**PROBLEM STATEMENT:**

Develop a CNN-based model capable of detecting and classifying plant diseases from images of leaves of various crops such as apple, cherry, grape, and corn. The model should accurately identify both healthy and diseased leaves while predicting the specific type of disease. This system will aid in precision agriculture by enabling early detection and effective disease management.

**PIPELINE:**

**1. Data Collection & Data Loading**

* **Dataset Structure:**
  + Divided into train, test, and valid folders.
  + Each split contains subfolders: category1, category2, etc.

**2. Model Input**

* **The dataset is used as input to a CNN model:**
  + Training set (train) → for training.
  + Validation set (valid) → for tuning.
  + Test set (test) → for evaluation.

**3. Uploading Dataset**

* **Steps:**
  1. ZIP the dataset.
  2. Upload the ZIP to Google Drive.
  3. Mount Google Drive in Google Colab.
  4. Unzip the dataset using Python code.

**4. Image Preprocessing & Augmentation**

* All images are resized to a uniform size: 128 x 128.
* Augmentation techniques might include: rotation, flipping, brightness adjustment (not shown but implied).

**5. CNN Model**

* Feed preprocessed images into the CNN model.
* The same dimension (128x128) is used for all images regardless of original size (e.g., 100x100 or 400x400).

**6. Testing / Evaluation**

* After training, evaluate the model using the test set.

**7. Deployment/Operation**

* The final model is used for inference in a Python application for real-world use.