

This project focuses on automating the classification of various household and recyclable waste categories using deep learning:

1. **Data Loading and Management:** The dataset, consisting of 30 classes of household and recyclable waste images, was handled using Python's kagglehub library.
2. **Data Splitting:** The dataset is divided into 80% for Training and 20% for validation to ensure balanced evaluation.
3. **Model Selection:** Three models were selected for comparison:
  - VGG16
  - VGG19
  - ResNet
4. **Data Preprocessing:**
  - Preprocessed data for the input requirements of models.
  - Trained and validated these models on the processed data.
5. **Evaluation Metrics:**
  - For each model, accuracy, F1 score, Recall and precision were calculated to assess model performance.
  - Confusion matrices for each model were generated to provide a detailed breakdown of classification results.

This submission includes the code, accuracy comparisons, and evaluation matrices for each model. This approach provides a comprehensive view of each model's effectiveness in classifying various household and recyclable waste accurately.