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A Survey on: Smart Waste Monitoring and Tracking System

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Abstract: *The challenge modern waste management faces is how to connect technological progress with citizen participation. The literature, above all recent discussions of IoT, AI, and data analytics, suggests opportunities for advancement. However, the solutions are mostly in silos, for example, monitoring at the bin level, route optimization for waste collection, and automated sorting, which provide little in terms of a method to trace back to household accountability, leading to erratic segregation techniques and thereby reducing long-term sustainability. In this paper, I propose an integrated IoT waste-tracking and management system that extends the innovative continuum of infrastructure, household-level ID, and real-time monitoring to promote effectiveness and transparency. The project aims to achieve automation and transparency to involve citizens in a way that transcends voluntarism and engagement. It is also worth noting that the design developed a GIS-based household authentication system using RFID to monitor individual disposal events and facilitate traceability. It should be noted that there are also smart waste disposal units with multifunctional sensors that can recognize the type of waste and send it to the appropriate compartment to enable appropriate segregation and mitigate contamination. The cloud-based platform may use an embedded controller to record each disposal transaction as an entry. The interactive dashboard will be available to municipal staff to deliver compliance reporting data and take timely measures. The other innovation is the automated regulatory layer, which is modelled on the digital fine systems that enhance accountability through the imposition of specific fines due to noncompliance. By introducing citizen-level monitoring, automatic authentication, and governance along data lines, this framework helps to curb major loopholes in current innovative waste management processes. It gives a foundation on which predictive analytics, decision support based on artificial intelligence, and blockchain-driven transparency will be integrated in the future to create an urban environment that is cleaner, more efficient, and sustainable.*

Keywords: *waste management*

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