

# Chapter 20

## Less Human Intervention (Automated) Waste Management System Using IoT for Next Gen Urbanization

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### ABSTRACT

*Next generation waste management in urbanization is the real and unpredictable challenge in the modern era. Government of modern city will face big challenges in handling and decomposing of waste. Suggestions were given by the researchers about handling of waste management with IoT-enabled devices. Smart bins were introduced that will focus on the capacity and type of the waste collected from different stakeholders, industries, and citizens. Smart bins were monitored by the municipality periodically. Government will focus on less human interventional (automated) waste management system that will lead to happy living of citizens in the nation. Due to tremendous growth of industry in cities, people migrated from village to cities. Handling this population and cleanliness of city is a very big focus of the government. Authors propose less human interventional (automated) waste management system for the next generation urbanization using smart IoT-enabled devices. Authors propose standard architecture model for tracking of smart bins in various region using self-efficient organization of wireless sensor networks (WSN) and grouping of those sensors in case of any malfunctioning or damage of sensors. Handling of large volume of data, cost of the underlying network topology, merging of devices, and speed of the data connectivity are focused to reduce human interventional waste management system that will organize the sensor group wisely. With the above architecture, the dream of smart city will come true in the future.*

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## **INTRODUCTION**

Now a days nearly 0.1 tonnes of municipal solid waste generated every day. India is the world third largest garbage generator, Nearly 53% of the world population live in urban areas . By 2050 this ratio will expected to increase to 80% . Planning mega city is both scary and fascinating. Managing large volume of waste is the one of the key challenge of the government in urbanization . Managing includes collection of the waste from different sources like household, industry, organization or biological and converting into renewable energy . Waste can be of different type like solid, liquid, organic, recyclable and so on. Improper waste disposal will lead a threat to human body. When waste increases diseases also get increases . Stop looking waste is waste look around waste is a recourse. The question is how the waste to be transformed in to resource ? with the help of internet of things (IoT) efficient architecture model needed for disposal, recycling and converting waste into resource, with the new architecture transforming waste into resource is possible .

Smart city development can be achieved by proper waste management techniques, Smart city development and proper waste management are integral aspect of city management. Information and communication technology (ICT) leads a major role in Smart City development and waste management. Proper waste management and Continuous development in smart city needs novel technology for waste management and waste transformation . The waste collection is being understood through the use of sensors and real-time systems (Prajakta, Kalyani, Snehal, 2015) . Smart bins are used to Collect and sending status of waste over a days or location. Supplementary waste forms like organic/inorganic, agricultural, biomedical, electronic, chemical, mineral, and radioactive are Considered by specific group points. Finding the level of waste from solid-waste-bins meets many difficulties due to the several indiscretions of the waste-bin filling process. Irregular disposal and the form of identifying process materials are the challenges exist for the smart waste management . Effective data aggregation from a large number of bins and the variety of the involved materials are more challenges in waste collection . Sensors are also be used to find the environmental conditions like humidity, temperature, and dust can suggestively affect the sensor accuracy and reliability in collected data amount and conditions constitute parameters that should also taken into interpretation for a complete waste management process, static route planning with static scheduling are followed in earlier waste collection system. Earlier systems indicates different areas that need to be developed continuously and encourages improvement in automation tools, recycling services, Privacy and Security Heterogeneity.

Authors interest is to ideate and encourage the use of the Internet of Things (IoT) to address the problems in waste management, starting with Challenges in design and implementation of Less Human Intervention (automated) Waste Management System, Architecture model for waste management, Types and Waste management techniques. Well suitable Software Technology Needed to Handle Waste Management in the development of urbanization, Innovative techniques were followed in different countries for handling Waste Clearance. Authors proposes less Human Intervention (automated) Waste Management System that will handle efficient transfer of waste into resource, on-site collection and proposes wise idea for monitoring and management system which involves a Wireless Sensor Network (WSN) for garbage bins in different regions .

## **Contribution of Internet of Things in the Development of Smart City**

People, industries, government and educational system everything in the world are directly or indirectly rely on internet . IoT refers list of devices which connect each other for communication in

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