Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue 10, October 2019

Smart Waste Collection Surveillance via IoT

Ms. Yashaswini H K
Assistant Professor, Department of EEE, Faculty of Engineering and Technology
Jain (Deemed-to-be University), Ramnagar District, Karnataka - 562112
Email Id- yashaswinisachin@gmail.com

Abstract

Nowadays certain actions are taken to improve the level of cleanliness in the country. People are becoming more interested in doing all the possible things to clean their environment. The government is also initiating various movements to improve cleanliness. We're going to try to construct a system that will alert the companies on time to clear the bin. We will position a sensor on top of the garbage bin in this device that will detect the total level of garbage inside it according to the total size of the bin. A notice will be sent to the corporation's office when the garbage hits the maximum level, so the workers will take more measures to clear the container. This scheme would help to clean the town in a better way. By using this system people do not have to check all the systems manually but they will get a notification when the bin will get filled.

Keywords: *Dustbin, Internet of Things (IoT), Garbage, Pollution, GSM, Smart sensors, Monitoring.*

I. INTRODUCTION

Nowadays, there are a number of techniques which are purposefully used and are being build up for good management of garbage or solid waste. Waste generation is rising by 1.3% per annum. The urban population, which is rising between 3% and 3.5% per year, generates around 5% per year of waste. With population growth, the cleanliness scenario in terms of waste management is important. In the current situation, we frequently see that the garbage bins out in public places in the cities are overflowing because of the frequent rise in waste. In the nearby surroundings, the overflow of waste in public areas creates the unhygienic condition and creates unpleasant smell around the surroundings. Among the people nearby, it can cause many severe deadly human diseases [1]. It also degrades the area's valuation. It is not collected immediately when the bin is filled with waste because waste collection takes place mainly in the mornings at normal time intervals. Since the bin is filled in the evening of the previous day, it is retrieved in the morning of the next day, which is one of the key explanations for urban environmental pollution.

With overflowing containers, this method sometimes produces inappropriate results. This has resulted in residential frustration and inefficient dustbin use. In order to provide an efficient service to the public, the entire waste collection and transport process must be observed by an approved party. The bulk of the project failed because the management was inappropriate and the public was less interested. In order to track the overall process and get the public interested in the project, approved parties are very necessary. The approved individual is unable to monitor the movement of the waste collection truck and there is no monitoring system for the waste collection process and no tracking mechanism for the waste collection truck.

Many cities around the world currently need demanding solid waste management strategies, as residential areas and the economy are increasing rapidly. In order to efficiently collect the waste generated, municipal authorities have insufficient resources for waste management institutions. When bins that are partially filled up are collected, it becomes an unnecessary wastage of resources. A very creative device that will help to keep the city and cities safe is the IoT-based garbage monitoring system. This device tracks the garbage bins in the city and tells an individual in the administrative department about the amount of waste collected in the garbage bins. People have seen for a number of occasions that the waste materials are overflowing the dustbins and the person concerned does not have any knowledge about it within the time, due to which unsanitary conditions are generated in the atmosphere and living area [2]. The bad smell is out at the same time due to waste in the dustbin. Also, the poor look of the city contributing to air and environmental pollution and to some quickly spreadable harmful infections and diseases around the locality.

Municipal companies have a variety of needless manual inspections of the level of the garbage bin, which are less reliable and time consuming. If they are full or not, trucks are sent to clear the dustbins. And the trucks need fuel which is costly. Several sensing methods have been integrated and have combined their verdicts that offer the detection of bin condition and its parameter measurement. There is a need to develop an efficient framework that can solve or minimize this problem to some extent. It will encourage them to keep their world green and safe in a successful way. Every government around the world is now preparing to create smart cities or to try to transform cities into smart cities [3]. A smart city is a city that is founded on the intelligent incorporation of autonomous, conscious and self-deciding citizens' activities and endowments. The disposal of solid waste in a smart city is an important part of the environment and its effect on society must be seriously considered.

The process of collecting, monitoring and handling solid waste can be easily and efficiently controlled and automated by providing an entire internet of things-based system, stating that the internet of things can be defined as a physical object networking with the use of embedded software and electronic sensors that enable the objects to receive and send information from each other. The Internet of Things gathers, senses, stores data and processes data by connecting physical devices to the Internet. IoT is a new network that is really beneficial to people around the world. The centre of such a groundbreaking growth of engines is the IoT [4]. Due to ample

power supply and internet access, IoT is possible. The IoT concept is widely used to define a system in which sensors are attached to objects and help these objects communicate their 'digital voice' over the internet connection with the external world. The IoT has recently become a set of purpose-built networks. Many IoT frameworks have been selected as an IoT platform for this project, such as Blynk, Ubidots, IBM Bluemix and Devicepilots. Ubidots is a cloud service that offers a friendly and intuitive interface where the users can interact with a variety of devices, ranging from a cell phone or a computer, to an embedded system such as a microcontroller system. In a nutshell, Ubidots is a platform that allows to link different types of devices to a cloud database and save variables that can represent them in a simple and fast way and secure manner.

