

# IOT Based Smart Garbage alert system using Wireless sensor network for Environmental hygiene



V.Malini, M.Hemalatha

**Abstract:-** In a Fast-growing world, garbage management is one of the biggest problem. In India to dispose the scrap materials there are many methodologies are available for handling the process and managing it. Still the major issue found was the waste in the street bins were spillover and uncollected at right time. The proposed solution focus on the method to monitor the street bins and send a message to the respective authorities automatically. Monitoring the Street bins can be possible by using level sensors and temperature sensor. WSN (Wireless Sensor Network) technology is used to read these sensors and send a message to respective authorities to take an action. While drizzling the level sensor will sense the rain and close the garbage bin automatically.

**Keywords:** Wireless sensor Network (WSN), Internet of things (IOT), level sensor, temperature sensor.

## I. INTRODUCTION

It is visible that the garbage bins are mostly overloaded, many bins were not attended by municipal persons at right time, this leads to spill over of waste on the streets. Due to which there the environment is polluted with bad odor and untidy to public. By proposing the new method of waste management, a message will be sent to authorities once the bin is about to fill, so that they can act quickly and clear the bin to provide hygienic environment to the public. The better way to manage the waste collection to organize the waste in the below said manner.

*Classification of waste:*

- Biological waste
- Recyclable waste
- Plastic Waste

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## II. IOT

IOT - Internet of Things which helps to connect the devices and systems to collect the required data. Embedded sensors which is present in the machines used to collect the data. IoT is an emerging technology which grows rapidly nowadays to improve the quality of life. This also helps for the future development and increase productivity of enterprises. IoT unlocks a new term GSMA (Global System Mobile Association). On our day to day life IoT plays a major role on handling things quickly and effectively, for example the data collected can be analyzed and used for decision making. Automating accessibility of home appliances which saves energy. IOT is widely used in many industrial sectors like, health, manufacturing, retail and agriculture. The proposed solution is to monitor the garbage bin and automatically send the message to municipal authorities if the garbage bin is about to fill, so that they can act quickly and clear the bin to provide hygienic environment to the public. While drizzling the level sensor will sense the rain and close the garbage bin automatically.

Using Wireless Sensor Network (WSN) the information is provided to local authorities and to the control center immediately once garbage bin status is sensed. This system consists of spatially dispersed and dedicated low powered devices and sensors for monitoring and recording the physical condition of the environment and organizing the collected data at a centralized location. The maximum performance is obtained by linking the sensors in different configurations. The communication process between sensors is done using transceivers. The sensor nodes range in WSN are in the order of hundreds and may be thousands in the network. These networks will not have any infrastructure. Wireless network is one of the best services that applied in automating the accessibility of home appliances, Industrial equipment's and machineries, it is because of the rapid technical growth in embedded computing devices, processor and communication. The Sensor nodes are predominantly used to monitor the environmental conditions such as, pressure, temperature, humidity, sound, position, vibration, etc.,

### 2.1. Related Works

The methods involved in garbage management is not uniform all over the world.



Each method will be different, and it is not possible to deal with managing all types garbage by a single method. It is needed to understand the type of garbage's to choose a waste management system for effective monitoring and disposal. The method chosen should be useful to the environment and public, considering capital cost and social conditions. Waste disposal management can be tackled by a variety of approaches.

It is common that all types of garbage management system have several processes and they are closely related to each other. Effective garbage management system has the following benefits.

- Maintaining cleanliness in the streets
- Hygienic environment to public.
- Quick disposal of wastes
- Creating awareness to the public on how to dispose different types of waste.

Any garbage management system framework comprises of Monitoring, alerting, quick disposal and maintain hygiene. The garbage management system collects the garbage data and send the information to municipal authorities for quick action and help for future analysis and decision making for the following.

- Increase the garbage bin size
- Number of garbage bin required for a street.
- Number of resources required for garbage clearing
- How much garbage collected in a day.

