

# **LITERATURE SURVEY**

## **Smart Waste Management System For Metropolitan Cities**

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### **PAPER 1:**

**TITLE:** Smart waste management using Internet of Things

**PUBLICATION YEAR:** 2017

**AUTHOR NAME:**K N Fallavi and V Ravi Kumar

### **DESCRIPTION:**

At present solid waste management is a major concern in the metropolitan cities of the developing and developed countries. As the population is growing, the garbage is also increasing. This huge unmanaged accumulation of garbage is polluting the environment, spoiling the beauty of the area and also leading to the health hazard. In this era of Internet, IOT (Internet of Things) can be used effectively to manage this solid waste. In this paper, we have discussed the definition of Internet of Things and its elements, testing and prototyping tool coca simulator and finally the study of various literatures available on smart waste management system using IOT.

## **PAPER 2:**

**TITLE:** IoT-Based Smart Waste Bin Monitoring and Municipal Solid Waste Management System for Smart Cities

**PUBLICATION YEAR:** 2020

**AUTHOR NAME:** Tariq Ali and Muhammad Ifran

### **DESCRIPTION:**

Increasing waste generation has become a significant challenge in developing countries due to unprecedented population growth and urbanization. From the literature, many issues have been investigated that signify direct connection with the increase in waste material generation and related difficulties to handle it in a smart city. These issues are the resultants of an improper collection and disposal mechanism used for waste material, the increase in moving trends of peoples toward big cities and lack of intelligent technology used to support the municipal solid waste management system. Consequently, the management of waste material has become a challenge due to a large amount of waste littered everywhere. Furthermore, various problems also occur due to the existing systems that are not only inadequate and inefficient but also their non-scientific procedures involved in the solid waste management. In this paper, an IoT-based smart waste bin monitoring and municipal solid waste management system is proposed. This system helps to solve the problems associated with management of waste material and the IoT-based waste collection for the smart city as discussed above. The proposed system is capable in the collection of waste effectively, detection of fire in waste material and forecasting of the future waste generation. The IoT-based device performs the controlling and monitoring of the electric bins. These devices are wirelessly connected with the central hub to transmit the information about the bins filling level with the existing location. The significant advantage of the system is to collect waste material on time in order to avoid the overflow of bins that would help in saving the environment from pollution.

## **PAPER 3:**

**TITLE:** A Smart IoT System for Waste Management

**PUBLICATION YEAR:** 2018

**AUTHOR NAME:** Whai-En Chen, Po-Chuan Huang and Min-Yan Tsai

## **DESCRIPTION:**

The waste management is one of the challenges in the smart cities. The waste containers are typically placed in the public areas. Without well management, the waste containers may be overflowed or give off unpleasant smell, which affect the public health. This paper proposes a smart waste management system, by using the Iot(Internet of Things)technology.

## **PAPER 4:**

**TITLE:** Automation of smart waste management using IoT

**PUBLICATION YEAR:** 2019

**AUTHOR NAME:** Prof. S.I. Shirke<sup>1</sup>, Shubhangi Ithape<sup>2</sup>, Sandhya Lungase<sup>3</sup>, Madhuri Mohare<sup>4</sup>

## **DESCRIPTION:**

The aim of the mission is to cover all the rural and urban areas of the country to present this country as an ideal country before the world with the proliferation of Internet of Things (IoT) devices such as Smartphone & sensors. One of the main concerns with our environment has been solid waste management which in addition to disturbing the balance of the environment also has adverse effects on the health of the society. The detection, monitoring and management of waste is one of the primary problems of the present era. The process of making the things automatic is being exploited in almost all the major fields of life. Solid waste which is one of the sources and causes of environmental pollution has been defined under Resource Conservation and Recovery Act as any solid, semi-solid liquid or contained gaseous materials discarded from industrial, commercial, mining or agricultural operations.

