# **Disposal Of Waste Using Sensors And Internet Of Things**

Prabavathi.S<sup>1</sup>, Premkumar.K<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of CSE, M. Kumarasamycollege of Engineering, India,

<sup>2</sup> Assistant Professor, Department of CSE, M. Kumarasamycollege of Engineering, India,

## Abstract

In recent days, the most important environmental concern is solid waste management. It is one of the major problem that the world faces irrespective of developed or developing country. A clean environment and human health is very important. The main issue of this waste management is the garbage gets overflowed in public places before the next cleaning process. Due to this many toxic wastes gets secreted, and the people are getting affected by various disease. This could be overcome by using some new technology like sensor, Arduino, motor and keypad. The ultrasonic sensor is used to find the distance of the trash can and check whether the trash can gets filled or not, if the garbage gets filled this sensor will detect and the garbage container door will close automatically. The closed door will be opened only by the municipal person using the keypad. The rain sensor detects the rain and close the trash pail door automatically, it protects the trash container from the natural calamities. The gas sensor(MQ7) is used to detect the unwanted smell that comes from the garbage like methane and toxic gases. By using this system we can control the environmental issue.

Keywords: Arduino, Sensors,

#### 1. Introduction

In recent days, there was a huge increase in population which leads to more waste disposal. Therefore, a proper waste management system is necessary to avoid spreading of various disease by monitoring and cleaning the garbage containers. The amount of total solid waste generated by the village is 558 kg/day and liquid waste is 108040lit/day. The device which are interconnected and controlled through internet are called Internet of Things (IoT). The device that send signals through the sensors like ultrasonic sensor, gas sensor, rain sensor and keypad. As the name indicates ultrasonic sensor is used to detect the level of the garbage in the bin using ultrasonic waves. It measures the distance based on transmitting and receiving signals.

Waste Generation in India	
India: 0.14 million tonnes garbage generated daily	
World:4.7 million tonnes garbage generated daily	
6 million tonnes is expected to be generated by 2025	

A alert or a message is sent as a notification so that the municipal people can come and collect the dust from the trash can.

#### 2. Existing Model

In the existing model, the author had developed a good model for waste management. The author finds the solution to control the overflow of the garbage can. This can be controlled using to approach :

Internet of things Machine Learning

ISSN: 2233-7857 IJFGCN Copyright ©2020 SERSC These two approaches are the best approach to control the overflow of the trash can. In the Existing system some technology to control the overflow of the waste from the garbage can. They used

- Ubidots cloud services
- Arduino UNO and Ethernet shield
- Ultrasonic sensor
- Ubidots dashboard and event manager

Existing system flow diagram:

In the early system, they used ultrasonic sensor to find the distance between the bottom of the trash can and the top of the trash can. This ultrasonic sensor fix in the top of the trash can, If the waste overflow from the trash can this sensor will detect and alert to the municipal person.

The Formula to find distance:

Distance L=1/2\*T\*C L=Distance T=Time C=Sonic Speed Ultrasonic sensor distance detection result:

💿 COM4 (Arduino/Genuino Uno)	-	- 0	$\times$
1			Send
Distance: 138			^
Distance: 24			
Distance: 23			
Distance: 24			
Distance: 23			
Distance: 24			
Distance: 25			
Distance: 26			
Distance: 27			
Distance: 189			
Distance: 189			
			~
Autoscroll	No line ending	✓ 9600 b	oaud 🗸

In this System they create alarm or alert message to the municipal person mobile device. As the garbage level increase, the distance between the waste bin lid with ultrasonic sensor will decrease Once the level of distance less than the determined value (4 cm), Ubidots will alert and send message to authorized person in form of SMS





## **3. Proposed Model**

In this section, the development of the project is explained clearly. This project is mainly developed to manage the waste properly and to safeguard the human and other living being life from the garbage waste. To control the overflow of garbage can this system will help to find the A rain sensor is the type of sensor, This sensor is an easy method to detect the rain. If the raindrop falls in the raining board means this sensor will detect and do the operation automatically without any human help. Some of the features of this sensor are Operating voltage is 5V, Provide both digital and analog output Adjustable sensitivity, Output LED indicator, Compatible with Arduino, TTL Compatible.distance between the bottom of the garbage can.

