

**Universiti Teknologi MARA**

**Recyclable Waste Classification  
using YOLO-Based Convolutional  
Neural Network (CNN)**

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## **ABSTRACT**

**Effective waste sorting management is essential for recycling efficiency and environmental challenges. Traditional methods of waste sorting, based on manual labor, often lead to inaccurate and inefficient results. An image recognition system using YOLO-based CNN is proposed in this study, which is in turn driven by a cyclical research design. After comparative analysis, the model that performed best is YOLOv8. This model achieved, by and large, over 90% classification accuracy in distinguishing between plastic, paper, and glass waste types. The model is able to extract critical visual features for effective classification after training on a prepared dataset. A simple interface is developed for real-time waste detection and identification, which is useful for waste management professionals. This is an important move forward since AI is now being used, even in its infancy, in different ways to improve on traditional systems to aid and promote sustainable waste management and environmental conservation. (142 word)**

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