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Leaf Disease Detection using Machine Learning and Deep Learning

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Abstract - Identification of leaf conditions plays an important part in the profitable success of any country. numerous corridor of the factory can be infected by bacteria, contagions, fungi and other conditions, but then we will concentrate only on the study of splint conditions as exploration. We excavated into this content from 2010 to 2022 and set up that numerous experimenters used multiple images or hyperspectrals to study crop conditions. Machine Learning (ML) and deep learning(DL) models were used to identify different types of splint conditions. We've developed a set of guidelines to help experimenters in this field. Support Vector Machine(SVM), Random Forest, and Multiple Twin SVM(MTSVM) are popular ML models for foliar complaint vaticination; Convolutional Neural Network(CNN), Visual figure Group(VGG), ResNet(RNet), GoogLeNet, Deep CNN(DCNN), Backpropagation Neural Network(BPNN), DenseNet(DNet), LeafNet(LN) and LeNet, for splint complaint discovery acquainted deep literacy models. Among these deep literacy models, it is clear that models similar as CNN, VGG and ResNet have strong capabilities in contagion discovery. The performance of the algorithm is generally related to the F1 score, perfection, delicacy,etc. measured with. This review will be useful to experimenters in the field and those seeking a good variety of ML and DL- grounded groups for foliar complaint opinion.

Key Words: Machine Learning, Deep Learning, SVM, Convolutional Neural Network, DNet, Deep CNN

1. INTRODUCTION

Leaf complaint is a kind of miracle to the natural growth of a factory which isn't only generated hurdles in agribusiness but is also responsible for hampering the agrarian product of a country. Several types of bacteria, fungi, contagions, and other natural contagious organisms are the main causes of splint complaint in their life cycles. There are numerous ways to descry and classify different kinds of splint stresses. The first option is direct observation via naked eyes which isn't a prominent process. Secondly, one can probe the splint stresses either by homemade process or applying any machine literacy(ML) algorithms. As far as numerous experimenters have concerned that visual observation or any instrument similar as microscope- grounded observation is a veritably slow process, which can not take speedy action before spreading the complaint in leaves. In this analogous trend, the next better option which is considered in numerous types of exploration to apply some ML ways over factory leaves. In the early periods, one can not fluently descry the complaint of leaves before spreading them by using previous knowledge. therefore, the identification of splint conditions is one of the grueling area of inquiries in image processing(IP), ML, as well as computer vision. Many researchers use drone cameras to capture images of diseased leaves in different areas. The performance of this camera is affected by weather conditions and short flight time. Based on this uncertainty, researchers have adopted drone cameras and derived various classifications based on the configuration of different models. This article does not contain images taken with drone cameras. Various image filters are commonly used to eliminate noise, such as box filter , Gaussian filter ,gradient and Laplace filter . Problem with IP. Specific extraction methods such as thresholding, source extraction, pattern matching, Hough transform, and generalized histogram transform of oriented gradients (HoG) help identify different types of diseases. In cases where the disease is irregular or appears in a random pattern, it is somewhat difficult to make out the characteristics of the leaves. Using the noise extraction method, many types of leaf diseases such as the background of the leaf, the effect of the leaf, and the green area of the leaf can be easily extracted. Identifying leaf disease in a photo is an important task because there are many shapes, forms and colors in the photo. Traditional methods are ineffective in detecting leaf diseases. Sunlight and weather are another challenge. These challenges create difficulties in identifying different types of organisms in leaf images.

2. LITERATURE REVIEW

Leaf disease detection using machine learning and deep learning would typically involve exploring existing research on the topic. You'd cover key studies, methodologies, datasets, and findings. Look for works that discuss the effectiveness of different algorithms, the types of diseases addressed, and any challenges faced in the field. Start by identifying seminal papers and gradually expand your review to include recent developments.

Remember to highlight gaps in the current literature that your research aims to address.

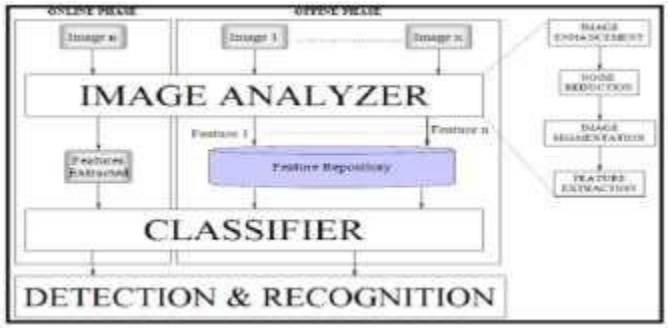
3. METHODOLOGY

This section consists of three subsections similar as methodology, data collection and different stages of Leaf complaint bracket. Methodology diagrammatically shows the way of Leaf Disease discovery for machine literacy and deep literacy models. Data collection is nothing but several datasets that have been espoused by several experimenters in former work. In different stages of the leaf disease classification subsection, several algorithms of every stage have been explained.

4. RESULT AND DISCUSSION

This section discusses the whole work done in this check study in a brief manner. Beyond this, it illustrates the former as well as recent processes of leaf disease detection ways. This section also indicates that which models have been named and which model can be chosen from machine learning and deep learning conception for leaf disease discovery. Naked- eye compliances combined with routine monitoring of factory leaf stress aren't only bring effective but also a time- consuming system.

5. BLOCK DIAGRAM



6. CONCLUSION AND FUTURE WORK

Several ML and DL models essay to identify leaf conditions, but some challenges remain present in this environment. numerous published exploration studies have worked withpre-trained models similar as GoogLeNet, AlexNet, VGGNet, and ResNet, and their training data similar as ImageNet (Image Database) which have produced better delicacy in comparison to other being models. Although the most common PlantVillage dataset is acceptable to train the CNN model, some experimenters have used lower than 1,000.

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