

## An IOT Based Smart Dustbin for Clean and Safe Public Place

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**Abstract:** The main objective of this paper is when 70 percent of the garbage bin is filled, the IFTTT Web hook sends the notification to the concerned central station where the monitoring the levels and the position of the dustbin is to be done. This station monitors all the dustbin levels and gives the direction of collecting the garbage by sending the message to the garbage collectors and authority. This will avoid overflow of the bin. A Prototype of proposed system to be designed as per the consideration of all problems in garbage collection process and this proposal makes the city towards a smart city.

**Keywords:** Smart bin, IFTTT Web hook, Garbage bin, IOT

### 1. Introduction

Recent days, many people are living in cities only for their convenience in all the ways and many people are coming from the rural areas for the opportunities. Due to this there is huge growth of population in metro politician Cities the waste percent is increased to the enormous level, the waste is overflowing from the bins and finally it leads a situation of general bin into mini dump yard in each and every street. So, it's became a major problem for the municipal authorities to clean that waste.

This paper IOT Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This design designates a technique in which the garbage level could be checked at regular intervals which would prevent the undesirable overflow of the bin. The system makes use of Node MCU and Ultrasonic Sensor which are the main part of the system. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins. For this, the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of Node MCU and a Wi-Fi is already placed in the Node MCU for sending data to webserver that monitors the garbage levels. Dustbin is the storage container used for disposing waste by each and every person in the world. The main thing they look in their surroundings for disposing waste is the Dustbin. Smart Dustbin is just a normal bin where everyone can dispose waste but integration of some hardware components is done for more efficient use of it. Smart Dustbin is integrated with some hardware components such as Arduino, NODEMCU, Servo Motor, Ultrasonic sensors. These components help in opening the lid, on detection of human hand and waste and also sending the notification in the form of LED. The code required to perform the above- mentioned operation is dumped in Arduino and NODEMCU. In cities, there are many public places where we see that dustbin are placed but they overflowing. This create unhygienic condition in the surrounding. And it also create some serious diseases. At the same time, an odor extends throught out the city, and degrading the environment. Recycling bin is really a waste management processing, but they are limited space in a garbage bin, it does not require extra waste. Waste disposal is an efficient method of eliminating garbage disposed in commercial settings such as business, classrooms, colleges, shopping centres and other public areas. This design designates a technique in which the garbage level could be checked at regular intervals which would prevent the undesirable overflow of the bin. The system makes use of Node MCU and Ultrasonic Sensor which are the main part of the system. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins. For this, the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of Node MCU and a Wi-Fi is already placed in the Node MCU for sending data to web server that monitors the garbage levels. We have to design the project, where the dustbin is filled or not and the waste level of the trash bin is measured. The Node MCU and the Ultrasonic sensor is a hardware component for measuring the garbage bin. The software component is an IFTTT Web hook, and it is used to receiving a notification. The main concept of this project is when 70 percent of the garbage bin is filled, the IFTTT Web hook sends the notification to the concerned central station where the regularly monitoring the levels and postions of dustbin is to be done. This station monitors all the dustbin levels and gives the directions

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of collecting the garbage by sending the message to the garbage collectors and authority. This will avoid overflow of waste in the bin. A prototype of proposed system to be designed as per the consideration of all problems in garbage collection process and this proposal makes the city towards a smart city.

## 2. Literature Survey:

This proposed by Gopal Krishna Shyam, Sunil kumar S.Manvi, Priyanka Bharti, propose the simulations are done for performing an efficiency comparison of different ways for collection of wastes: Traditional method and dynamic on-demand solution, proposed work (intelligent) for several cases. A Better Method for Frequent Data Updating System by Waikhom Reshmi, RamKumar Sundaram, M. Rajeev Kumar focus on sensors unit are used for sensing, microcontroller for controlling and GSM module used for communication. This system use solar energy for power. This was proposed by Alexey Medvedev, Petr Fedchenkov, Arkady Zaslavsky, Theodoros Anagnostopoulos, and Sergey Khoruzhnikov propose the design of a cloud system for organization of waste collection process and applications for waste truck drivers and managers. The system also features an on-board surveillance system which raises the process of problem reporting and evidence collection to a higher level. Palaghat Yaswanth Sai proposed an Effective Way to Promote Smart City focused on easy to detect the liquified waste by using waterproof sensors. Many times Garbage dust bin is in overflow and many animals like dog goat enters inside or near the dustbin. This creates a bad scene. Also some birds are also trying to take out garbage from dust bin. In this project can avoid such situations the waterproof sensors are very much advanced and useful. This was proposed by Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, and Sehyun Park focused on IoT-based smart garbage system (SGS) is proposed to reduce the amount of food waste. In an SGS, battery-based smart garbage bins (SGBs) IOT exchange information with each other mesh networks, and a router and server collect and analyze the information for service provisioning. The basic system structure of a SGB is a centralized structure in which information gathered in each bin is transferred to the server; we also designed a HSGB for improving the battery efficiency of each SGB. Dr. N. Sathishkumar et.al [1] they develop a system which is helpful for the ultimate need of developing nation is the key for “Smart City”. The influential ecological factors that pose to be a threat may include: hazardous pollution and its subsequent effects on health of humanity, alarming global warming and depletion of ozone layer etc. Mostly Environmental pollution may be owing to the Municipal Solid Leftovers (MSL) [2]. A Proper maintenance becomes mandatory for an efficient and effective removal of the generated Municipal Solid Leftover .It is perceived that often the waste space gets too much occupied due to irregular removal of garbage occupancy in the dustbin. Lewinsohn, H. C et al [3] Things that are connected to the Internet and those devices controlled from the Internet is called Internet of Things. In this system, the smart bin is connected with the internet to display the exact information about the dustbin level and to which area it belongs. The overflow of dustbin will create an unpleasant environment and it affect many people by spreading the deadly disease the truck driver will go immediately and collect the waste form the dustbin. Multiple dustbins are connected through the cities. The Dustbins are integrated with ultrasonic sensor, RF module. The ultrasonic sensor is used to detect the level of dust in the dustbin. After detecting the level of dustbin the information is send to the RF Transmitter and received by the RF Receiver at the Central System and Internet connection is enabled through the connection of Wi-Fi module. The data is Received and processed in the cloud. This information is send to the web browser.

