

ABSTRACT

Environmental pollution caused by the mixing of electronic waste (e-waste) and non- electronic waste has become a serious issue with wide-ranging impacts on human health, environmental degradation, and economic loss. E-waste contains hazardous materials and valuable metals that require special handling to prevent environmental contamination. The lack of early waste separation is one of the main causes of the accumulation of mixed waste, making it difficult to manage effectively.

To address this problem, an automatic waste separator based on the Internet of Things (IoT) was designed to distinguish between electronic and non-electronic waste. The system uses an ESP32 as the main mikrokontroller, inductive and capacitive proximity sensors to detect waste types, and a servo motor to direct the waste to the appropriate bin. Additionally, an HC-SR04 ultrasonic sensor is used to monitor bin capacity, while an LCD provides real-time system status update.

Test results show that the tool can separate waste with an accuracy of approximately 70% under normal conditions. The average response time for processing a single waste item is around 2 seconds, and the system consumes low power. Although the accuracy is not yet optimal, this tool shows promising potential for further development as a smart and environmentally friendly solution to support automatic waste sorting.

Keywords: e-waste, IoT, waste separator, sensor, environment