Brainstorming & Project Summary - Waste Classification

Introduction

Project Name: Cleantech Transforming waste management with transfer learning

Team ID: LTVIP2025TMID39058

This document provides an overview of the problem selection, brainstorming, solution building, and prioritization process for a machine learning-based waste classification system.

Step 1: Problem Statement

Step 1: Team Gathering, Collaboration, and Problem Statement

Problem Statement:

To build a machine learning system capable of classifying waste into categories such as biodegradable, recyclable, or trash using images. The system should be trained using a custom dataset and deployed via a web application.

Step 2: Brainstorming & Grouping

Step 2: Brainstorming, Idea Listing, and Grouping

Ideas Discussed:

- Collecting a custom dataset with properly labeled waste images
- Using transfer learning with MobileNetV2 for efficiency
- Data augmentation to improve model generalization
- Creating a Flask web app for real-time predictions
- Using `splitfolders` to preprocess and organize the dataset
- Saving and loading the trained model for reuse

- Displaying results via HTML templates

Grouped Concepts:

- Data Preparation: Dataset splitting with `splitfolders`
- Model Development: MobileNetV2 with Keras
- Interface: Flask app with image upload and prediction

Step 3: Prioritization & Conclusion

Step 3: Idea Prioritization

High-Priority Features:

- Efficient model using transfer learning
- Flask app for user interaction
- Clear separation between training and inference

Medium Priority:

- Data visualization for training progress
- Adding callbacks and hyperparameter tuning

Low Priority:

- Deployment to cloud platforms
- Advanced UI design

Conclusion:

The team selected an architecture that is easy to train, efficient in performance, and simple to deploy. The full project pipeline includes dataset preparation, model training, and deployment in a web environment.