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[Garbage Classification using a Transfer Learning with Parameter Tuning]

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Abstract: [To better manage waste resources, minimize environmental pollution, and simplify garbage sorting, this paper presents a method for garbage classification and recognition using a fusion network based on transfer learning. We begin by balancing the dataset through data augmentation and then integrate a pre-trained model with a customized CNN model. Three Convolutional Blocks with varying filter sizes (32, 64, and 128) and Mish activation function are employed. The flattened output of the last MaxPool2D layer is fed into three fully connected layers (1024, 512, and 12 neurons) with Softmax activation for multi-class prediction. Evaluation of the model reveals DenseNet169 achieved the highest accuracy of 99.58\%. Our approach yields an efficient garbage classification model, requiring less training time and parameters. Mish activation function demonstrates superior performance compared to ReLU. Previous models were more complex, requiring extensive training time and parameters. This study underscores the importance of automated garbage classification and presents an advanced solution.]