LEAF DISEASE IDENTIFICATION AND REMEDY RECOMMENDATION SYSTEM USINGCNN

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Abstract- ***Agriculture is one field which has a high impact on life and economic status of human beings. Improper management leads to loss in agricultural products. This processis to detect the leaf disease detection using the deep neural network, the alternative of conventional neural network. This can easily detect the disease of leaf. First user can upload the image of the leaf and it will upload the image on the screen. Thenanalyze the image by pressing the button. The disease can analyze and show the status of a leaf that is healthy or unhealthy.The disease can be detected in the image of a leaf. This work utilizes an open dataset of 1500 pictures of unhealthy and solid plants, where deep convolutional systems and semi supervised techniques are used to characterize crop species and detect the sickness status of 3 distinct classes.***

***Keywords**: deep neural network, deep convolutional systems, semi supervised techniques.*

I. INTRODUCTION

Agriculture is one of the main positions in the world. The Fundamental needs for all the living things is Food, henceforth it assumes a critical part. Accordingly, it has become fundamental towork on the nature of horticultural merchandise. It is basic to dealwith these yields accurately from the beginning. A plant's life expectancy has various stages. Soil readiness, planting, adding compost and manures, water system techniques, infection conclusion, pesticide use, and yield collecting are totally included. For instance, bugs, animals, weeds, nematodes and illnesses causesthe crop yield incidents of around 30%-41%. Crop contaminations,as per a few evaluations, cause normal result misfortunes of 42% for the main food crops. Leaf Diseases debilitate trees and bushes by disrupting the photosynthesis, the cycle through which the plants produce energy. Accordingly, the illness forecast at the beginning phase is basic. Crop illnesses may now and then clear out a whole yield's efficiency. Therefore, ranchers should learn all that they can about editing sicknesses quickly so they can really control them. Because of the contemporary populace's rising craving for food and food things, horticultural frameworks have embraced a wide way to deal with utilizing manures for development goals. This model spotlights on recognizing leaf sicknesses from the get-go, lessening the probability of the whole plant being annihilated. Manual assessment of a leaf and ailment forecast are two customary methods of illness recognition. Notwithstanding, this technique doesn't permit a rancher to pinpoint the exact infirmity. Thus, understanding appropriate sickness picture handling strategies might be utilized to distinguish plant leaf infection. These are state of art methodology that utilizestate of art innovation to give exact results.

II. EXISTING SYSTEM

Disease identification in existing systems is accomplished using successful methods such as K-mean clustering, texture, and colour analysis. It employs texture and colour traits that are common in normal and afflicted areas to identify and differentiate distinct agriculture.

Conventional multiple regression, artificial neural networks (back propagation neural networks, extended regression neuralnetworks), and support vector machines are some of the other approaches used (SVM). The SVM-based regression strategy resulted in a more accurate representation of the association between environmental circumstances and illness level, which might be valuable for disease management.

DISADVANTAGES OF EXISTING SYSTEM:

The results showed that using an SVM-based regression strategy not only improved the description of the link between environmental factors and disease level, but it might also be effective for plant disease detection.

Existing approaches such as k-means and SVM are inefficient, taking a long time to analyse and forecast with low accuracy.

III. PROPOSED SYSTEM

In this project, we are utilizing machine learning to forecast plant leaf disease using the CNN model. We're utilizing a Kaggle- sourced plant village dataset, and we've trained the data with a CNN model and stored the model. A user-friendly GUI has been created, allowing users to submit photos and confirm illness.

Proposed Architecture:

The design phase's goal is to come up with a solution to the problem, such as a requirement document. The opening switches the matter domain to the answer domain in this section. The system's criteria are met during the design phase. The design of a system is perhaps the most important factor, followed by the software package's quality. It will have a significant influence on the subsequent stages, particularly testing and maintenance.

