WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Plant Leaf Disease Detection

Sanjay Bandi, Sree Teja Chiravuri, Mary Jyothi Boina, Anil Doppa, Maheedhar Bhamidipati

Department of Electronics and communication Engineering, SRKR Engineering College, Bhimavaram, Andhra Pradesh, India

ABSTRACT :

Plant leaf diseases must be identified to keep crops healthy and producing at a high level. Deep learning algorithms are now often used to detect plant leaf diseases due to their potential to automatically extract important information from pictures. It has been proven that the Inception ResNet V2 model and CNN are capable of performing effectively in this scenario. CNN is a classic convolutional neural network, whereas Inception ResNet V2 is a deep neural network architecture that combines the Inception and ResNet modules. These algorithms have been trained to recognize a variety of illnesses using vast datasets of images of plant leaves. Based on these models' accuracy, efficiency has been evaluated. The results show that both models are quite good at detecting illnesses in plant leaves. Transfer learning algorithms have also been used to improve the performance of these models by reusing previously learned weights. Overall, the use of CNN and Inception ResNet V2 models for plant leaf disease diagnosis has tremendous promise for improving crop health and increasing agricultural output.

Keywords: Agriculture Management, Image Acquisition, Convolution Neural Network (CNN), Machine Learning Inception ResNet V2.

1. INTRODUCTION

A crucial component of the crop is the leaf. The affected region of the crop can be used to quickly identify the illnesses. Often, a leaf will display the affected area so that it may be easily detected. With the naked eye, infection is discernible. So, we may conclude that the change in crop colour is a crucial component of the notification. When a crop's health is at a good stage, its colour is different, but as soon as any harmful diseases start to impact the crop, the colour changes immediately. Agricultural diseases have become a problem since they could lower productivity. In general, it is possible to observe plant diseases with the naked eye. Yet, this calls for ongoing professional observation, which is too challenging in broad sectors. Farmers must put up a lot of work. It will take time and be pricey at the same time. This study will explain how to crop illnesses may be automatically detected, which has several advantages for monitoring vast fields of crops and identifying disease symptoms.

2. METHODOLOGY

A dataset of images of healthy and sick leaves should be gathered and prepared. Pre-processing of the images should include uniform resizing and normalizing their pixel values to lie between 0 and 1. A training set, a validation set, and a test set should be created from the dataset. The test set is used to evaluate the model's final performance, the training set is used to train the model, and the validation set is used to adjust hyperparameters and prevent overfitting. The Inception-ResNet-v2 model's construction Layers of the pre-trained Inception-ResNet-v2 model should be loaded and frozen. The model will be used to extract features from the leaf image data. Construct a convolutional neural network (CNN) model to analyze the pre-processed leaf pictures and forecast the presence of illness using the information. Several convolutional and pooling layers, followed by one or more dense layers, should be included in the CNN model. By creating a single dense layer using the results of the CNN and Inception-ResNet-v2 models, the input photographs will allow the model to extract both high-level and low-level information. Train the combined model on the training set using an appropriate optimization method (like Adam) and a binary cross-entropy loss function. To change the hyperparameters and prevent overfitting, keep track of the model's performance on the validation set. Evaluate the model's final performance on the test set by computing accuracy. Use the algorithm to infer the presence of disease from images of young leaves. enhancing the model By changing the architecture (for example, by adding or deleting layers), the hyperparameters (for example, learning rate, dropout rate), or by using transfer learning with a different pre-trained model, the model may be improved. Repetition of steps 6 and 7 is necessary until an acceptable performance is obtained.

