

SMART DUSTBIN FOR THE MANAGEMENT OF THE WASTE IN AN EFFICIENT MANNER

Arun Kumaar V.

*Faculty of Engineering and Technology,
Jain (Deemed-to-be University), Ramnagar District, Karnataka – 562112
Email Id: k.arun@jainuniversity.ac.in*

Abstract

As urbanization rises, so does the production of waste. The garbage bins put around are overflowed with the garbage generated on a daily basis due to inappropriate waste management. Even, it is not an easy task to verify which dustbin is complete on a daily basis. Not only does it render the air unsanitary, but it is also the primary cause of many deadly and infectious diseases. It suggests, therefore, that waste management is the world's current need. The Swacchh Bharat Mission was also launched in India to help it with a view to make India clean and hygienic. In an efficient process, this paper helps to achieve that objective. For this purpose, this paper offers an efficient model of an automatic dustbin. To detect the garbage level, the dustbin will have sensors and once it exceeds its threshold limit set, a notification will be sent to the approved staff to clear the waste. It will also have a sensor which, when a person arrives to use it, will automatically open the lid of the dustbin only if the dustbin is not full. This will improve its efficacy as it will not disperse the pungent odor and thereby make the air more hygienic.

Keywords: *Sensors, Microcontroller, Servo Motor, IOT (Internet of Things), Waste Management.*

I. INTRODUCTION

In India, private sectors grew very rapidly due to the adoption of the mixed economy and thus quickly triggered urbanization. The percentage of urbanization was 11.4 percent in the 1901 census where it was 28.53 percent as in the 2001 census and it grew to 31.16 percent in the 2011 census [1]. By 2030, more than 40 percent of the country's population is projected to be in urban areas, according to a World Bank estimate. According to a 2017 Times of India article, India's whopping 62 million tons of waste is generated every year by the urban population [2].

Just about 22-28 percent of the waste is processed from this waste, and the remainder stays like that without proper treatment. This causes air pollution which affects the environment which contributes to slower economic development, causing many fatal illnesses. Taken together, 'waste management' is the big problem facing India today.

Wastes can be categorized as solid waste and liquid waste, hazardous in all forms. Food waste, e-waste, medical waste, re-useable waste, recyclable waste, toxic waste, may be further categorized [3]. There are primarily three sources of liquid waste: residential areas, industrial areas and commercial areas. For example, dirty industrial water, household discharges, etc. Although solid waste consists of products such as scarves of metal and tins, food waste, old furniture etc. Staff come from bins in India to collect waste in two to three days, but the dustbins are full of dust, so there are no choices for clearing the dustbins. It allows waste to spill and thereby produces an unhygienic atmosphere and causes many diseases. As the government does, it is induced. There is no way to verify the state of the dustbin whether it is complete or not before the scheduled day of waste collection. As the population is growing at a very rapid pace, this new waste management model or scheme does not work properly. The main objective of this paper is to create a prototype for future bins where once it is complete, the status of bins based on their depth is sent to the officials and also to open and close the lid of the bins automatically when the individual enters in order to improve the hygiene of the surrounding areas [4].

Cause of building smart dustbin

The scenario of waste that is not disposed of in due time is normal. The worker's issue is not the details on the bin's status whether it is complete or not. Because of not clearing the waste, this allows the unhygienic condition in that region, which also causes many infectious diseases, on proper time and causes foul smell [5].

A. Disadvantages of the new system employed

- i. The Scent of Foul
- ii. Spreads illnesses
- iii. The town has a negative reputation of being disgusting.

B. Advantages of the approach proposed

- i. Efficient town resource management
- ii. Expenditure decreased
- iii. Updates in Real Time
- iv. Cleared bins as per requirement

II. TECHNIQUE

i. From the Internet of Things (IOT)

Related objects are referred to by the Internet of Things. The Internet of Things simply means connecting electronic embedded devices such as micro-controllers or micro-processors to the Internet, which enables the devices to be connected. Interacting and sharing data. Here, we are using the Arduino Uno micro-controller that is similar to C++ and will be programmed via Arduino ID.

ii. IDE Arduino

The Arduino coding environment is somewhat similar to the Arduino IDE known as C++ [6]. The Arduino IDE or Arduino Integrated Programming Environment enables a user to write, compile and upload the code for use on the Arduino.

iii. Arduino Uno

The Arduino is an open-source framework for electronic prototyping. The main benefit is that it is simple to use software and hardware [7]. It is a microprocessor composed of circuit board and the input/output or I/O pins are used for communication purposes and to monitor different physical objects, such as LEDs, servo motors, buttons, etc. It derives its power supply from an external source that it uses to power the other physical source. Based on the 8-bit ATmega328P microcontroller, the Arduino Uno. This serves as the center of the proposed framework and processes all the information required.

iv. IR sensor

The depth of the dustbin or its level is detected by the IR or the Infrared sensors. The IR circuit comprises of the two main sub-circuits a. emitter circuit b. receiver circuit. The IR emitter circuit comprises of a simple IR LED or IR Light Emitting Diode, which emits the IR light of a particular wavelength[7]. The IR receiver circuit comprises of the detector which is an IR photo-diode which is sensitive towards that particular wavelength of IR light emitted by the IR LED in the IR emitter circuit.

v. Ultrasonic sensor

Ultrasonic sensors are sensors that are used for distance measurement purposes. For this purpose, it utilizes ultrasonic waves. The entire process is split between the step of emission and receipt [8]. It sends ultrasonic waves to the target in the emission phase, and the ultrasonic waves that are reflected back from the target are detected in the reception phase. The distance is measured between the emission and the receipt on the basis of the time taken. The ultrasonic sensor HC-SR04 will be used here in this suggested model to detect the distance between the

person and the dustbin. If the person gets close to the dustbin, the servo motor will open the lid automatically and the lid will close down automatically when the person leaves.

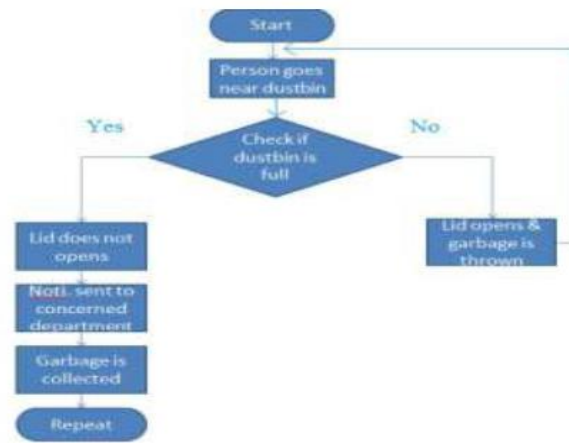


Fig 1: Flow Chart of the proposed system

III. CONCLUSION

In this proposed model, the key emphasis was to enhance the waste management process and improve the environmental quality of the area. It has been found several times that the dustbins are not sealed and cause birds to spill waste. In the current step, it also solves this problem. With this proposed model, the proverb "Cleanliness is next to Godliness" would be genuinely achievable in the city by providing an automatic opening for the lid of the dustbins and by granting the dustbin full status to the worker concerned.

IV. REFERENCES

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