# A Method for Waste Segregation using Convolutional Neural Networks:

The article discusses the architecture of a convolutional neural network (CNN) used for waste classification into 2 categories; ‘organic’ or ‘recycled’. The article uses dataset provided by Kaggle. It is waste classification data, which comprises approximately 25,077 waste images split into two categories: organic and recyclable [1]. The ReLU activation function is used in the fully connected layers since it provides better results in comparison to Sigmoid and tanh functions, and the output layer has a single neuron with values of 0 or 1 for classifying "Organic" or "Recycled" materials. The proposed CNN has 6 Conv2D layers, 3 MaxPool2D layers, and 3 fully connected Dense layers. This article compares the results of their proposed model with VGG16 and ResNet-34 and the proposed model performs significantly better than the two at 94.9% accuracy.

## Significant work:

The authors used a CNN architecture, compared the results of their configuration of CNN with VGG16 and ResNet-34 and their model performed better than the two models discussed.

## Limitations:

The model performs the task of classification and would simply tell whether an image contains organic waste or recyclable waste. The model will not perform well on images with multiple instances of objects and would also not detect where the instance of an organic or recyclable object is in an image.

# Waste Classification using Transfer Learning with Convolutional Neural Networks:

This article performs a comparison of 8 different models with different configurations and datasets to measure which model gives best accuracy. The authors proposed transfer learning with data augmentation for 3 models; ResNet34, DenseNet121, MobileNetV2, and compared the accuracy of their configurations with the same models without the new configurations. The proposed models had a higher accuracy than the base models. The datasets used in training were TrashNet and CompostNet.

## Significant work:

The authors used transfer learning on three different models with CompostNet and compared their results with the base models trained on TrashNet [2].

## Limitations:

The authors are not taking into account what materials are recyclable or organic. Just like the previous paper, this paper focuses on classification only, and not on object detection.

# References:

[1] Shah, J. and Kamat, S., “A Method for Waste Segregation using Convolutional Neural Networks” in arXiv:2202.12258, [Online] <https://doi.org/10.48550/arXiv.2202.12258> [Accessed: Feb. 27, 2023]

[2] Srivatsan, K., Dhiman, S., & Jain, A. (2021). Waste Classification using Transfer Learning with Convolutional Neural Networks. *IOP Conference Series: Earth and Environmental Science*, *775*(1), 012010. https://doi.org/10.1088/1755-1315/775/1/012010