# LITERATURE SURVEY

## SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

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**PAPER 1:**

**TITLE:** Survey on Smart Waste Management Systems for Metropolitan Cities.
**PUBLICATION YEAR:** 2021

**AUTHOR NAME: Rikin Thakkar, Brinda Patel, Satvik Kharao**

**DESCRIPTION:**

The waste management is a major problem now days. Waste bins checking procedure for waste collection is one of the major troublesome tasks. The typical technique by which, a man needs to wander through the distinctive spots and check the spots for waste accumulation. This is to some degree complex and time consuming process. Presently, waste management system is not as effective as it ought to have been taken over the progressions in the advances and technologies that emerged in the current years. Smart Waste Management System is to implement a smarter way of conventional waste management using smart sensors to gather fill-level data, presence of garbage around the dustbin and stinking condition from containers and garbage bins, and send it to servers in real time.

**PAPER 2:**

**TITLE:A Survey on Smart Waste Management Systems**

**PUBLICATION YEAR:** 2016

**AUTHOR NAME:** Mohammad Aazam, Marc St-Hilaire, Chung-Horng Lung, Ioannis Lambadaris

**DESCRIPTION:**

provides the idea of sensors-based wastebins, capable of notifying waste level status. An automatic waste bin and make use of cloud computing paradigm to evolve a morerobust and effective smart waste management mechanism. Waste management is linked to different stakeholders, includingrecyclers, importers and exporters, food industry, healthcare, research, environment protection and related organizations, andtourism industry Mohammad Aazam et al proposed Cloud SWAM, in which each bin is equipped with sensors to notify its

wastelevel. Different bins for each category of waste, namely: organic, plastic/paper/bottle, and metal. In this way, each type of waste isalready separated and through the status, it is known that how much of waste is collected and of what type. The availability of datastored in the cloud can be useful for different entities and stakeholders in different ways. Analysis and planning can start from asrelated matters are conducted. The system Cloud SWAMprovides Timely waste collection. Timely and efficient way of collecting waste leads to better health, hygiene, and disposal. Thesystem provides shortest path to the location of waste bins. So the collectors can plan a better and fuel efficient route. Recycling anddisposal by the system s uses separate smart bins for each type of waste. So the stakeholders will be able to see through the cloudand analyze type of waste and its magnitude. So they can do better arrangements and efficient ways of recycling can be adopted in adynamic way. Resource management by Cloud SWAM is based on the waste generation trends of a particular city and/or area,resources can be effectively managed since the data is available live through the cloud. Food industry planning can done through theCloud SWAM. Food industry can plan according to the trends of a certain locality. In this way, not only waste material can beminimized, but also, food trends and habits of an area can be coped in a much more keeping track of each kind of waste, better taxation and fine imposition can be performed on unnecessary waste generation. BigData practices can be used to reduce waste generation and improve its management. Various healthcare stakeholders can takebenefit from the gathered waste management data and foresee what type of diseases a particular locality is more prone to and how toprevent from certain types of insects and bugs from breeding. Waste-based energy production means generating energy from waste management.

**PAPER 3:**

**TITLE:** IoT-Based Smart Waste Management Solutions.

**PUBLICATION YEAR:** 1 January 2019

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**DESCRIPTION:**

Waste management is a name given to a waste collection system, including its transportation,disposal or recycling. This term is attributed to waste material that is produced through a humanactivity which must be handled to avoid its adverse effect for health and for the environment.Most often, waste is managed to reuse available resources. Waste management methods may differbetween developed countries, between an urban and a rural environment, or between an industrialand a residential area. The management of waste in metropolitan and rural areas is the generalresponsibility of a municipality, while waste produced by industries is their responsibility and managedby themselves.According to data released by the United Nations Department of Economic and Social Affairs,the share of the urban population worldwide is expected to reach 66% by 2050, compared to 52%in 2014, resulting in increased waste production in cities. Data released by the World Bank Groupconfirm that waste generation rates are growing. In 2012, cities worldwide generated about 1.3billion tons of solid waste, representing 1.2 kilograms of waste generated per person–day. With rapidpopulation growth occurring along with urbanization, urban waste generation is projected to rise to2.2 billion tons by 2025, confirming that municipal solid waste (MSW), the main by-product of anurban lifestyle, is growing even faster than the rate of urbanization. This increase in municipal andindustrial waste generation, together with stricter regulations aimed at ending illegal waste disposal,stimulate the growth of applications for better waste management. Other factors that have driven thegrowth of applications designed for the effective management of waste worldwide are directly linkedto the constant use of recycling techniques, the cycle of technological innovation, the application ofadvanced techniques for waste collection, and the use of technologies based on IoT and big data. Thereis also a vision of strengthening waste management based on public initiatives aimed at building morecorrect and safer environments, as well as reducing greenhouse gas emissions.According to Allied Market Research, Portland, Oregon , waste management worldwideis expected to grow at an annual rate of 6.2% by 2023, with greater growth in the emerging AsiaPacific

region. In Europe, this sector grew by more than 30% in 2016 and growth is expected tocontinue to accelerate due to the presence of advanced infrastructure and the high demand of severalinterested sectors.Currently, there are increasing initiatives by governmental and public authorities in relation towaste management to efficiently improve the collection and intelligent disposal of waste generated by a city. These are already considering the accelerated pace of urbanization worldwide and the expansionof the industrial sector, and the manufacturing and healthcare industries that are likely to produce a significant amount of waste and can already be efficiently treated by smart management. Moreover,growth of infrastructure facilities and a rising adoption of advanced waste management systems indeveloping economies with the goal of using cost-effective and waste–time disposal methods shouldpositively impact the growth of smart management of waste.The great precursor of technological development that has led to innovations in the wastemanagement sector is undoubtedly the advance of the Internet . The Internet has revolutionized theworld and offers global connectivity. Similarly, the Internet of Things (IoT) is also set to underpinsignificant change and represents an Internet evolution known as the next generation of the Internet.The IoT began with the increasing number of interconnected physical objects providinginteractions. The IoT paradigm has a main role as a key facilitator of the integration of variousapplication solutions and communication technologies, such as identification and tracking,sensornetworks, wired and wireless actuators,improved communication protocols, and distributedintelligence for objects. According to the Internet Business Solutions Group (IBSG), a milestone of IoTemergence occurred when the Earth's population was exceeded by the number of objects connectedto the Internet, which happened in 2008–2009. IBSG predicts that by 2020, about 50 billion deviceswill be connected to the Internet [. IoT can include a large number of applications designed toassist in many sectors, such as industry, transportation, markets, education, agriculture, healthcare,environment, and smart cities .The European Union has defined smart cities (SC) as a system where people interact and use energy,materials, services, and waste to stimulate economic development and improve the quality of life. Theseinteraction flows are considered intelligent because they make strategic use of infrastructures, services,information, and communication in planning urban management, a way to meet the social andeconomic needs of

society. Despite being a relatively recent concept, the smart city topic has alreadybecome synonymous with sustainable development within global discussions on sustainability .Currently, cities in emerging countries are investing heavily in smart products and services tosustain economic growth and, at the same time, developed countries need to upgrade existing urbaninfrastructures to remain competitive.