

SYNOPSIS

Project Group No:

Register No

Name

1. 125003459

Mopuri Mahendra

2. 125015054

Janapana Abhinav Reddy

3. 125015064

Dega Lokesh

Project Title: Plant Species Classification using Deep Learning and Machine Learning Techniques

Name of the Guide: Dr. R. Nithya, Assistant Professor, School of Computing

Abstract:

The plant species, which are essential for medicine and health, have become major points in studies because of their outstanding characteristics. However, difficulties in classification occur because of inter-class and intra-class leaf similarity in leaf attributes, such as color, texture, and shape. This paper introduces a Deep Belief Network (DBN) model for classification of ten herbal plants - Alstonia Scholairs, Arjun, chinara, Guava, Jamun, Jatropha, Lemon, Mango, Pomegranate and Pongamia Pinnata - based on real-time leaf images obtained using IoT devices. Data augmentation increases the dataset for making the model robust and preventing overfitting. The existing CNN outperformed classical machine learning methods like logistic regression, decision trees, and random forests. The confusion matrix indicated near-perfect classification with little disparity in some classes. Comparing it with other deep networks like RCNN and Mask R-CNN, the new method outperforms them. This structure provides a platform for plant pathology studies and monitoring of plant growth using computer vision, to be subsequently augmented by IoT and drone-based sensing for agricultural applications.

Specific Contribution:

- Performed data preprocessing using flipping, scaling, denoising, and contrast normalization.
- Trained CNN and DBN models, saved the trained models, and developed a GUI using the Streamlit interface. Deployed the application on Streamlit Community Cloud.

Specific Learning:

- Deep Belief Network (DBN) outperformed Convolutional Neural Network (CNN) and other machine learning algorithms with an accuracy of 96.55%.

Keywords: Plant species, Deep Belief Network, Convolutional neural network, Data augmentation, Machine learning, Deep learning, Python, Streamlit



Janapana Abhinav Reddy

Signature of the Student

Signature of the Guide

Date:05/05/2025