Literature Survey

1)Smart Garbage Monitoring System using Internet of Things(IOT) by Prakash Kanade Researcher in Robotics, Artificial Intelligence. Prajna Alva Lecture, LeenaBOT Robotics Pvt Ltd,

Trash defilement has a significant ecological effect.The components used are Arduino microcontroller ,a ultrasonic sensor, a Wi-Fi module and a heap battery.Information from the ultrasonic sensor and burden cell is collected by the Arduino microcontroller.Utilizing a ultrasonic sensor, the profundity of the trash in the compartment is resolved and the heaviness of the waste receptacle from The heap cell is estimated For indicating the information, the LCD screen is utilised. The Wi-Fi module sends to the web.In this framework, the executive can plan and track the waste disposal.The scavengers will get an alert when the capacity reaches the saturation level.The trash bin information can be viewed and tracked and it saves money.

2)Borozdukhin, O. Dolinina and V. Pechnkin, "Approach to the garbage collection in the Smart clean city Project,"Yuri Gagarin State Technical University of Saratov,Russia, 2016

Andrei Brozdukhin and friends later proposed the new system with two working hands: software components and unique indicator equipment [4]. The unique indicator equipment is attached on the dustbin walls. It is made up of two parts: one is the receiver-transmitter and the other is the sensor. The sensor is used for indicating the level of garbage in the dustbin and is attached to the transmitter device that sends the “Dustbin is full, Please empty it” signal to the concerned authorities. It is now the job of Artificial Intelligence algorithms to find the shortest path and nearest truck driver to the concerned dustbin and notify them for the waste collection.

3) SMART GARBAGE MONITORING SYSTEM USING IOT Dr. Ihtiram RazKhan, Mehtab Alam, Anuj Razdan Department of Computer Science & Engineering, School of Engineering Sciences & Technology, Jamia Hamdard, New Delhi, India

The main objective of the Smart Garbage Monitoring System using IoT is to reduce the usage of the resources and efforts and to improve the city's smart vision. By using a sensor and GSM the environment is clean and hygienic and ensures environmental cleanliness. Improper disposal and storage of household waste creates problems for public health and pollution. Smart Garbage Monitoring System using IoT is developed using ultrasonic sensor as distance measuring sensor, GPS will help in sending the location of the garbage box and GSM will help in sending the message to the municipal authorities with the current location The Smart Garbage Monitoring System using IOT was developed using Arduino IDE as IDE Tool and Google API as software tool

4)F. Folianto, Y. Low, and W. Yeow, "Smart waste management system," in Proceedings of the IEEE 10th International Conference on Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), Singapore, April 2015.

Waste collection is one of the targets of smart cities. It is a daily task in urban areas and it entails the planning of waste truck routes, taking into account environmental, economic and social factors. In this paper, the Smartbin system identifies the fullness of litter bins. The system is designed to collect data and to deliver the data through a wireless mesh network. The system also employs duty cycle technique to reduce power consumption and to maximise operational time. The Smartbin system was tested in an outdoor environment. Through the testbed,data was collected and applied sense-making methods to obtain litter bin utilisation and litter bin daily seasonality information.

5)K. Pardini, J. Rodrigues, S. A. Kozlov, N. Kumar, and V. Furtado, "IoT-based solid waste management solutions: a survey," *Journal of Sensor and Actuator Networks*, vol. 8, no. 1, p. 5, 2019.

The Internet of Things (IoT) and cloud computing offer an automation possibility through cyber physical systems that will change the way solid waste management is performed. Considering IoT requirements, a review analysis of waste management models available in the literature is performed in detail in this paper. Then, a deep review is undertaken of the related literature based on IoT infrastructure for efficient handling of waste generated in urban scenarios, focusing on the interaction among concessionaires and waste generators (citizens) from the perspective of a shorter collection time with reduced costs, as well as citizenship promotion. An IoT-based reference model is described, and a comparison analysis of the available solutions is presented, with the goal to highlight the most relevant approaches and identify open research issues on the topic.

6)M.-V. Bueno-Delgado, J.-L. Romero-Gázquez, P. Jiménez, and P. Pavón-Mariño, "Optimal path planning for selective waste collection in smart cities," *Sensors*, vol. 19, no. 9, p. 1973, 2019.

In this work, an optimal path planning algorithm has been developed together with a practical software platform for smart and sustainable cities that enables computing the optimal waste collection routes, minimising the impact, both environmental (CO2 emissions and acoustic damage) and socioeconomic (number of trucks to be used and fuel consumption). The algorithm is executed in Net2Plan, an open-source planning tool, typically used for modelling and planning communication networks. Net2Plan facilitates the introduction of the city layout input information to the algorithm, automatically importing it from geographical information system (GIS) databases using the so-called Net2Plan-GIS library, which can also include positions of smart bins.

7)L. Álvaro, J. Caridad, J. De Paz, G. V. González, and J. Bajo, "Smart waste collection system with low consumption LoRaWAN nodes and route optimization," *Sensors*, vol. 18, no. 5, pp. 1804–1282, 2018.

This paper introduces a waste monitoring and management platform used in rural environments. A prototype of a low consumption wireless node is developed to obtain measurements of the weight, filling volume and temperature of a waste container. This monitoring allows the progressive filling data of every town container to be gathered and analysed as well as creating alerts in case of incidence. The platform features a module for optimising waste collection routes. This module dynamically generates routes from data obtained through the deployed nodes to save energy, time and consequently, costs.This paper presents a case study performed in the region of Salamanca to evaluate the efficiency and the viability of the system's implementation.

8)A. Lundin, A. Ozkil, and J. Schuldt-Jensen, "Smart cities: a case study in waste monitoring and management," in *Proceedings of the 50th Hawaii International Conference on System Sciences*, Waikoloa, HI, USA, January 2017.

This paper explores the potential of employing sensor enabled solutions to improve on waste monitoring and collection in public trash bins. Through a user-centred design approach, an inexpensive monitoring system developed and tested in pilot study. The system consists of wireless nodes that use ultrasonic sensors to measure the empty space in the bins, a sensor gateway that is based on Long Rage Wide Area Network (LoRaWAN) protocol and cloud-based back/front end for data collection, analysis and visualisation.The system was evaluated through a pilot test, where six outdoor trash bins were remotely monitored at a university campus and a number of stakeholders were observed and interviewed. The results show that the existing technologies are mature enough to be able to develop and implement inexpensive add-on sensors to existing trash bins, and employing such a system can provide the necessary insights to optimise waste collection processes.