

## ABSTRACT

The plastic bottle waste on the campus of Telkom University is widely left and not disposed of properly. The awareness among some members of the surrounding community and campus inhabitants, including students, lecturers, staff, and employees, tends to be negligent regarding the disposal of the beverage bottles they consume. This is evidenced by the discovery of several samples of plastic bottle waste scattered in various points within the Telkom University area, starting from the parking lots, campus gardens, 'galau' lake, to the study areas.

The Reverse Vending Machine (RVM) is a conversion machine that can turn plastic bottle waste into money. Researchers designed the Reverse Vending Machine (RVM) with the aim of attracting the interest of the Telkom University campus community to pay more attention to their plastic bottle waste. It provides a modern waste sorting tool that specifically accommodates plastic bottle waste and offers rewards for each contribution of depositing plastic bottle waste units into the system.

Research related to the Reverse Vending Machine (RVM) has been extensively conducted, resulting in various versions with their own advantages in each created Reverse Vending Machine (RVM) system. On this occasion, the researchers designed a Reverse Vending Machine (RVM) with a sensing system for plastic bottle waste at a rate of 94.70%. This result includes the system's ability to detect the bottle's volume, differentiate the bottle's color based on transparency level, with a maximum detection time speed of  $\leq 4$  seconds. These findings refer to previous research on the Reverse Vending Machine (RVM) with detection accuracy for plastic bottle waste at 92.28%, and a detection speed capability of  $\leq 5$  seconds. The designed system achieved a 98.81% accuracy in the reject capability (automatic disposal when non-plastic bottle waste is detected), performed forward action on eligible bottle waste based on system criteria, and exhibited a 95.50% accuracy in the system's ability to provide reward output in the form of coins, including 100, 200, and 500 denominations, for each empty plastic bottle waste based on its size that enters the system. Furthermore, the system is equipped with a large storage capacity capable of holding up to 3 Kg of waste.

*Keywords: RVM, reward, coin, reject, storage, bottle sensing*