

ABSTRACT

The accumulation of waste continues to increase every day due to the mixing of various types of waste and poor waste management. This situation also causing ineffective waste processing especially in landfills. This research aims to design and implement an innovative solution in waste management with a focus on detecting organic and inorganic waste types. As a solution, a waste detection tool for organic and inorganic types was developed, intended for used by the dustman when collecting household waste. The design of this tool integrates various sensors, including capacitive sensors, inductive sensors, and LDR (Light Dependent Resistor), along with display devices and lights indicator to detect and convey detection results effectively. The classification results of the two types of waste are obtained by processing sensor values using a machine learning model, with the best accuracy selected from several models which is AdaBoost, KNN, SVM, and Decision Tree. With using the AdaBoost model, a training accuracy of 84.75% was achieved through cross-validation, and a test set evaluation accuracy is 80.82%. From the device testing results, a classification accuracy of 91.6% for waste types was obtained, with a waste type composition error is 5.06%. The device can classify waste types well, although detection performance is affected by limitations in the types of objects detected and sensitivity to light that plays a role in the detection process.

Keywords: detection tool, waste accumulation, capacitive sensor, inductive sensor, LDR, AdaBoost