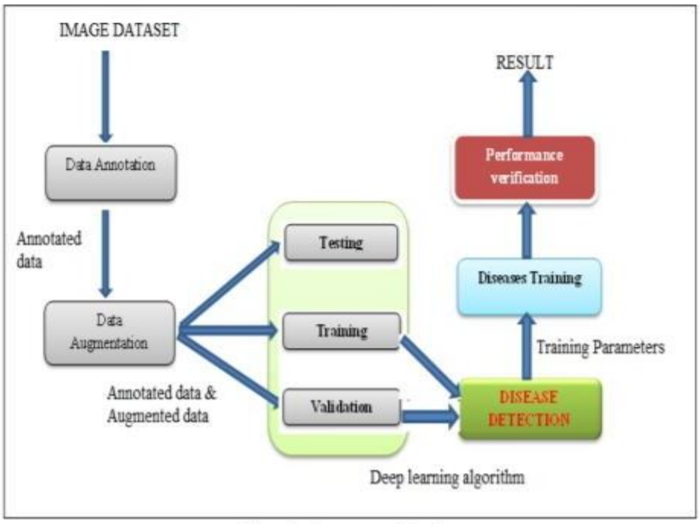

Fig 1: Workflow

ADVANTAGES OF PROPOSED SYSTEM:

The suggested approach was created with the interest of farmers and the agricultural industry in mind. The proposed method can identify illness in plants as well as give treatment options. It is possible to improve the plant's health by having a thorough understanding of the ailment and its treatment.

IV. LITERATURE SURVEY

Tomato Leaf Disease Detection Using Convolutional Neural network [1]:

A model has been created that can diagnose illnesses with a precision of up to 94-95 percent. The major goal is to find a cure for illnesses that are discovered under adverse situations.Tomatoes are widely used across India; however, disease identification is difficult owing to their complexity. To identify tomato leaf diseases, there are three critical stages: data acquisition, data pre-processing, and classification. Images are acquired from the plant repository during data collecting. Images are acquired from the plant repository during data collecting. Various sorts of photos were gathered and saved in JPG format. (The default colour space is RGB.) Python Script is used to download the images. When it comes to data preparation, the dataset must be as noise-free as possible. The photographs are resized at the same fixed resolution as throughout the training. Using mean and standard deviation, we can get pictures of all the pixels in the fixed range. It's known as the Zscore in machine learning. The unstructured image input is converted to appropriatecategorization output labels in the order. Convolutional, enactment, pooling, and totally related layers make up LeNet, a simple CNN model. The categorization of tomato leaf illnesses was done using a variation of the LeNet model. In comparison to the initial LeNet architecture, it has an additional square of convolutional, initiation, and pooling layers. The architecture is straightforward.

To categorize tomato leaf diseases into ten different groups, CNNwas used with a minimum number of layers. 4800 photos were preserved for testing and 13360 photos were used for training out of the 18160 total. This study can differentiate and recognise ten distinct tomato illnesses. When opposed to using existing deep learning models for diverse applications to obtain optimum accuracy, creating and training a CNN model from scratch is a time-consuming operation.

Leaf Disease Detection and Recommendation of PesticidesUsing Convolutional Neural Network [2]:

They have two phases in this paper, namely the Training phase andthe Testing phase. They acquired photos, pre-processed them, andtrained CNN on them in the first step. The second step involves illness categorization and identification, as well as pesticide identification. There are 54,309 photos in their dataset. Photos from the dataset are utilized for training, while the real-timeimages can be used for testing. They scaled the image to a 150150dimension for pre-processing.

TensorFlow is used to create the CNN technique. They were able to classify the data using this method. The results for training and testing accuracy are provided for several epochs, as well as different layers of CNN (five, four, and three-layer CNN) and classlabels of 38 and 16 classes. The five-layer model achieves the bestaccuracy with 95.05 percent for 15 epochs and 89.67 percent for 20 epochs, while the five-layer model also achieves the maximum testing accuracy with 89.67 percent.

V. IMPLEMENTATION

In our Proposed Model the first step we will do is collecting the data through Kaggle (dataset source) through some processing techniques and feature extraction techniques we will finally detect the disease.

