Waste Classification Using Deep Learning

Abstract
This project focuses on classifying waste into Organic and Recyclable categories using a Convolutional Neural Network (CNN). The system helps improve waste segregation efficiency and supports sustainable waste management.

Introduction
Waste management is an important environmental challenge. Manual waste segregation is time-consuming and error-prone. Deep Learning techniques can automate this process using image classification.

Problem Statement
To build a system that automatically classifies waste images into Organic and Recyclable categories using Deep Learning.

Dataset Description
The dataset is collected from Kaggle and contains labeled images of Organic and Recyclable waste. The dataset is divided into training and testing sets.

Methodology
A CNN model is used for feature extraction and classification. Images are resized, normalized, and passed through convolutional and pooling layers. The final output layer predicts the waste category.

Model Architecture
The CNN model consists of convolutional layers, max-pooling layers, dense layers, and a sigmoid activation function.

Training and Testing
The model is trained for multiple epochs using Google Colab. After training, the model is saved and used for prediction on new images.

Results
The trained model successfully classifies waste images into Organic or Recyclable categories. The prediction output is verified using real-world images.

Conclusion
The project demonstrates the effectiveness of Deep Learning in waste classification. This system can be further improved by adding more categories and advanced models.

Future Scope
The system can be extended to include multiple waste categories and real-time deployment using web or mobile applications.