# Classification of waste materials into biodegradable and nonbiodegradable using machine learning

**Question:**

Can I use artificial Neural Networks that specialize in image classification to train an AI model to classify waste materials into Biodegradable and Nonbiodegradable?

**Rationale:**

According to my research, only around 63 percent of waste materials that are composted globally are actually biodegradable, the other 37 percent is just non compostable materials being wasted. Glass, metal, rubber, leather and most plastic are all non-biodegradable materials that are not supposed to be composted but are. Many people can't tell if something is biodegradable or not, and many materials go to waste, so that's why I wanted to create an AI model that can classify waste materials into biodegradable and nonbiodegradable.

**Hypothesis:**

I hypothesize that the use of deep neural networks to classify images of waste materials into biodegradable and non-biodegradable materials is possible with an accuracy greater than 95%.

**Description in detail of method or procedures:**

1.  Download [Non and Biodegradable Material Dataset](#) from Kaggle repository.
2.  Split the dataset into 3 categories: 80% train data, 10% test data, and 10% validation data.

3. Using the image classification algorithm MobileNetV2, tune the hyperparameters, Epochs and learning rate, by training the model with the training data, and then testing it with the new images (validation data). Record the accuracy of the model when tested. Repeat this with different hyperparameter combinations.
4. Generate a multi line plot graph with the data you recorded using python code to ensure the best combination of hyperparameters.
5. Find the best model using the data collected and save it in a file.
6. Generate a confusion matrix showing how many images the AI predicted right and wrong.
7. Repeat steps 3-6 with the algorithms VGG16 and Resnet50.
8. Determine the best AI model for the data based on all the experiments from steps 3-7.
9. Complete data analysis and conclusion.

**Safety Risks:**

Because this experiment is completely run on a computer and requires no living organisms to be tested on, there are no safety precautions or risks.

**Bibliography:**

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