## 3. Proposed Method

In this system we are monitoring the level of bins and composition of waste using IoT and cloud. Our main goal of proposing this system is to remotely monitor the system and send quick notification to official which can reduce the overflow of bins. The level of bin is identified using ultrasonic sensor. If the bin is filled then mail alert will be sent through IFTTT. The proposed technique will create an IOT-based dustbin. The existing system is that, it send the notification when the bin is filled. The air will become unsanitary if garbage is not properly disposed of, and serious disease can spread rapidly. Many of these drawbacks will be addressed by the proposed scheme. To determine that trashcans were completed or not, their capacity is measured using actual sustainability. A sensor and a node that gathers and transmits data make up a smart bin. We have to design the project, where the dustbin are completed and waste for the garbage is measured. To use a webpage, we can identify a dustbin is completed or otherwise. A dustbin updates its status percentage, and when more than 70 percent of the dustbin is filled, it sends an email that the dustbin is almost full. IFTTT Web hooks are used for collect Node MCU data and, send an email when the trash level exceeds 70%. The device removes the need for people to regularly monitor the trash cans; instead, we will receive a message once the trash reaches fully functional.

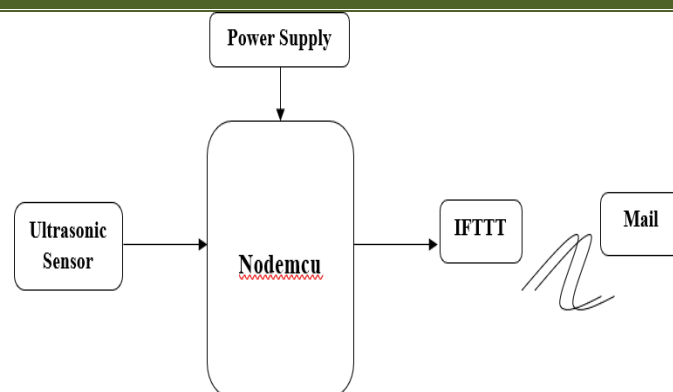


Figure 3.1: Block Diagram

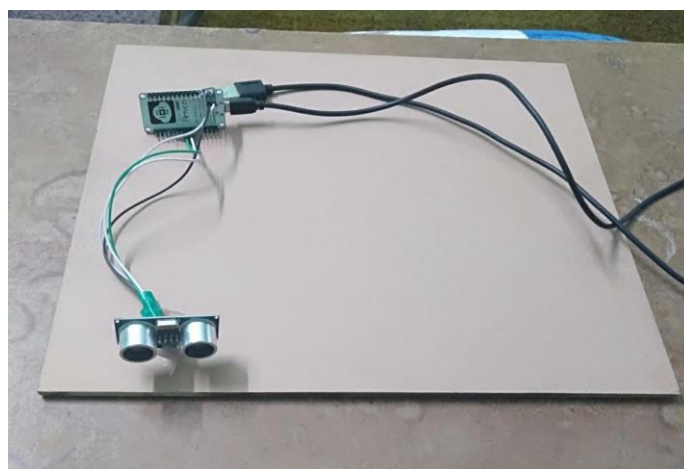


Figure 3.2: Full equipment of the Smart Bin

#### 4. Conclusion:

We presented an intelligent waste collection system. The system is based on IOT sensing prototype. It is responsible for measuring the waste level in the waste bins and later send this data (through Internet) to a cloud for storage and processing. This data helps to compute the amount of waste and how it is decomposed. The waste collected can also be used as a fertilizer in future. In future we can detect the methane and other gases by using gas sensors. This helps in distinguishing the waste at the source and hence reducing the requirement of manpower. To enhance it further, an automated system can be developed which is able to pick up waste in and around the bin, segregate them and put them in respective bins.

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