**PAPER 5:**

**TITLE:** IoT-Based Smart Waste Management System in a Smart City

**PUBLICATION YEAR:** 2018

**AUTHOR NAME:** Nibras Abdullah, Ola A. Alwesabi and Rosni Abdullah.

**DESCRIPTION:**

The revolution of the Internet and the Internet of Things (IoT) has led to the development of numerous devices, such as radio-frequency identification tags, sensors, and other intelligent devices. Devices with significant computational capabilities and those that are transformed into intelligent objects are used to monitor and gather information about the environment of a city, thereby leading to smart cities. The most important problem that is currently experienced by smart cities is waste management problem. The following factors directly affect this problem: an increase in urban areas and rapid population growth. Intelligent services can function as the frontline in obtaining information regarding every aspect of human activities. A typical example of a service provided by smart cities is waste management supported by IoT. Waste management involves different responsibilities, such as the collection, disposal, and utilization of waste in relevant facilities. A review of common waste management models is presented in this paper. Then, an enhanced waste management design is proposed. This design considers and deals with population and urban growth by using different truck sizes according to waste type and IoT devices that ease communication among system entities, such as smartbins.

## **PAPER 6:**

**TITLE:** Implementation of an smart waste management system using IoT

**PUBLICATION YEAR:** 2017

**AUTHOR NAME:** P Haribabu,Sankit R Kassa and J Nagaraju.

### **DESCRIPTION:**

Waste collection services, today, are exhausted and unable to bear the burden of rising cities. It is one of the biggest ongoing challenges, being faced by developing economies, where a large variety of goods ranging from cars to metal and hardware end up in inadequately managed and uncontrolled dumpsites, spreading diseases and increasing pollution. However, most of these plans have been able to manage waste once it has already been created. We, therefore, propose a system through a mobile application associated with a Smart Trash Bin. The main aim of this application is to reduce human resources and efforts along with the enhancements of a smart city vision. At regular intervals dustbin will be squashed. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. Breeding of insects and mosquitoes can create nuisance around promoting unclean environment. This may even cause dreadful diseases.

## **PAPER 7:**

**TITLE:** Waste Management System Based On IoT

**PUBLICATION YEAR:** 2018

**AUTHOR NAME:** Sapna Suryawanshi<sup>1</sup>, Rohini Bhuse<sup>2</sup>, Megha Gite<sup>3</sup> , Dhanashri Hande<sup>4</sup>

### **DESCRIPTION:**

Waste management is one of the primary problem that the world faces irrespective of the case of developed or developing country. The key issue in the waste management is that the garbage bin at public places gets overflowed well in advance before the commencement of the next cleaning process. It in turn leads to various hazards such as bad odor & ugliness to that place which may be the root cause for spread of various diseases. To avoid all such hazardous scenario and maintain public cleanliness and health this work is mounted on a smart garbage system. The main theme of the work is to develop a smart intelligent garbage alert system for a proper garbage management .This paper proposes a smart alert system for garbage clearance by giving an alert signal to the municipal web server for instant cleaning of dustbin with proper

verification based on level of garbage filling. This process is aided by the ultrasonic sensor which is interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled . After cleaning the dustbin, the driver confirms the task of emptying the garbage with the aid of RFID Tag. RFID is a computing technology that is used for verification process and in addition, it also enhances the smart garbage alert system by providing automatic identification of garbage filled in the dustbin and sends the status of clean-up to the server affirming that the work is done. The whole process is upheld by an embedded module integrated with RF ID and IOT Facilitation. The real time status of how waste collection is being done could be monitored and followed up by the municipality authority with the aid of this system. In addition to this the necessary remedial / alternate measures could be adapted. An Android application is developed and linked to a web server to intimate the alerts from the microcontroller to the urban office and to perform the remote monitoring of the cleaning process, done by the workers, thereby reducing the manual process of monitoring and verification. The notifications are sent to the Android application using Wi-Fi module.

## **PAPER 8:**

**TITLE:** An IoT Cloud Solution for Smart Waste Management in Smart Cities

**PUBLICATION YEAR:** 2016

**AUTHOR NAME:** Maurizio Giacobbe, Carlo Puliafito and Marco Scarpa.

### **DESCRIPTION:**

Research and industries are devoting a great effort in getting cities and communities smarter, thus to improve citizens' *Quality of Life (QoL)* and paying serious attention to e-government and e-inclusion processes. This is a strategic but also very complex objective that involves both governance and citizens to address many challenges. Following this line, this paper discusses the necessity for new smart waste management systems and presents a comprehensive state of the art on the use of the **Internet of Things (IoT)** for smart waste recycling. In particular, we present and argue the Big Bucket IoT Cloud environment, where smart dumpsters are equipped with low-cost sensors and open source easy-to-use hardware and software. Its architectural model is discussed and compared with other existing solutions in the future perspective.