The following things to solve this waste management

- Ultrasonic sensor
- Gas sensor(MQ7)
- Rain sensor
- Arduino UNO

Ultrasonic sensor:

- The ultrasonic sensor is a type of sensor to find the distance between an object. Some of the features of this sensor: It has Power Supply of +5V DC, Quiescent Current is <2mA, Working Current is 15mA, Effectual Angle is <15°, Ranging Distance is
- 2cm 400 cm/1" –13ft, Resolution is 0.3 cm, Measuring Angle is 30 degree, Trigger Input Pulse width is 10uS, Dimension is 45mm x 20mm x 15mm



• In this system the ultrasonic sensor is used to detect the distance between the bottom of the trash can and sensor if the trash can gets filled it helps to alert the union to clean it. This will helps to stop the overflow of the trash can.

Gas Sensor(MQ7):

• The Gas sensor (MQ7) is used to detect any type of gas. This MQ7 sensor has many features, some of them are it has 5v operation, Simple to use, LEDs for output and power, Output sensitivity adjustable, Analog output 0V to 5V, Digital.

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• For this system, this MQ7 sensor is used to detect the unwanted gas that comes from the garbage can. If the unwanted smell comes means this sensor will detect and send the notification to the municipal person.

Rain Sensor:

• A rain sensor is the type of sensor, This sensor is an easy method to detect the rain. If the raindrop falls in the raining board means this sensor will detect and do the operation automatically without any human help. Some of the features of this sensor are Operating voltage is 5V, Provide both digital and analog output Adjustable sensitivity, Output LED indicator, Compatible with Arduino, TTL Compatible.



• In this system, this rain sensor is used to detect the, If the rain comes and raindrop will fall in the sensor board means trash can door will automatically close and the rainwater will not enter into the trash can. If the rain enters the trash can then the bad odor will come it will affect human health and society.

Cayenne application

- Cayenne is one the most used application for IOT based work. This cayenne application can be use through smartphones and computers. The Raspberry pi is controlled by this cayenne
- This cayenne is very user friendly application compare with other application because this application is fully symbol based, compare to text the human can understand the symbols very easily
  - There are some step should be follow to work weith this application
  - Step 1: Sign up with new account.

Step 2: Find your device on dashboard of cayenne.

30.668	Device Name	Made	anir:
	222 C		0
0	GPIO 2 SOA		0
	6PID 3 50L		9
11	GPIO 4 GNEWIRE	200 C.	0
10000	GND		-
HIGH	GPID 17 P17	OUT	0
	GP82 27 P27	100	0
	GPID 22 P22	100	0
	V33		0

Step 3: connect to your raspberry pi.

- Step 4: Switch on led.
- Step 5: create your own button on the dashboard

$\sim$	Display Welget Example	>	Torre Blue
$\sim$	Gauge Diquia, Widget Example	>	Construction CSP4266
1	2 State Digity Widget Example	>	Analog Actuator
$\bigcirc$	Button Costable Widget Example	>	Unit Council
	Slider Costroller Widget Example	>	Original State (Section 1) Section 1) Section 1)
(法)	Motion	>	Step 1: Code Add Widget

# 4. Smart Trash Can process

- The first process is if the trash can get filled means the ultrasonic sensor will detect and send alert to the municipal office through the very useful application cayenne, this cayenne will mainly used to connect to the raspberry pi. By using this application the municipal person can able to whether the trash can is get filled or not.
- If the unwanted smell comes from the trash can means the MQ7 gas sensor will sense and send the alert to the municipal person and the analysis will store on the cayenne application. The concerned person will monitor the website if the limit cross means they will take immediate action to clean the trash can. From this, we can take the analysis of how much methane or toxic acid secreted.
- When the rain comes the rain sensor will detect at notify to the municipal person through the cayenne application. Then the normal person can't able to lift the trash can from this place the municipal person can only able to lift that.

### 5. Conclusion

• The main aim of this project is to maintain the hygienic and dirt-free environment in the city which in turn creates an environment for better living. By implementing thisproject in real time basis, it assures the improved database for garbage collection time and waste management amount at each location. It also improvises the cleaning of the garbage bins until it reaches its maximum. Data-driven methodology for achieving the highest performance where first the existing solution to the problem was assessed, second this solution was optimised using the collected dataset, next, machine learning algorithms were applied to the problem, and finally, the feature engineering was used to find if additional features would improve the results. There are several limitations to this study. First, it was not directly quantifying to which extend inaccurate detection of emptying affects filling level predictions.

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