

ABSTRACT

In 2021, the amount of waste in Indonesia reached 21.88 million tons, with 2.6 million tons of it being disposed into rivers. The government has undertaken several efforts, including the installation of signs prohibiting trash disposal into rivers and the use of heavy machinery to clear waste from riverbeds. However, after these actions, the waste is left to accumulate. Interestingly, within the accumulated waste, there are types of trash that still possess utility and economic value, such as plastics and metals. In the waste sorting process in the rivers, manual methods are employed, involving the sorting of trash one by one. These efforts are perceived as less effective in addressing the issue of waste buildup in rivers.

This research discusses the design and development of a prototype for a river waste sorting system that can collect, dry, sort, and monitor the final waste holding capacity. The primary focus of this study is on managing accumulated river waste. The objective of this research is to reduce the water content in river waste by up to 60%. Additionally, the system aims to sort waste with volumes ranging from 7.5 to 1,500 ml, with a minimum accuracy of 60%. The waste sorting subsystem employs an image processing-based approach utilizing the SSD-MobileNet v2 algorithm. The system is also expected to monitor the final holding capacity within a range of up to 10 km, utilizing Internet of Things (IoT) technology. To ensure user-friendliness, the system is designed to be compatible with the standard household voltage of 220 V.

The prototype of the river waste sorting system operates on a 220 V voltage. Furthermore, the system manages to reduce the water content in river waste by 70.51%. Test results also demonstrate that the system can effectively sort waste with volumes ranging from 30 to 1,500 ml, achieving an accuracy rate of 80%. The system is also capable of monitoring the final holding capacity and sending notifications via Telegram within a distance of up to 10 km.

Keywords: Internet of Things, Image Processing, Plastic, Metal