

## **Multi Crop Disease Detection using Deep Learning Techniques**

### **Para Upendar**

Computer Science and Engineering, Keshav Memorial Institute of Technology (KMIT), Hyderabad, Telangana, India

### **D. Prasad**

Computer Science and Engineering, Keshav Memorial Institute of Technology (KMIT), Hyderabad, Telangana, India

### **K. Soumith**

Computer Science and Engineering, Keshav Memorial Institute of Technology (KMIT), Hyderabad, Telangana, India

### **K. Ganesh**

Computer Science and Engineering, Keshav Memorial Institute of Technology (KMIT), Hyderabad, Telangana, India

### **M. Shravan**

Computer Science and Engineering, Keshav Memorial Institute of Technology (KMIT), Hyderabad, Telangana, India

### **Abstract:**

This study presents a deep-learning-based system for early detection and classification of plant diseases using the ResNet9 architecture, which achieved superior performance in comparison with other models. The PlantVillage dataset served as the primary training source. Optimized hyperparameters such as learning-rate scheduling, gradient clipping, and weight decay enabled the model to reach an accuracy of 99.2%. To address the needs of Indian agriculture, supplementary datasets for crops such as cotton, rice, and groundnut were integrated. A user-friendly web application allows farmers to upload leaf images and receive instant disease predictions. Built on Convolutional Neural Networks (CNNs), the system provides reliable diagnoses and practical recommendations for crop-health management. Overall, the proposed platform supports precision agriculture, enhances decision-making, and contributes to sustainable farming and long-term food security.

### **Keywords:**

Deep Learning, Plant Disease Detection, CNN, ResNet9, Precision Agriculture, PlantVillage Dataset.