

Abstract

This abstract presents the development and testing of a novel recycling machine that integrates an artificial intelligence (AI)-powered camera system for the identification and classification of recyclable materials. The objective of this invention is to automate the sorting process of recyclables with a high degree of accuracy, thereby increasing efficiency and reducing the dependency on manual sorting in waste management operations. The machine features a conveyor belt apparatus, akin to a treadmill, which transports items past an AI camera that determines the material type, such as glass, metal, or wood.

The research method involved a sequence of systematic experiments designed to evaluate the machine's material recognition accuracy, processing speed, and classification effectiveness. The results from these experimental trials were overwhelmingly successful, demonstrating the machine's proficiency in accurately sorting various materials and suggesting a significant improvement over traditional recycling methods.

The study's findings not only validate the machine's potential to revolutionize waste management practices by enhancing the accuracy and efficiency of recycling processes but also underscore its role in promoting environmental sustainability. The successful results from the experimental validation suggest that this machine could be highly beneficial for large-scale implementation in municipal and industrial recycling facilities.