**1. Problem Statement**

The goal of this project is to build a CNN model that can detect diseases in plants using images of their leaves. Early detection of plant diseases can help farmers and agriculturists take preventive actions, leading to better crop yield and reduced loss.

**2. Pipeline**

We will follow the following pipeline steps for our plant disease detection system:

1. **Dataset Preparation**
   * A dataset of plant leaf images categorized by disease types is provided in a .zip format.
   * It is unzipped using Python and mounted in Google Colab.
2. **Dataset Splitting**
   * The dataset is divided into **training**, **validation**, and **testing** sets to evaluate the performance of the model effectively.
   * This helps in reducing overfitting and improving generalization.
3. **Preprocessing**
   * All images are resized to a uniform dimension of **128x128** pixels to feed into the CNN.
   * Normalization is applied to scale pixel values between 0 and 1.
4. **Model Building: Convolutional Neural Network (CNN)**
   * A CNN is used as it performs well on image classification tasks.
5. **Training the Model**
   * The model is compiled with a loss function and optimizer.
   * It is trained over multiple epochs using the training data, while validation data is used to tune hyperparameters.
6. **Evaluation**
   * The final model is evaluated on the test dataset to report accuracy and loss.
   * Confusion matrix and classification reports can be used to understand performance.