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Automated Multisensory Data Collection System for Continuous Monitoring of Refrigerating Appliances Recycling Plants

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Abstract : Recycling refrigerating appliances plays a major role in protecting the Earth's atmosphere from ozone depletion and emissions of greenhouse gases. The performance of refrigerator recycling plants in terms of material retention is the subject of strict environmental certifications and is reviewed periodically through specialized audits. The continuous collection of Refrigerator data required for the input-output analysis is still mostly manual, error-prone, and not digitalized. In this paper, we propose an automated data collection system for recycling plants in order to deduce expected material contents in individual end-of-life refrigerating appliances. The system utilizes laser scanner measurements and optical data to extract attributes of individual refrigerators by applying transfer learning with pre-trained vision models and optical character recognition. Based on Recognized features, the system automatically provides material categories and target values of contained material masses, especially foaming and cooling agents. The presented data collection system paves the way for continuous performance monitoring and efficient control of refrigerator recycling plants.

Keywords : automation, data collection, performance monitoring, recycling, refrigerators
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