence it becomes very essential to detect and recognize the leaf disease that results in losses ,since agricultural is critical to the growth of the economy.The neural network is trained with new plant village data set.

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