

PAPER-ID-072

An AI based Automated System for Classifying and Identifying Electronic Waste Using Deep Learning Methods

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Abstract

Artificial Intelligence (AI) can help digitalization instead of traditional methods to sort a large stream of electronic and electrical waste accurately in a short amount of time. The convergence of AI with the circular economy has the potential to expand a number of environmental friendly technology services, most notably intelligent electronic waste (e-waste) recycling. In order to handle the rapidly expanding stream of e-waste, automated e-waste recycling is becoming increasingly necessary. The purpose of this study is to examine an image recognition system that uses images to identify and categorize waste of electrical and electronic equipment. Its primary goal is to take advantage of the widespread adoption and use of smart phones by facilitating information interchange regarding the waste that has to be collected from people or from waste collection locations. People would take a picture of the e-waste item and send it to the garbage collection company's server, where it would automatically identify and classify it, hence improving e-waste collection planning. A deep learning convolutional neural network (CNN) is used to classify the type of e-waste, and send for specified recycling. Deep learning algorithms like Inception V3, VGG19, Resnet50, and MobileNet are used to further evaluate the collected photos in order to classify different electronic waste. This automated recognition and classification system of e-waste recycling mechanism will help the users and recycling company owners to maintain the eco-friendly system.

Keywords: Artificial Intelligence (AI); Circular Economy; Electronic Waste (e-waste); Convolutional Neural Network (CNN); Recognition and Classification System