# Plant Disease Detection Using CNN

## Objective:

Design and implement a Convolutional Neural Network (CNN) model to detect and classify diseases in plant leaves using image data. The system must recognize both healthy and affected leaves across various plant types, including apple, grape, corn, and cherry, and identify specific diseases. This tool aims to support precision farming by facilitating early diagnosis and better disease control.

## Workflow Pipeline Overview:

1. Dataset Preparation:  
Images are divided into training, validation, and testing groups, each containing labeled classes representing different disease conditions. These images are imported into the workspace and prepared for model development.

2. Uploading and Environment Setup:  
The dataset is compressed and stored on Google Drive. It is then linked to a Colab notebook through drive mounting. Subsequently, the contents are extracted into the notebook environment for access.

3. Preprocessing and Data Augmentation:  
Images are resized to uniform dimensions (e.g., 128x128). Additional transformations such as flipping, rotating, or zooming may be applied to enrich the dataset and boost the model’s learning capacity.

4. Model Construction with CNN:  
A convolutional neural network is constructed and trained on the prepared images. The model learns to recognize and differentiate disease patterns from healthy foliage.

5. Model Evaluation:  
The trained model is validated using the test images. Performance is measured using relevant metrics to assess the accuracy and reliability of predictions.

## Image Preprocessing Example:

Below are examples of an image before and after preprocessing (e.g., resizing or augmentation):