Formative Assessment 2.2

Assignment Project: Banana Leaf Disease Classification Using Deep Learning

Module: ITLML801 – Machine Learning

Assignment Type: Practical Project

Date: Monday, November 17, 2025

Deadline: November 30, 2025 at 23:59pm

Maximum marks 50

Duration 2 weeks

Dataset: Banana Leaf Disease Dataset (cordana, sigatoka, pestalotiopsis, healthy)

1. Project Description

Banana plants are highly vulnerable to fungal leaf diseases. This project focuses on building a Deep Learning model using CNNs to classify banana leaf diseases.

2. Dataset Details

Classes:

- cordana

- sigatoka

- pestalotiopsis

- healthy

3. Learning Objectives

- Understand and organize image datasets.

- Build CNN models.

- Apply transfer learning.

- Use data augmentation.

- Evaluate model performance.

- Visualize predictions.

4. Tasks and Instructions

Task 1: Dataset Loading and Exploration

- Load dataset (from [Banana Leaf Classification Dataset](#)).

- Display sample images.

- Analyze class distribution.

Task 2: Data Preprocessing

- Resize images.

- Normalize pixels.

- Split dataset.

- Apply data augmentation.

Task 3: Model Building

Option A: Own CNN model.

Option B: Transfer learning (MobileNet, ResNet, EfficientNet).

Task 4: Model Training

- Train 10–30 epochs.

- Use Adam optimizer.

- Apply early stopping.

Task 5: Model Evaluation

- Accuracy, confusion matrix, classification report.

Task 6: Final Predictions

- Predict on test images.

- Save predictions to CSV.

Task 7: Project Report

Include: Introduction, Dataset, Methods, Results, Discussion, Conclusion.

5. Deliverables

- Notebook (.ipynb)

- Model output

- CSV predictions

- Report (PDF)

6. Grading Criteria (100 marks) Marks = accuracy/2 if you get 50%, marks = 50/2 = 25/50

To detect cheating cases below steps will be evaluated. Any kind of cheating will result to zero marks.

- Dataset exploration

- Preprocessing

- Model architecture

- Training & evaluation

- Predictions

- Report

7. Tips for Students

- Use transfer learning.

- Avoid overfitting.

- Use GPU.

8. tools to be used

- TensorFlow or Pytorch

Recommendations: Read notes uploaded to eLearning under in ANN page you will find all techniques that will help you to avoid underfitting and overfitting then move to CNN page to check how to implement deep learning project.

Important Note

This project should be implemented to help you build real Machine Learning skills, not just to earn marks.
Focus on understanding each step—data exploration, preprocessing, model building, training, and evaluation.
The goal is for you to confidently apply these techniques in real-world AI projects.