MODULES:

DATA COLLECTION:

The collection includes images of many diseases in a range of plants. Cash crops, fruits, cereal and vegetable crops featured in this system include sugarcane, cotton, potato, carrot, chilly, brinjal, rice, wheat, banana, and guava. For the crops listed above, diseased leaves, healthy leaves, and everything in between were gathered from a variety of sources, including images obtained from the internet, or just taking the pictures with any camera equipment or anything else.

IMAGE PRE-PROCESSING:

Picture explanation and increase Image comment, the assignment of naturally creating depiction words for an image, is a critical partin different picture search and recovery applications. However, inthis framework, we physically comment on the region of each picture containing the sickness with a bouncing box and class. A few illnesses could appear to be comparable relying upon its contamination status.

IMAGE ANALYSIS:

The primary purpose of our system is to identify and recognise theclass sickness in a picture. We need to reliably recognise the itemand determine which class it belongs to. We enhance the object detection framework concept by using several feature extractors toidentify illnesses in images.

ALGORITHM DESCRIPTION:

A. CNN LAYERS:

The establishment for CNN movement is move learning, in whichwe foster a coordinated open-source model VGG16 and utilize an exploratory review to evaluate the effect of preparing limits like learning rate, number of neurons (or focus focuses) in the last completely related layer, and arranging dataset size on the game- plan model's exactness. No matter what the way that CNNs have changed topographies, they all around notice similar huge plan rules of applying convolutional layers and pooling layers to a datapicture in a successive way. The ConvNet diminishes the spatial parts of the responsibility from the past layer while broadening how much credits collected from the information picture in this plan.

In a neural network, input pictures are addressed as multi-layered clusters, with each variety pixel addressed by a worth going from 0 to 255. A 1-D exhibit addresses greyscale pictures, while a three-dimensional cluster addresses RGB pictures, with the variety channels (Red, Green, and Blue) addressing the profundity of the cluster.

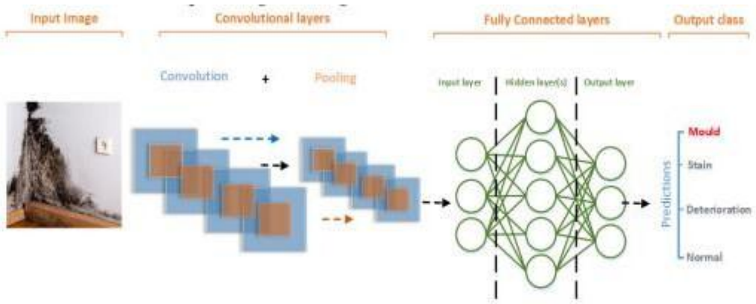

Fig 2: Basic Convent Architecture

a) Convolution Layer:

This layer entails scanning the entire image for patterns and converting the results into a 3x3 matrix. Kernel is the name given to the image's convolved feature matrix. The weight vector is the name given to each value in the kernel.

Fig 3: Convolution Layer

b) Pooling Layer:

Following the convolution, the image structure is bound down intosets of four non-covering rectangular pieces for pooling. Max pooling and normal pooling are the two sorts of pooling. The mostincredible worth in the general lattice region that isn't completely settled by max pooling. The normal worth in the overall affiliation locale is procured through standard pooling. The pooling layer's key benefit is that it further increases PC speed while decreasing the ordinary delayed consequences of over-fitting.

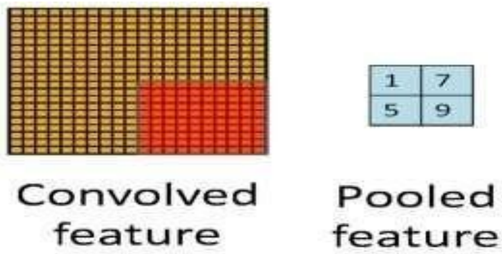

Fig 4: Pooling Layer

c) Activation Layer:

The activation layer in Convolutional Neural Networks is where the data are normalized, or fitted into a specific range. The convolutional function employed is ReLU, which only accepts positive values and rejects negative ones. It's a result of the cheapcomputational cost.

