Assessment Week 1

# 1. Problem Statement

The goal of this project is to develop a Convolutional Neural Network (CNN)-based model capable of detecting and classifying plant diseases from leaf images of various crops such as apple, cherry, grape, and corn. The model should be able to distinguish between healthy and diseased leaves and accurately identify the specific type of disease. This application supports precision agriculture by enabling early detection and more effective disease management.

# 2. Pipeline Overview

The following pipeline outlines the key stages of the project, as discussed during the lecture:

1. Data Collection & Loading:  
   The dataset is organized into training, validation, and testing sets. Each set contains images categorized by plant type and disease. These datasets are loaded and prepared for model training.
2. Dataset ZIP & Mounting:  
   The dataset is compressed and uploaded to Google Drive, then mounted in Google Colab. The dataset is extracted within the Colab environment using Python code.
3. Image Processing & Augmentation:  
   All images are resized to a standard dimension (e.g., 128x128 pixels). Augmentation techniques such as rotation, flipping, or zooming may be applied to increase diversity and improve model generalization.
4. Model Development (CNN):  
   A CNN is built and trained on the processed training data. The network learns to classify the images based on patterns associated with different diseases.
5. Testing & Evaluation:  
   The trained model is evaluated on the test set using appropriate performance metrics (e.g., accuracy, precision, recall) to assess its effectiveness in real-world scenarios.