# Senior AI Take-Home Assignment

Company: Innofarms.AI

Duration: 2 days

## 1. Objective

This assignment evaluates your ability to design, develop, and optimize AI systems in a smart farming context.  
Design and implement an AI solution to classify lettuce leaf images into healthy or diseased categories, using a publicly available dataset. Your submission should demonstrate both classical machine learning and deep learning approaches, with emphasis on code quality, reproducibility, and practical design.

## 2. Dataset

Use the publicly available 'Lettuce Leaf Disease Images' dataset on Kaggle.

Link: https://www.kaggle.com/datasets/ashishjstar/lettuce-diseases

Include in your report:

• A brief summary of the dataset

• Any preprocessing steps you applied

## 3. Core Tasks

1. Data Exploration and Preprocessing

• Review the dataset and summarize its characteristics

• Apply preprocessing steps suitable for modeling

2. Classical ML Baseline

• Extract features from the images (e.g., histogram, texture)

• Train a baseline model using an algorithm like SVM or Random Forest

• Evaluate and report baseline performance

3. Deep Learning Approach

• Build or fine-tune a CNN model for image classification

• Validate the model using appropriate metrics and split strategies

• Report accuracy and include any visualizations or confusion matrix

## 4. Deliverables

• All scripts or notebooks used for data processing and model training

• A README with setup and execution instructions

• A short report summarizing your methodology, results, and observations

## 5. Evaluation Criteria

• Model performance and correctness

• Clarity and professionalism in documentation

• Reproducibility of results

• Quality of insights and interpretation

Please ensure your submission is well-organized and self-contained. We look forward to your approach.