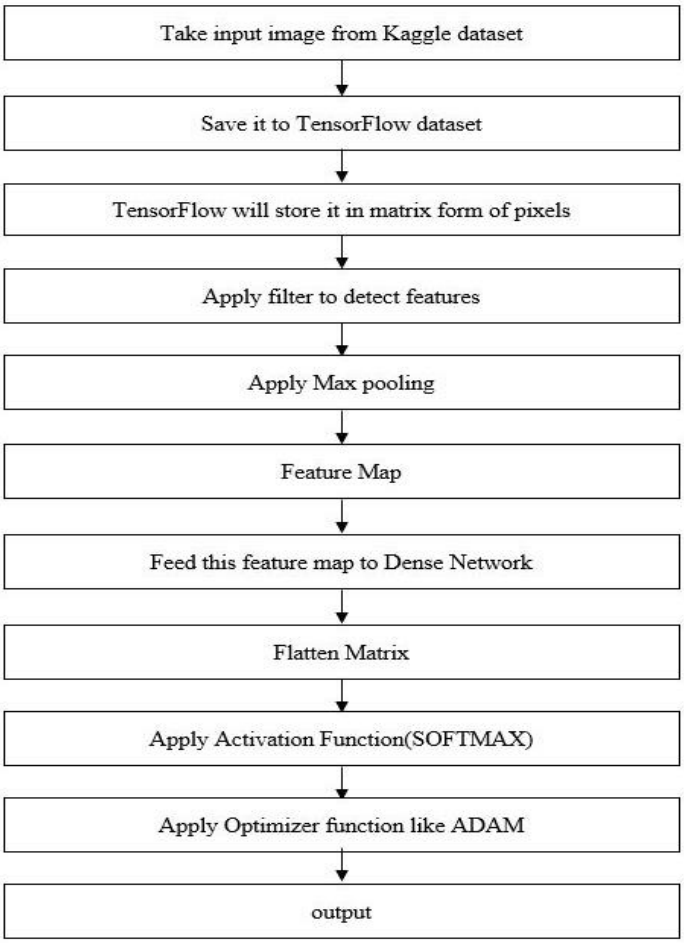


Figure 1. Block diagram

3. RESULT

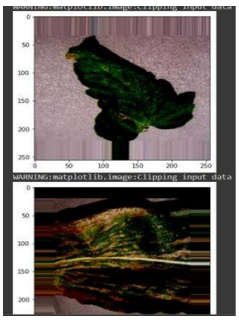
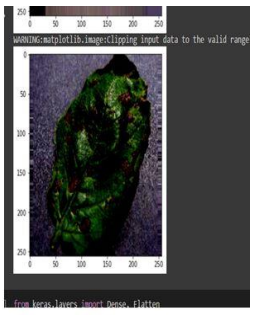


Figure 2. Image after pre-processing



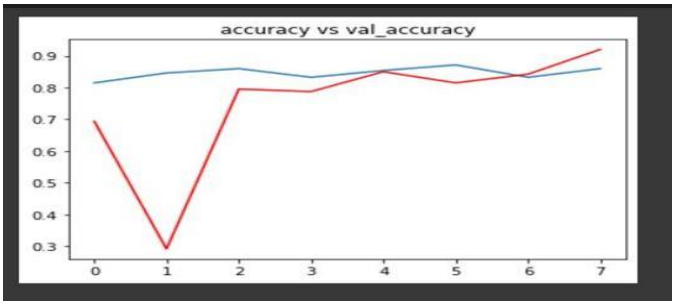


Figure 3. Accuracy Vs Val_accuracy

The final output of this project is building a model which can detect whether the leaf is healthy or diseased and if diseased the output will be the name of the disease. For this, we have developed a model by combining CNN and Inception ResNet V2 which is compatible with large-size datasets. This can be used in the field of agriculture in a massive way where accurate results are required.

4. CONCLUSION

There are various benefits to using CNN and Inception ResNet V2 to detect plant diseases. These models can quickly and precisely identify the disease kind from pictures of plant leaves, allowing farmers to take the necessary precautions to stop the disease's spread and save their crops. Also, these models are simple to train on substantial datasets, enabling them to pick up on and distinguish intricate variations and patterns in the images. The findings show

the potential of deep learning models like Inception ResNet V2 and CNN for the diagnosis of plant leaf diseases. These models can help identify plant illnesses with accuracy and efficiency, allowing farmers to increase crop output and quality while lowering disease-related losses.

5. REFERENCES

[1] Tanawade, Vishal & Shirude, Suraj & Saswadkar, Hitesh & Thorat, Sarthak & Karhekar, Pratik & Waykule, Prof. (2022). Plant Leaf Disease Detection using Inception Resnet V2 -CNN. International Journal of Advanced Research in Science, Communication and Technology. 502-505. 10.48175/IJARSCT-2987.

[2] Liang, S., & Deng, X. (2022, October). Research on rice leaf disease identification based on ResNet. In *2022 IEEE 6th Advanced Information Technology, Electronic and Automation Control Conference (IAEAC)* (pp. 1409-1413). IEEE.

[3] Zhang, X., Han, L., Dong, Y., Shi, Y., Huang, W., Han, L., ... & Sobeih, T. (2019). A deep learning-based approach for automated yellow rust disease detection from high-resolution hyperspectral UAV images. *Remote Sensing*, *11*(13), 1554.

[4] Deepalakshmi, P., Lavanya, K., & Srinivasu, P. N. (2021). Plant leaf disease detection using CNN algorithm. *International Journal of Information System Modeling and Design (IJISMD)*, *12*(1), 1-21.

[5] Wang, Y., Zhao, Y., Zhang, J., Qian, Y., Huang, J., Zhao, Q., ... & Zhao, J. (2022, July). DiseSniper: A potato disease identification system based on the ResNet model. In *2022 10th International Conference on Agro-geoinformatics (Agro-Geoinformatics)* (pp. 1-4). IEEE.