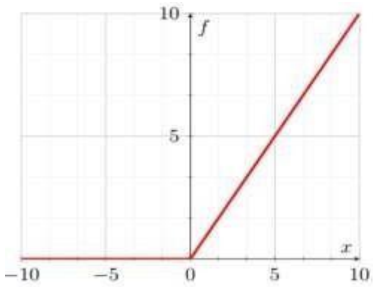

Fig 5: ReLU Function

VI. RESULTS

Fig 6: Home Page

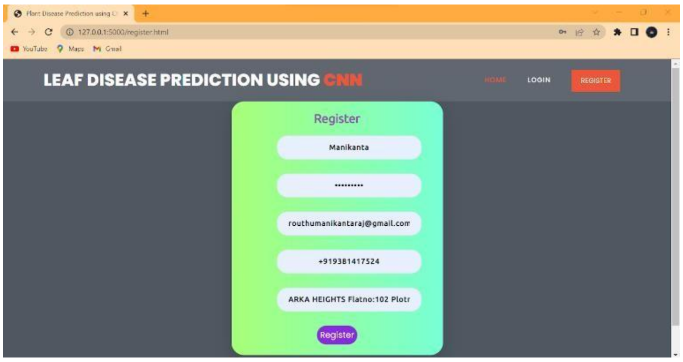

Fig 7: Register Page

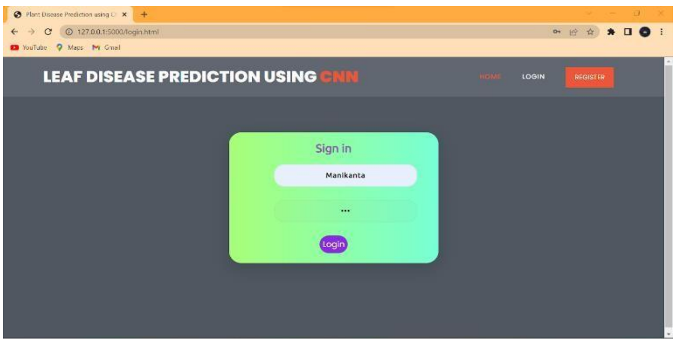

Fig 8: Sign in page

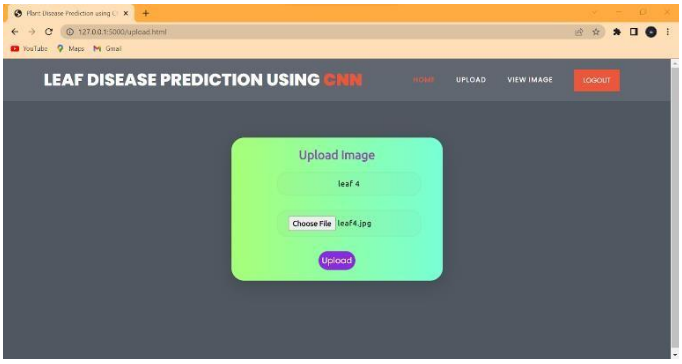

Fig 9: Upload Image

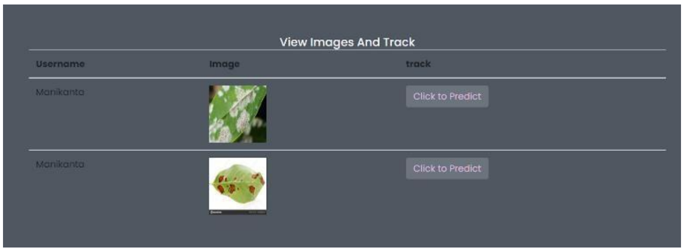

Fig 10: View Images and Track

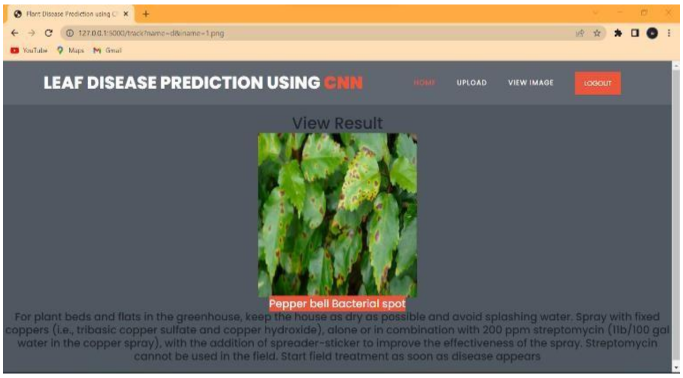

Fig 11: Output 1

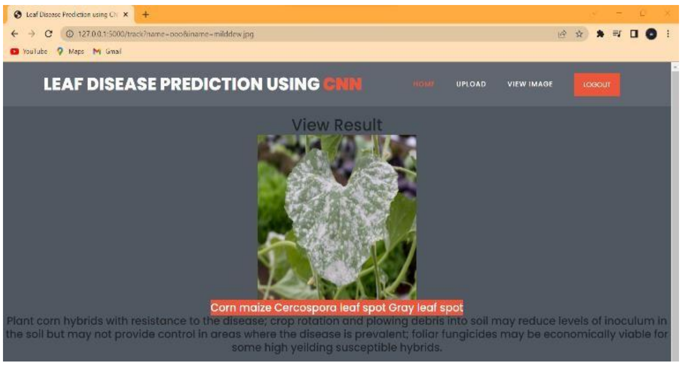

Fig 12: Output 2

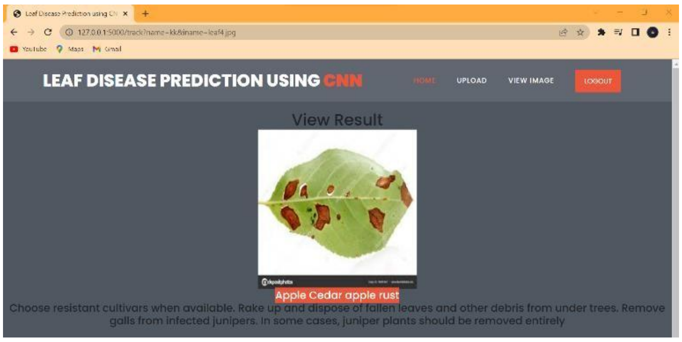

Fig 13: Output 3

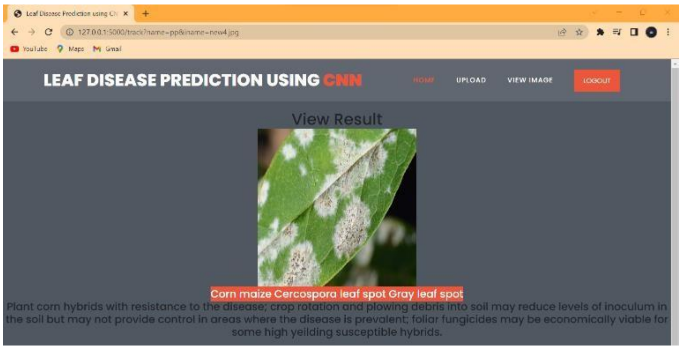

Fig 14: Output 4

VII. CONCLUSION

This project presents a prepared model that decides the illness of the plant leaf. Different sicknesses of plant leaves like cotton, sugarcane, wheat, and grapes are identified. The information is handled and prepared on CNN engineering. Mobile Net calculationis utilized to prepare the information. Python programming alongside TensorFlow/Keras libraries is utilized for controlling thearrangement of the leaf infection.

Future Enhancements:

Fostering a framework that makes every one of the prerequisites ofthe user is unimaginable. Client necessities continue changing as the framework is being utilized. A portion of things to come improvements that should be possible to this framework are:

- As the innovation arises, it is feasible to overhaul the framework and can be versatile to the ideal climate.
- In light of things to come security issues, security can befurther developed utilizing rising advancements like single sign-on.

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