

Project Problem Statement

Plastic pollution is one of the most pressing environmental challenges of our time, affecting ecosystems, wildlife, and human health globally. A critical step in addressing this crisis is effective recycling, which requires accurate identification and sorting of different plastic types. However, traditional methods of plastic sorting rely heavily on manual inspection or basic mechanical separation, which is often time-consuming, labor-intensive, and prone to errors.

With the advancement of Artificial Intelligence (AI) and Deep Learning, it is now possible to create intelligent systems capable of identifying plastic types automatically from images. Using Convolutional Neural Networks (CNNs), these systems can analyze plastic item images, detect visual patterns, and predict the type of plastic material accurately.

To address this problem, there is a need for an intelligent, automated system that can classify plastic images into different categories such as PET, PP, PE, PS, PC, and Others. Such a system will support recycling facilities in efficient sorting, reduce contamination in recycling streams, and promote sustainable waste management by improving recycling accuracy and reducing plastic pollution.

DataSet

Dataset Name:

Plastic Type Classification Dataset – A Comprehensive Image Dataset for Plastic Material Recognition

About Dataset:

This dataset contains over 3,000 high-quality images of plastic items collected under various conditions. The images represent different plastic types, making it ideal for building machine learning and deep learning models focused on plastic material identification.

Key Details:

- Number of Classes: 6 classes (covering different plastic types and other materials)
- Image Type: RGB plastic item images
- Plastic Types Included: PET, PP, PE, PS, PC, Others
- Categories: Each class represents a specific plastic polymer type or general category (e.g., PET - Polyethylene Terephthalate, PP - Polypropylene, PE – Polyethylene, PS - Polystyrene, PC - Polycarbonate, Others - Mixed or unidentified materials).
- Image Format: JPEG / WebP
- Total Images: 3,164 images
- Class Distribution:
 - PET: 594 images
 - PS: 527 images
 - Others: 526 images
 - PP: 514 images
 - PE: 511 images
 - PC: 492 images

Source:

[Kaggle – Plastic Type Classification Dataset](#)

Next Steps

- 1) **Collect & Prepare Dataset** – Download and organize images into training, validation, and test folders.
- 2) **Train the CNN Model** – Use Google Teachable Machine or TensorFlow/Keras to train a deep learning model for plastic type classification.
- 3) **Evaluate & Test the Model** – Measure model accuracy, precision, recall, and confusion matrix performance.
- 4) **Build the Web Interface** – Develop a simple web app where users can upload a plastic item image and get the predicted plastic type label.
- 5) **Test the Complete Application** – Ensure that the interface and model work seamlessly together.
- 6) **Deploy & Document** – Deploy on a cloud platform (e.g., Streamlit, Flask, or Heroku) and document the results.