FLAURALYSIS

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Abstract

During the complete growth phase of plants, from sprout-seedling to vegetative-budding to flowering-ripening, diseases are one type of natural catastrophe that affects the normal growth of plants and even results in plant mortality. **Flauralysis** is a Deep Learning based model solution that will detect and predict most of the plant diseases which may be caused by pathogenic organisms such as fungi, bacteria, viruses, protozoa, as well as insects and parasitic plants. The productivity, quality and richness of plants are greatly influenced by diseases and pests.The most outrageous problem faced by farmers that causes loss on overall yields include plant diseases, and this has to be solved on an immediate basis to help crop producers separate out the infected plant after recognising it from its symptoms. This application will also give some useful tips on the basis of details entered by farmers and will display the possible diseases that may affect crops in the long run and give advice that can be used to prevent the same as **"Prevention is always better than cure".** This can help farmers and researchers quickly detect and respond to outbreaks, potentially preventing crop losses and improving yields.

Introduction

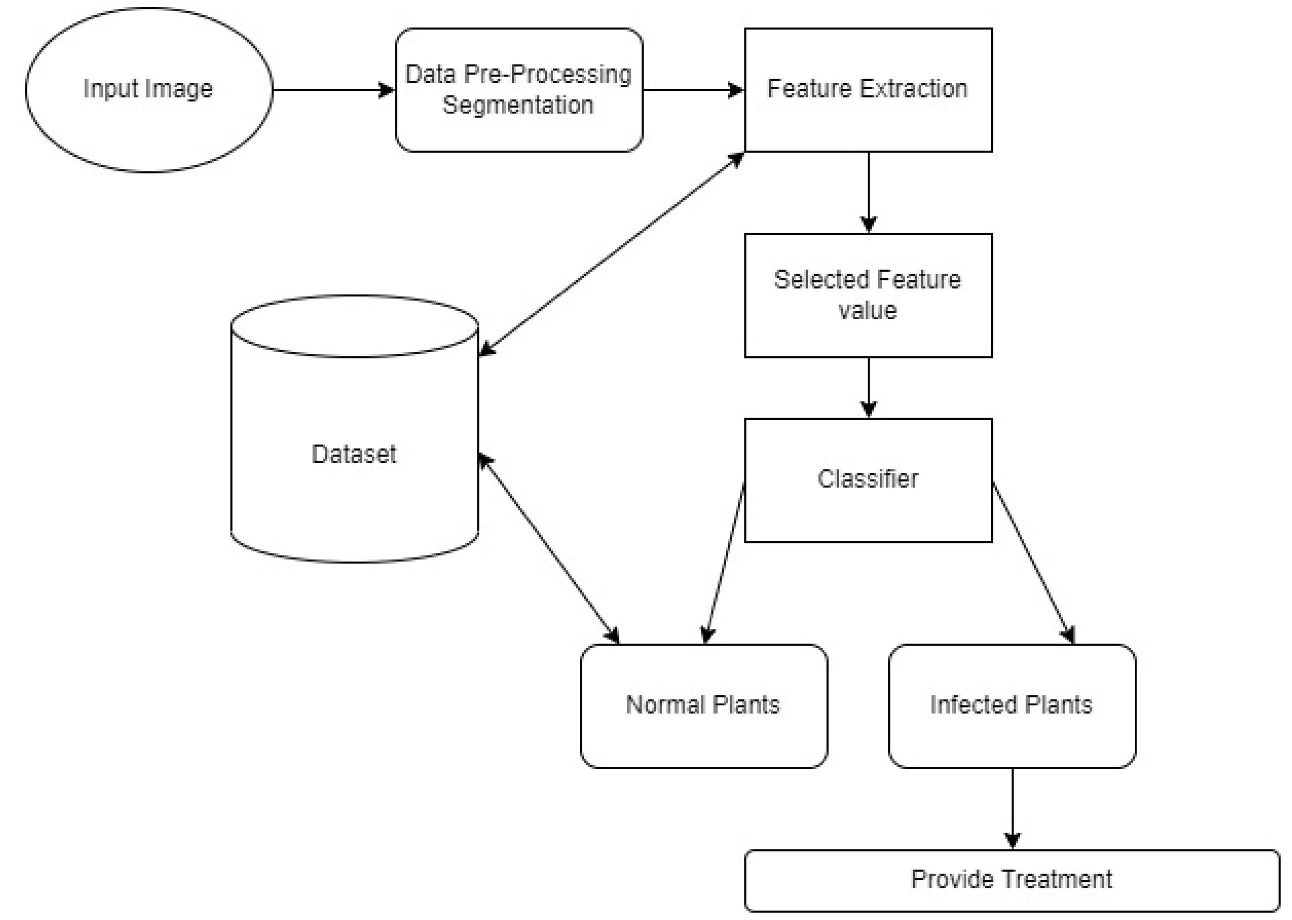
Plant diseases result in significant reductions in both the quality and quantity of agricultural products as well as productivity and economic losses. In today's crop monitoring of wide fields of crops, plant disease detection has attracted growing attention. Making the transition from one disease management strategy to another presents challenges for farmers. The conventional method used in practise for finding and identifying plant diseases is expert observation with the unaided eye. In this essay, we examine the requirement for an easy-to-use method for detecting plant-leaf diseases that would speed up agricultural improvements. Early disease diagnosis and crop health information can make it easier to manage illnesses through effective management techniques. Crop productivity will increase as a result of this method. This model also contrasts the advantages and drawbacks of different prospective strategies like Picture capture, image pre-processing, features extraction, and neural network-based classification are some of the procedures that are included in it.

