# **Problem Statement:** Develop a Convolutional Neural Network (CNN)-based model for automated detection and classification of plant diseases from leaf images across multiple crops, including apple, cherry, grape, and corn. The model should accurately distinguish between healthy and diseased leaves while identifying the specific type of disease. This system aims to support precision agriculture by facilitating early diagnosis and targeted disease management, ultimately improving crop yield and sustainability.

**Pipeline:**

The pipeline discussed during the lecture includes the following steps:

**1. Data Collection & Data Loading:** The dataset is categorized into train, test, and validation sets. Each set contains images belonging to different categories. These datasets are loaded and prepared for training.

**2. ZIP & Mounting**: The dataset is zipped and uploaded to Google Drive. It is then mounted in Google Colab for future use. Python code is used to unzip the dataset into the Colab environment.

**3. Image Processing & Augmentation:** The images are processed to a consistent size (e.g., 128x128 pixels). Augmentation techniques may be applied to improve model generalization.

**4. CNN Model:** A CNN is used to train the model using the training dataset. The processed images are fed into the CNN, which learns to classify them.

**5. Testing & Evaluation:** The model is tested using the test dataset. Evaluation metrics help determine the model’s performance.