

# IOT based Garbage Management System

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**Abstract:** Nowadays we can see that most of the garbage's across the roadside are overloaded because the wastes are not collected periodically. It creates unhygienic condition for the people and creates bad odor around the surroundings. This leads in spreading some deadly diseases & human illness. To overcome this problem we are going to implement a project called IOT based Garbage Management System. In this system we are going to use Raspberry Pi, Ultrasonic sensor and Flame sensor. The vision of our project is to make the surroundings clean in smart way.

**Keywords:** Flame sensor, IOT, Raspberry pi, Ultrasonic sensor

## 1. Introduction

The future India will be digitalized. Everything will be based on internet. The usage of internet will become a part of our life. Evolution of cloud computing and IOT is increasing rapidly. Here the communication takes between machine to man. All the devices we are using in our day to day life is interconnected with IOT. The IOT allows object to sense and control remotely. In our system we are using Raspberry Pi which is interfaced with ultrasonic sensor. The ultrasonic sensor is used to detect the level of the garbage. Sometimes there may be a possibility of getting fire in the garbage system. For security purpose we are using flame sensor.

Coimbatore, the Manchester of South India, located on the banks of Noyyal river surrounded by the Western Ghats – and is also the biggest city of the region. With a population of over 3,458,045 the total quantum of municipal solid waste generated in Coimbatore is approx. 115000MTs per day. Municipal Corporation Coimbatore operates a huge fleet of 983 Municipal and Private Vehicles for collection of waste making 1396 number of trips each day. But still there is overflow of garbage in many areas in Coimbatore. To avoid this smart garbage Monitoring and collection system is developed.

## 2. Proposed System

### 2.1 System Architecture:

#### 2.1.1 Raspberry Pi

Raspberry Pi is a small computer board and used as a fantastic tool for IOT based projects. It is low cost device and accessible by all due to „plug and play“ nature of the board. Grouping a set of Raspberry Pi to work as a server is more cost-effective than a normal server. The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity, and peripheral device support. In our project we are using Raspberry Pi 3 Model B because of more processing power and on-board connectivity. On the Model B and B+ the Ethernet port is provided by a built-in USB Ethernet adapter. The Raspberry Pi may be operated with any USB connected mouse and keyboard. The Raspberry Pi 2 and the Raspberry Pi 3 have 1 GB of RAM. It promotes Python and Scratch as the main programming language, with support for many other languages.



Figure 1: Raspberry Pi

#### 2.1.2 Ultrasonic Sensor

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. Ultrasonic sensors can be used to solve even the most complex tasks involving object detection and level measurement with millimeter precision, because their measuring method works reliably under almost all conditions. The sensor surface cleans itself through vibration and that is not the only reason why the sensor is insensitive to dirt. It can pass through all the materials easily.



Figure 2: Ultrasonic Sensor

#### 2.1.3 Flame Sensor

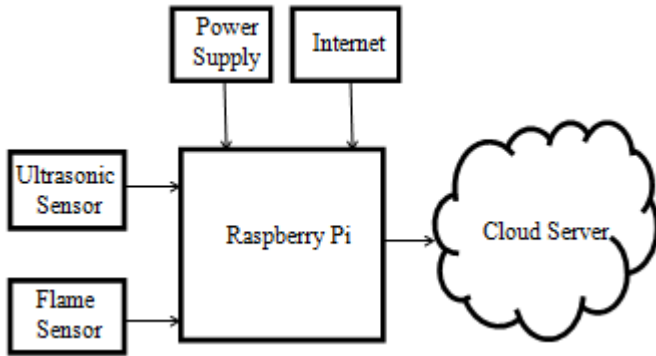
Flame sensor is the most sensitive to ordinary light so that it is generally used as flame alarm purpose. A flame detector is a sensor designed to detect and respond to the presence of a flame or fire. The module that can detect flame or wavelength in 760 nm to 1100 nm range of light source. The sensor and the flame should keep a certain distance to avoid high temperature damage to the sensor.



