Machine Learning for Plant Leaf Disease Detection and Classification

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ABSTRACT

It is not always possible for the farmers to predict the situation that can arise and their prediction can fail. The main reason is the plant disease. So to assist the farmers in safeguarding the plants from diseases becomes the motivation. The majority of the researchers have identified that leaf images play a crucial role in the automatic detection of plant diseases. Currently, various advancement techniques are used in automatic disease detection of plants such as Machine Learning, Deep Learning, Computer Vision, Internet of Things (IoT), Expert Systems. The purpose of this system is to detection leaf disease using the machine learning technique based on Healthy and Unhealthy Image Dataset for processing the plant leaf image to detect diseases.

Keyword: - *Machine Learning1 , Leaf Dieses Detection2, Languages and compilers3, and Optimization4 Image Processing5*

1. INTRODUCTION -

The plant diseases mean the studies of visually observable patterns seen on the plant. Health monitoring and disease detection on plant is very critical for sustainable agriculture. It is very difficult to monitor the plant diseases manually. One major effect on low crop yield is disease caused by bacteria, virus and fungus. It can be prevented by using plant diseases detection techniques. It requires tremendous amount of work, expertize in the plant diseases, and also require the excessive processing time. Hence, image processing is used for the detection of plant diseases. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification. So to detect the plant diseases in advance and to detect the diseases with the help of modern computer technology, proposed a model for the efficient distinguishing plant diseases....

Fig -1 Simple Leaf Dieses

1.1 Problem Statement:

To The global economy mainly depends on the agricultural sector. Rising incidents of diseases that are discovered recently or did not exist before is an increasing concern in the Agriculture sector. The environment is changing continuously which is harmful to the crops and leading farmers towards debt and suicides. The majority of the researchers have identified that leaf images play a crucial role in the automatic detection of plant diseases.

2. LITERATURE REVIEW AND OBJECTIVE

[1] Plant Disease Classification Using SOFT COMPUTING Supervised Machine Learning, Aman Sehgal, Sandeep Mathur, these project undertaking would help in improving the Plants growth. The plant is always concerned about the diseases introduced by pathogens for example infections, microorganisms and parasites in the plant bodies. It is globally recognized that, pathogens tends to cause huge yield misfortunes. Various researchers have explored how to diminish the harmfulness of pathogens in plants. A few analysts have explored some opposition qualities in plants and attempts to improve the obstruction of plants to pathogens. Meanwhile, different analysts have created ID and s coring framework for monitoring and examining the advancement or quality and also by anticipating the infection bolstered leaves. The reason for this Review work is to display the use of AI in the revelation of plant opposition.

[2] Plant disease identification and classification using Back-Propagation Neural Network, Moumita Chanda, Mantosh Biswas, It Agriculture is the culture of land and rearing of plants to supply food to nourish and enhance life. Different types of plants are farmed every year based on environmental conditions and it is one of the main economic sources in India. These plants are prone to many diseases which hinders normal growth of the plants; these diseases are caused by seasonal changes, environmental variations, and cultivation procedures. To protect the plants from such damages, diseases need to be identified and properly diagnosed on time. Hence, innovation of feasible and powerful methods for identification and classification of plant diseases is an urgent need. So to remove this constraint, in this paper author given an image processing solution to distinguish and classify plant diseases efficiently and accurately. In this proposed method, for classification first, author use back-propagation algorithm to get the weights of neural network (NN) connections and then optimize these weights using Particle Swarm Optimization (PSO) to come out of the problems like local optima and overfitting which are very common in conventional NN training methods.

[3] Disease Manifestation Prediction from Weather Data
Using Extreme Learning Machine, B.K.Singh. Shweta
Kharayat, in these based on Potato Late Blight is caused by Oomycete pathogen Phytophthora infestans, considered to be a community disease due to rapidity of spread. It causes huge economic losses estimated at US dollars 898 billion Worldwide. The motivation behind this the work is to reduce the economic loss caused due to late blight in potato. So far statistical approaches have been used for predicting the disease outbreak. It predicts late blight disease in potatoes with the help of weather parameters with a new approach. Extreme Learning Machine is used as an intelligent learning agent for generating the prediction model. Experiments are conducted on AICR potato database. Proposed approach was tested for several variations and could achieve accuracy of 91.5%.

