



ORIGINAL ARTICLE

**GARBAGE MONITORING SMART DUSTBINS USING  
RASPBERRY PI PICO AND LORA WAN**

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**ABSTRACT**

The trash cans or dust bins that are poisoned in public areas of cities filling up quickly because of the daily growth in waste. This work is aimed to construct a Garbage Monitoring System using Raspberry Pi Pico Model and Long Range Wide Area Network (LORA-WAN) which will be useful at public places to maintain an unhazardous environment and prevent the spread of infections. There are several trash cans with the low cost embedded systems, spread out across the campus and the public places in the city which is connected to the main server at the city corporation office via wireless network protocol. Each trash can communicate the status of the garbage can such as empty, half-filled or crossed the threshold level. This information from each trash unit is helpful for the concerned authorities to take prompt and timely actions to get the trash cleared from the trash cans by scheduling the dump trucks and collect the garbage at the main center without delay. This reduces the human dependence and interventions in handling the ever increasing garbage in the city and will be helpful to provide smart and low cost solution to the problem.

**Keywords:** LoRa Module, Ultrasonic Sensor, Raspberry Pi Pico, Wireless Sensor Network (WSN), Embedded System, Garbage Monitoring

**1. INTRODUCTION**

Several ecological, social, and environmental issues are becoming more prevalent due to the world's population growth and the quick expansion of metropolitan areas. Garbage disposal is one of the main issues that are frequently encountered in residences, workplaces, enterprises, hospitals, and educational institutions. Improper garbage disposal maintenance can lead to health and hygienic problems. Large workplaces, organizations, and enterprises have specific issues with garbage disposal and monitoring. Numerous issues can arise from delaying the disposal of a garbage can full of trash. In first-world societies, failing to dispose of trash properly on schedule can result in severe fines and penalties. Using advanced technology can help prevent carelessness and mistakes made by people while disposing of waste [1].

A smart waste monitoring project is suggested in order to achieve this goal. IOT connectivity technologies and a Raspberry Pi Pico controller serve as the foundation for this project. Ultrasonic sensors are used by the Internet of Things and Raspberry Pi Pico-