# Assessment Week 1

## 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.

## Aim

To design and implement a CNN-based model that accurately detects and classifies plant diseases from leaf images, identifying both healthy and diseased conditions. The system aims to support precision agriculture by enabling early diagnosis and improving crop management practices.

## Pipeline

The pipeline for the CNN-based plant disease detection system includes the following stages:

1. 1. Data Collection & Loading

- Collect datasets containing leaf images categorized into different classes such as healthy and diseased.  
- The dataset is organized into training, validation, and test sets for different categories.

1. 2. Data Structuring

- Organize the dataset with subfolders for each class (e.g., category1, category2).  
- Ensure the structure includes /train, /test, and /valid directories each containing labeled data.

1. 3. Upload and Mount

- Compress the dataset into a ZIP file.  
- Upload the ZIP file to Google Drive.  
- Mount the drive on Google Colab and use Python code to unzip and extract the dataset.

1. 4. Image Processing & Augmentation

- Perform preprocessing operations such as resizing (e.g., 100x100 or 400x400) and normalization.  
- Apply augmentation techniques to enrich the dataset and improve model generalization.  
- Resize images to a consistent dimension (e.g., 128x128) for input into the CNN model.

1. 5. CNN Model Development

- Design and train a Convolutional Neural Network (CNN) using the training dataset.  
- Validate model performance using the validation set.

1. 6. Testing & Evaluation

- Evaluate the trained CNN model on the test set.  
- Measure accuracy and assess performance in classifying healthy vs. diseased leaves.