

# Geo Waste Classification Using Deep Neural Networks

**D Tejaswini ,B Akshitha ,Ch Dharani**

Under the esteemed guidance of

**Ms. M. Sudha Rani**

Assistant Professor



Bachelor of Technology

Department of Information Technology

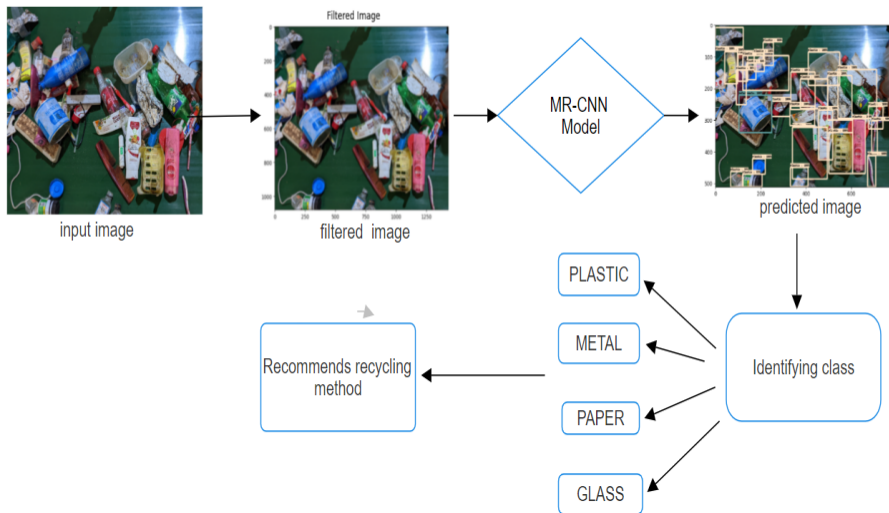
**BVRIT HYDERABAD College of Engineering for Women**

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# Overview

- 1 Graphical Representation of the System
- 2 Algorithm used
- 3 Methodology of the System
- 4 Comparison with Recent Methods
- 5 Why is our Model better than other's ?
- 6 Overview of Report Structure

# Graphical Representation of the System



# MRCNN

- Mask R-CNN is an extension of the Faster R-CNN that adds a branch for predicting segmentation masks on top of the existing object detection capabilities.
- It operates in two stages: Regional proposal and mask prediction.

# Steps Involved (Part-1)

- **Image Preprocessing**

- **Objective**

- Prepare the input image for segmentation and feature extraction.

- **Steps**

- Resizing, Normalizing, Removing noise

- **Object Detection**

- **Objective**

- Implement techniques to separate waste items from the background.

- **Steps**

- object segmentation

- **Classification**

- **Objective**

- Train a deeplearning model on a dataset of labeled waste images.

- **Steps**

- Classify waste items in different categories.

# Steps Involved (Part-2)

- **Recycling Methods**

- **Objective**

- Suggest appropriate recycling methods

- **Steps**

- identified waste categories and recommends recycle methods

- **Integration and Testing:**

- **Objective**

- Integrate all components of the system and test its functionality.

- Steps**

- Integrate all components of the system and test its functionality.

- Ensure accurate waste detection, classification, and recycling method suggestions

# Steps Involved (Part-3)

- **User Interface Design**

- **Objective**

Design a user-friendly interface for the application.

- **Steps**

Create an intuitive interface that allows users to upload images of waste items and receive recycling suggestions.

# Waste detection using MRCNN

- **Task:** Waste Detection and Classification
- **Dataset:** Trained on using trashnetdataset .
- **Results:** Achieves 86% accuracy.
- **Strengths:** Designed for instance segmentation, accurately detects and segments multiple waste items in a single image.