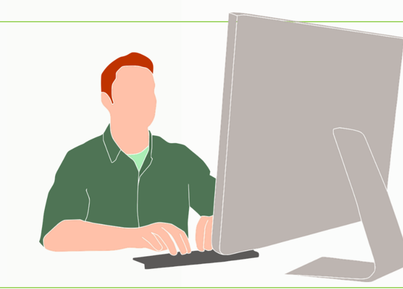
Objective

In the realm of machine vision, the identification of plant diseases is a key study topic. It is a technique that takes plant photos and determines if they contain diseases using machine vision equipment. Plant diseases detection tools based on machine vision are currently being used in agriculture and have partially replaced the old fashioned naked eye identification techniques. In this project farmers and household people can easily detect the disease that is affecting the productivity, life of the plant in some simple and few steps .It identifies the plant diseases using image processing ,after identification of the disease, suggests the name of pesticide to be used. It also identifies the insects and pests responsible for the epidemic. Along with the disease detection, users can get the suggestion of preventive measures to treat the disease . Additionally , disease prevention ideas and care tips will be provided for the different plants and crops .

Scope

Farmers, Horticulturist, Botanist, Florist, Gardeners, Plant breeders, Agronomist make up the project's main target audiences for plant disease detection. These people deal with the difficulties of managing diseases since they are actively involved in crop production. By providing them with a reliable and accessible disease detection system, we can encourage them to improve their agricultural methods, make timely choices, and reduce crop losses. Additionally, Agricultural Extension Services, Researchers, Scientists, Nurseries, Agricultural Authorities, and Plant Health Agencies will be drawn to this endeavor.





Methodology/Planning of the Project work

The following phases comprise the system's implementation:

•Data collection: A leaf dataset with several leaf types at various phases of development is utilised to train and evaluate the model. Early-stage diseased leaves, late-stage diseased leaves, and fresh healthy leaves.
•Pre-processing of the data: The dataset is divided into three subsets: training, validation, and test. The validation dataset will be tested against during training, the training dataset will be used during training, and the testing will take place after model training.

The CNN Model is constructed in the manner described below:

Before uploading photographs to the network, we must resize them to the desired size using the resizing and normalisation layer. In order to improve model performance, we should normalise picture pixel values (keeping them between 0 and 1 by dividing by 256). Both during training and inference, this is done. As a result, it may be included in our Sequential Model as a layer.

Data enhancement: When we have less data, we need to enrich it; by doing so, our model's accuracy is increased. Following data augmentation, we additionally verify the channel's anticipated dimension order, as illustrated in figure 6 below.

Model Architecture: In the output layer, we combine a CNN with a SoftMax activation. We also add the first layers for data augmentation, standardisation, and scaling.

Building the Model: Accuracy and loss are computed.

Training the Model: Using the predetermined parameters, the model is subsequently trained on the training dataset.

Testing the Model: Following training, we test the model using the specified test dataset to ascertain the model's correctness.

Inference Function: When a plant leaf picture is supplied for scanning, the inference function will be called.

Displaying Inference Data: Plots of the inferred data show the actual uploaded image, the projected illness, and the degree of confidence in the prediction.

Backend Fast API TensorFlow: The implementation of a fast API server model will allow the website to access and utilise the model for uploading photographs, obtaining inference, and forecasting or detecting illnesses on plant leaves.

Conclusion

The proposed system was developed taking in mind the benefits of the farmers and agricultural sector .The developed system can detect disease in plants and also provide the remedy that can be taken against the disease.to provide an efficient and accurate solution for identifying and diagnosing various diseases that affect plants, thereby aiding in timely interventions and preventing crop losses. With proper knowledge of the disease and the remedy can be taken for improving the health of the plant .The proposed system is based on python and gives an accuracy of around 78%.The accuracy and the speed can be increased by use of Google's GPU for processing. The system can be installed on Drones so that aerial surveillance of crop fields can be done. The integration of robust deep learning models, coupled with an intuitive user interface, provides an effective solution for timely disease identification, ultimately leading to improved crop health and increased agricultural productivity. By contributing to sustainable farming practices, this project has the potential to make a substantial positive impact on food security and global agricultural sustainability.