IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 5, March 2025

Smart Waste Management

Abhijeet Khatale
Department of Electrical Engineering
Guru Gobind Singh Polytechnic, Nashik, India

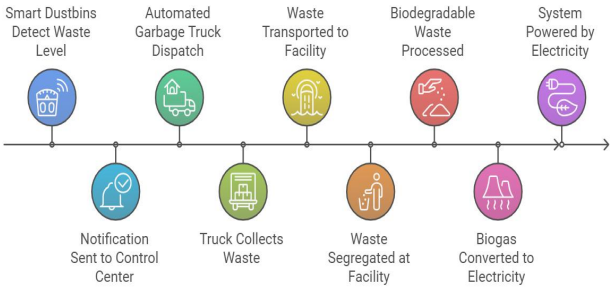
Abstract: *Urban waste management remains one of the most critical challenges faced by modern cities. Overflowing garbage bins, delayed waste collection, and inefficient segregation methods lead to environmental pollution, health hazards, and wastage of valuable resources. This project introduces an integrated Smart Waste Management System designed to address these challenges by leveraging IoT, automation, and renewable energy solutions. The system consists of three core components which hare explained in details.*

The system consists of three core components:

1. Smart Dustbins: These dustbins are equipped with IoT sensors that monitor the waste level. When the bin is 75% full, a notification is sent to the control center, triggering the dispatch of an automated garbage truck.

2. Driverless Garbage Trucks: These autonomous vehicles are programmed to navigate to designated locations, collect waste from the smart dustbins, and transport it to a waste management facility.

3. Waste Separation and Processing Facility: At this facility, waste is segregated into iron, biodegradable, and recyclable materials using advanced sensing and sorting technologies.



The biodegradable waste undergoes anaerobic digestion to produce biogas, which is then converted into electricity. This electricity powers the dustbins, garbage trucks, and waste separation machines, ensuring energy self-sufficiency within the system. The surplus energy generated can be fed back into the grid or used for other city-wide applications. This closed-loop system minimizes manual intervention, reduces carbon emissions, and optimizes resource recovery.

The proposed system not only promotes environmental sustainability but also offers a scalable and efficient solution to urban waste management. Its integration of IoT and automation makes it suitable for deployment in smart cities, contributing to cleaner environments and improved public health outcomes.

Keywords: IoT (Internet of Things), Automation, Renewable Energy, Waste Segregation, Smart Cities

DOI: 10.48175/IJARSCT-24166
ISSN 2581-9429 IJARSCT