

Waste Detection & Classification Using Deep Learning Algorithms

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Abstract:

Waste management is a pressing global concern especially in the Philippines. Efficient waste segregation is a crucial component of environmentally responsible practices. This study aimed to systematically evaluate the performance of various deep learning models and techniques in the context of waste segregation by using local images here in the Philippines. This study sought to provide valuable insights of the YOLOv8 and VGG19 into their relative strengths and limitations, aiding waste management professionals and environmentalists in making informed decisions. This study hopes to contribute to the ongoing effort surrounding waste management and the role of deep learning in enhancing waste segregation efficiency. Training and testing of the algorithms was done over a locally acquired data set personally taken by the researchers. A 5-fold cross validation was performed to verify the accuracy of our models as well as a confusion matrix to further evaluate its accuracy, precision, recall, and f1-score. After training the 2 models, VGG19 gave a higher accuracy rate which is 95% than YOLOv8 which has an accuracy rate of 85%. VGG19 offers superior precision and consistency for scenarios requiring highly accurate classification compared to YOLOv8.

Keywords:

Accuracy, Classification, Deep-Learning, Detection.