**PLANT DISEASE PREDICTION SYSTEM**

**Problem Statement**: Plant diseases can seriously affect the health and quality of crops, leading to big losses for farmers and the agricultural industry. Being able to correctly identify and classify plant diseases is an important part of managing crops and keeping them healthy.

In this project, we aim to build a Plant Disease Prediction System that can analyse images of leaves from crops like apple, cherry, grape, and corn and tell whether the leaf is healthy or affected by a particular disease. This system will help farmers and agricultural workers recognize the type of disease on their crops so they can take the right steps to manage it**.**

**Pipeline for this project:**

1. **Collect and Organize the Data:**

We’ll gather a collection of plant leaf images, sorted into different categories for example: healthy, disease1, disease2, and so on.

We’ll divide the images into three groups:

* **Training set** (for teaching the model).
* **Validation set** (for fine-tuning the model).
* **Test set** (for checking how well the model works).

1. **Store and Access the Data:**

We’ll zip (compress) the dataset and upload it to Google Drive so we can easily access it.  
In Google Collab, we’ll mount the Drive and unzip the dataset so it’s ready to use.

1. **Prepare and Improve the Images:**

We’ll make sure all the images are the same size (for example, 128x128 pixels) so the model can work with them easily.

To help the model learn better, we’ll also apply some image tricks like rotating, flipping, and zooming this is called augmentation, and it makes the dataset more diverse.

Finally, we’ll normalize the pixel values to get the images ready for training.

1. **Build and Train the Model:**

We’ll design a **Convolutional Neural Network (CNN)** — a type of deep learning model that’s great at recognizing images.

We’ll train this model using our training data, and keep an eye on how it performs using the validation data so we can adjust it as needed.

1. **Test and Check the Model:**

Once the model is trained, we’ll test it using the test dataset to see how accurately it can predict plant diseases.

We’ll measure its performance using things like accuracy, precision, recall, F1-score, and a confusion matrix to make sure it’s reliable.