II. INTELLIGENT DUSTBIN DESIGN

An IoT-based Smart Dustbin suggested through which the smart bin was designed on a platform based on an Aurdino Uno board interfaced with a GSM modem and an ultrasonic sensor. On top of the bin, the sensor was mounted. There was a threshold amount set at 10cm. The sensor activates the GSM modem as the waste exceeds the threshold level, which warns the related authority before the waste in the bin is emptied. In the end, it was concluded that when these smart bins were planned, different issues such as affordability, maintenance and durability were dealt with. In the process of developing a smart city, it has also led to a hygienic and safe climate. The researchers propose the following approach for the management of garbage. The bin was connected to a microcontroller-based device that had IR wireless systems with a central system that demonstrated the current garbage status in the bin. The status was displayed using Wi-Fi on a mobile web browser with an html tab. They only used weight-based sensors to minimise the cost and only used a Wi-Fi module on the sender's side to send and receive the data. In the end, the sensor was only able to detect the weight of the waste present in the bin, but not the waste level [5].

All around the world many urban areas are developing, with the development of urban areas, the population of the urban area is also increasing. Thus, with the increase in population density, an unhealthy environment chance increases because there is an increase in the quantity of garbage and waste products. The issue with the current developing society, mainly in India, is that most of the people have less responsibility, and many of the people in society throw the garbage around the society surroundings. To overcome all these problems, this proposed system is designed, which main aim is to provide a healthy environment condition and keep the particular society clean. The biggest pollution problem today is Garbage Overflow. It produces unhygienic conditions for individuals and creates a bad smell around the environment, leading to the spread of certain deadly diseases and human disease. We are going to incorporate a project called IoT Based Waste Management with Smart Dustbin to prevent all such situations. Implementation is achieved with the assistance of the definition of IoT [5].

The Internet of Things (IoT) is a term in which, without user interaction, surrounding objects are linked via wired and wireless networks. Objects share information and exchange it. Several dustbins are placed in the city or the campus in this method, these dustbins are provided with a sensor that helps to measure the level and weight of the garbage bins and a unique ID will be provided for each dustbin in the city so that it is easy to identify which garbage bin is complete. The unit will transmit the reading along with the specific ID supplied when the level and weight of the bin exceeds the threshold limit. To prevent the decaying odour around the bin, harmless chemical sprinklers are used to sprinkle the chemical as soon as the smell sensors sense the decaying odour. Once the bins are full then user will not be able to access the bins. In such circumstances the bin displays the direction of the nearby bins on LCD display also generate the voice messages if the user place the waste on the floor. The status of the bin is accessed by the concerned authorities from their place with the help of Internet and an immediate action will be taken to replace overflowing bins with the empty bins.

III. CONCLUSION & DISCUSSION

An embedded smart dustbin based on alert system is designed for the real time monitoring and maintenance of the wastage in dustbin. This advanced system prevents the irregular cleaning of the dustbins by sending notification to the authorized authority at regular intervals of time. It further improves the system by additionally adding the features of automatically opening and closing a smart dustbin door when any person comes in range of an ultrasonic sensor then this sensor will sense the person approaching towards the dustbin and open the door automatically with help of a motor attached in the Smart Dust-bin, after that the person can throw wastage without applying any extra efforts to open the door of the dustbin. The person will move away from the Smart Dust-bin after depositing the wastage, if ultrasonic sensors do not sense anything obstacles in its range or in front of it, and will indicate the motor to close the Smart Dust-bin. The smart dustbin like other dustbins will be a box to collect garbage with an automatic opening and also notify when dustbin garbage level reaches at 80% capacity of smart dustbin. Also a solar panel is attached to the provided power supply these all features make this smart dustbin more advanced.

IV. REFERENCES

[1] S. Sensors, B. Board, and P. Supply, “IOT BASED WASTE MANAGEMENT USING SMART DUSTBIN PROJECT REFERENCE NO .: 40S _ BE _ 2142 Introduction : Objective : Methodology :”

[2] R. P. Vasani, “Smart Dustbin- ‘ An Intelligent Approach to Fulfill Swatchh Bharat Mission ,’” no. October, 2017.

[3] M. S. Singh, K. M. Singh, R. K. Ranjeet, and K. K. Shukla, “Smart Bin Implementation for Smart City,” Ijarcce, vol. 6, no. 4, pp. 765–769, 2017, doi: 10.17148/ijarcce.2017.64143.

[4] A. Anitha, “Garbage monitoring system using IoT,” IOP Conf. Ser. Mater. Sci. Eng., vol. 263, no. 4, 2017, doi: 10.1088/1757-899X/263/4/042027.

ISSN: 0374-8588
Volume 21 Issue 10, October 2019

[5] A. . Hanees and A. . Muhammeth, “Iot based waste collection monitoring system using smart phones,” no. June, pp. 284–293, 2018.