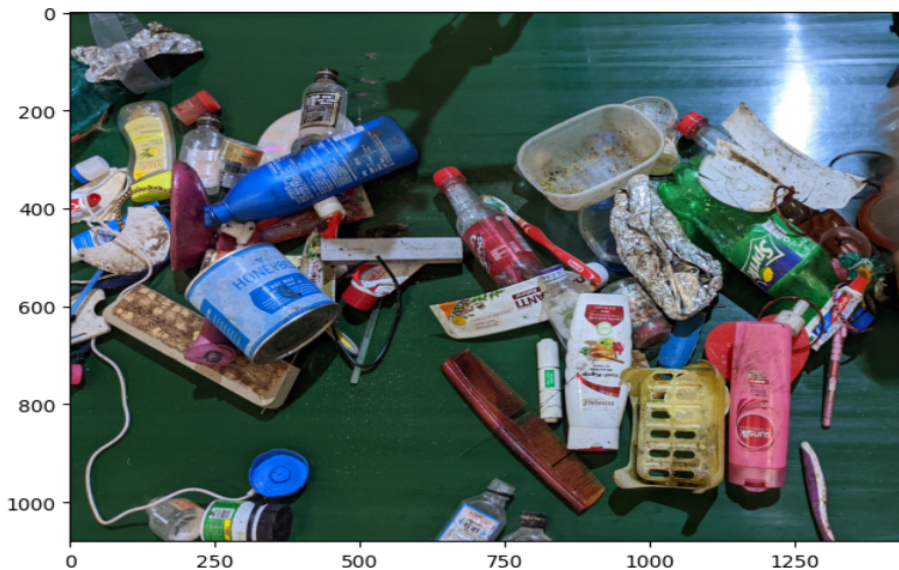
# Waste detection using MobileNetV2

- **Task:** Waste Detection and Classification
- **Dataset:** Trained on using trashnetdataset .
- **Results:** Achieves 83% accuracy.
- **Strengths:** MobileNetV2 is efficient and lightweight, making it suitable for resource-constrained environments such as mobile devices
- **Weaknesses:** MobileNetV2 focuses on classification and object detection single object in image.

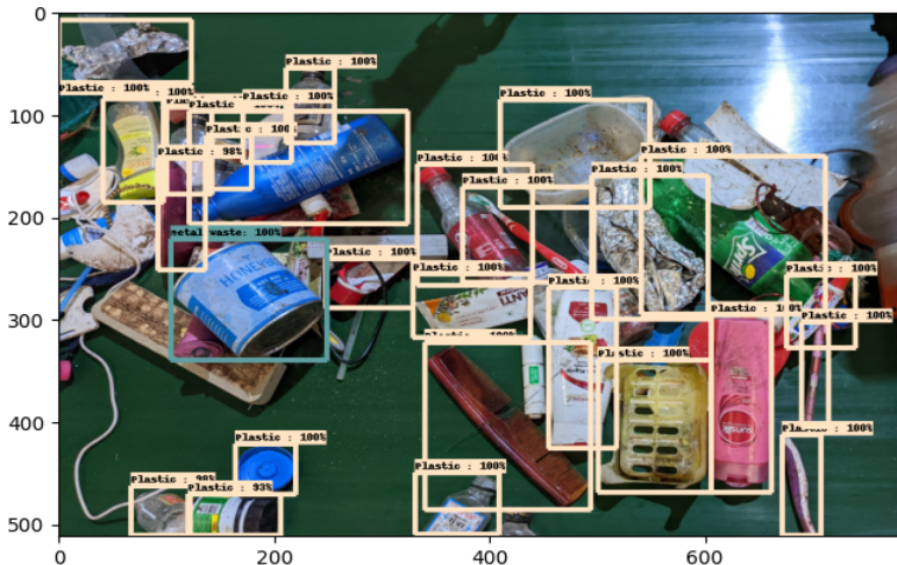
# Best Model Comparison

Algorithm	Accuracy (acquired)	Accuracy (Paper)	Authors
CNN	67	63	Liying Yong, Le Ma, Dandan Sun, Liping Du - 2023
SVM	75	73	Adedeji, Olugboja, and Zenghui Wang - 2019
MobileNet	83	82	Liying Yong, Le Ma, Dandan Sun, Liping Du - 2023
MRCNN	86	84	Jansi Rani S.V, Raghu Raman V, Rahul Ram M, Prithvi Raj A - 2022

# Input



# Output



# Output

Detected category: {'id': 6, 'name': 'Plastic '}

Plastic recycling typically involves sorting, cleaning, shredding, melting, and pelletizing.

Sorted plastic waste is cleaned to remove contaminants before being shredded into small pieces or melted.

The melted plastic can then be formed into pellets for manufacturing new plastic products.

Advanced recycling technologies, such as chemical or enzymatic recycling,

are also emerging to break down plastics into their molecular components for reuse.

# Report Structure

- **Introduction:** Waste Detection and Classification
- **Literature survey:** Collected information from few survey papers
- **System Design:** proposed a system to overcome the existing problems
- **Dataset:** "Trashnet" is used as data set for this project which consists of 2547 images with 6 classes
- **Methodology:** Model is trained with different algorithms
- **Results:** Detects and Recommends Recycling methods
- **Conclusion and Future works:** Implementation of GUI

# Result and Future works

- Detected waste and recommend Recycling Methods
- GUI Implementation

THANK YOU