Automated recyclable waste classification using multiple shape-based properties and quadratic discriminant

ABSTRACT

Nowadays, a crucial issue in major cities throughout the world is waste management where tons of waste being generated every single day. Fortunately, people can count on other methods to protect the environment through waste recycling. In most countries, waste that can be recycled are being categorised or handled manually by using human labour. The objective of this project is to develop an automated recyclable waste classification method which can replace the traditional ways of dealing with three types of waste, namely plastic bottles, papers, and soda cans. Firstly, we computed a global threshold value based on the Otsu method to obtain a binary image representation. Few morphological operators are then executed to obtain the regions of interest (waste's object). For feature representation, we calculated multiple shape properties of the waste's object such as perimeter, area, eccentricity, and major axis length. We experimented the extracted feature vectors with few classifiers. Our findings have shown that the waste classification prototype is able to effectively categorise waste up to 94.4% accuracy based on the proposed shape representation and Quadratic Discriminant classifier.