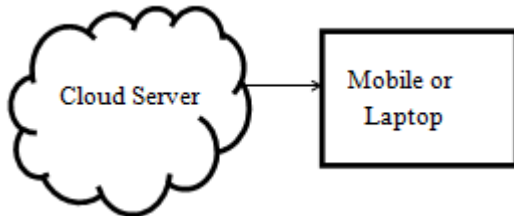
Figure 3: Flame Sensor

### 3. Block Diagram

#### 3.1 Transmitter Side



#### 3.2 Receiver Side



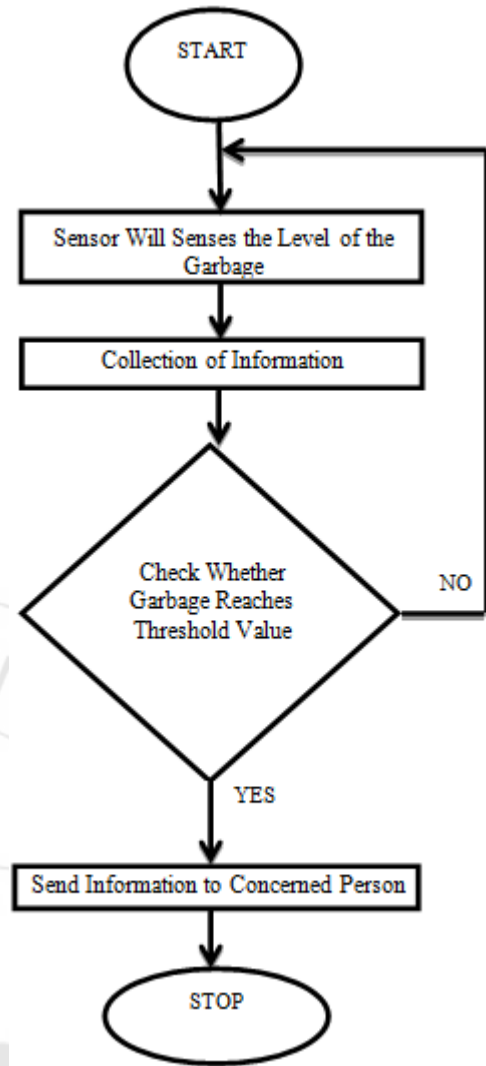
#### 3.3 Disadvantages of Existing System

- Unhygienic condition.
- High cost.
- More traffic and noise occurrence.

#### 3.4 Advantages of Proposed System

- Make the environment clean.
- Reduce bad odour.
- Cost effective and hygienic.
- Efficient management of smart bins in smart cities.

### 4. Flow Chart



### 5. Result

After the garbage level reaches the threshold value. The intimation will be send to the concerned person either via mobile or through webpage.

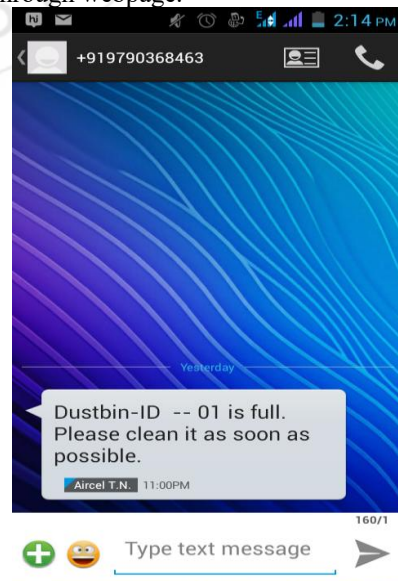


Figure 4: Message sent to concerned person

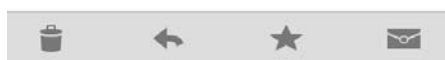
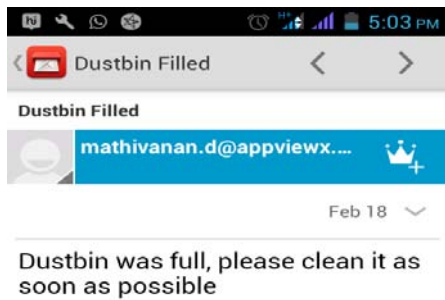


Figure 5: Mail sent to concerned person



Figure 6: Smart bin

## 6. Conclusion

By implementing our project in real time scenario we can reduce the unhygienic condition among the smart cities and many areas. The module will give information to the concerned person through the webpage. The webpage can be seen by all the officials. If the wastes are not properly cleaned and remove, there may be a possibility for diseases to spread. This may cause severe health hazards to humans. With our system we can clean the environment and give our contribution to the society for Clean India concept. By intimating the notification of waste filled in the garbage, we can reduce the number of trips of the garbage collecting vehicle.

## 7. Acknowledgements

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