3. MATERIAL AND METHODS

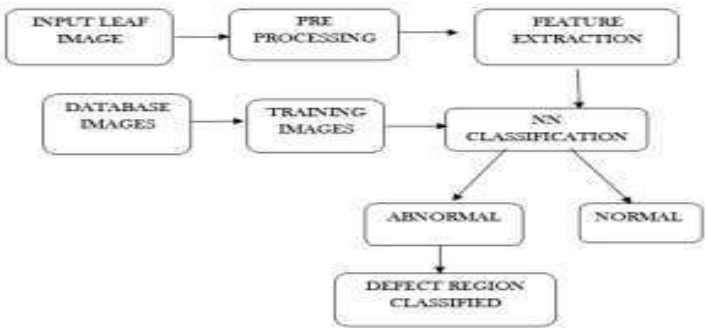

Fig -2 System Architecture

It focuses on the finding prominent accuracy of the leaf image diseases using deep learning approach. Acquiring the better performance in disease identification. Proposed model provides an improved solution in disease control for leaf diseases with high accuracy

3.1 CNN IN Our Project

1. Classify dataset under labeled folders such as leaf images healthy and unhealthy images
2. Read dataset
3. Read features of all images and label (here name of dataset folder) of it
4. Store it in model file
5. Get input image
6. Read features of input image
7. Compare features of stored features

3.2 RESULT AND DISCCUSION

Fig -3 Disease Leaf

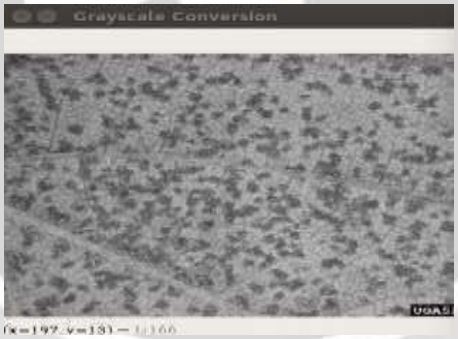

Fig -4 Gray scale Conversion

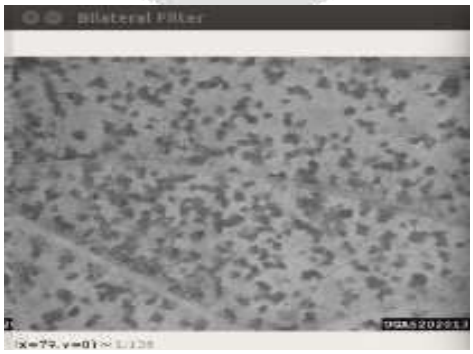

Fig -5 Bilateral Filter

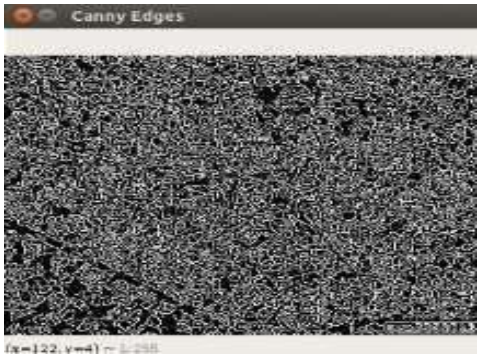

Fig -6 Canny Edges

4. CONCLUSIONS

The model not only adapts to complex environments, but also increases the accuracy of identification. Compared with the traditional model, the plant disease identification model based on deep learning proposed in this module can overcome the complexity of the environment and improve the accuracy of identification. When scaled, this approach can help in digitally monitoring crop health and could lead to significant improvement in the agriculture productivity and yield.

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6. REFERENCES

[1] Ana errero, Aoife owen, Nathalie Gorretta,Jean-Michel Roger: "Early detection of the fungal disease "apple scab" using SWIR hyperspectral imaging", pp – 2019.

[2] Md.Sazzadur Ahamed; Aniruddha Rakshit; K. M. Zubair

Hasan : "Recognition of Jute Diseases by Leaf Image Classification using Convolutional Neural Network", pp. – 2019.

[3] Md. Al-Amin; Tasfia Anika Bushra;: "Prediction of Potato Disease from Leaves using Deep Convolution Neural Network towards a Digital Agricultural System", pp – 2019.

[4] Ira Prasetyaningrum; Tessy Badriyah : " Corn Pests and Diseases Prediction Using Linear Regression and Natural Spline Methods", pp. 2018.

[5] B. K. Singh ; R. P. Singh ; Tejasvee Bisen : "Disease Manifestation Prediction from Weather Data Using Extreme Learning Machine ", pp. 2018.

[6] Komal Raikar Sushopti Gawade: "Usability improvement with crop disease management as a service", pp. 2017

[7] Thomas Truong, Anh Dinh:An IoT environmental data collection system for fungal detection in crop fields. Pp - 2017