### III. SYSTEM ANALYSIS & RESULTS

#### 3.1 Old System

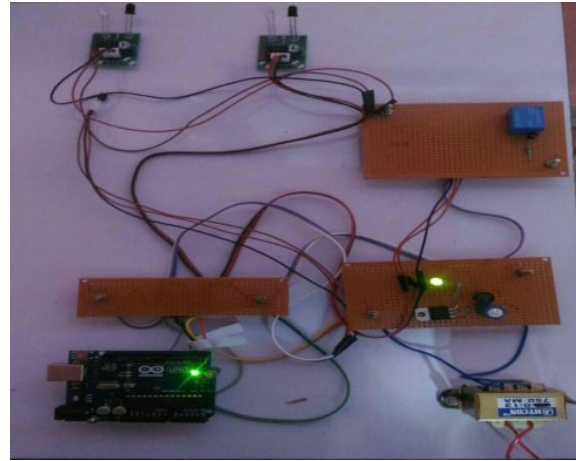
- ✓ The garbage bin is monitored manually
- ✓ The garbage is mixed with rain water and produce more bad odour
- ✓ The municipal doesn't know whether the garbage bin is empty or full
- ✓ Due to high volume of garbage, takes more day to start the cleaning process

#### 3.2 Proposed System

- ✓ The garbage bin is monitored automatically
- ✓ It will send the information if the garbage bin is full
- ✓ While drizzling, it will sense the rain and the garbage bin door is closed automatically.
- ✓ If the garbage bin about to fill or spill over, the information will automatically sent to the municipal authorities

#### 3.3 Hardware Tools

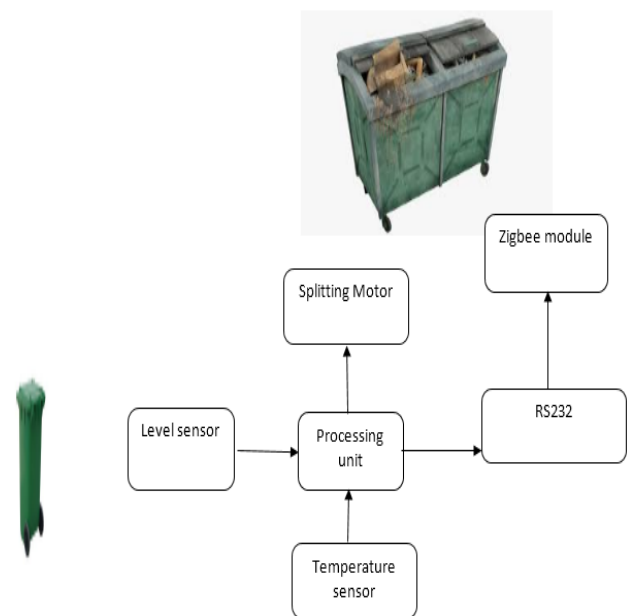
- ✓ Processing unit
- ✓ Level sensor
- ✓ Temperature sensor
- ✓ Zigbee module
- ✓ RS232
- ✓ Power supply unit



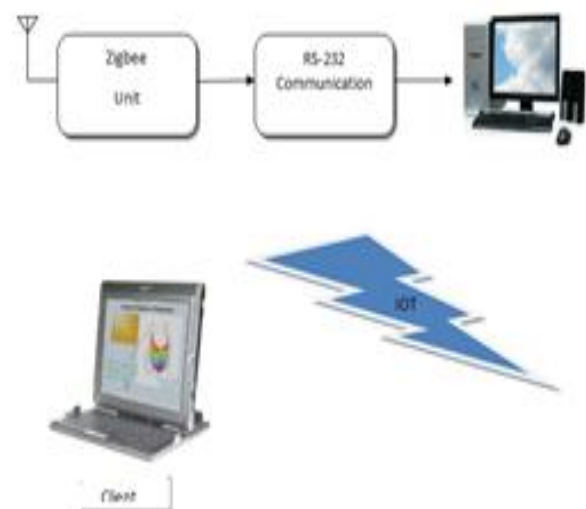
**Arduino and Sensor unit**

### IV. BLOCK DIAGRAM

*Trash Box Section:*



*Server Section:*



Two level sensors are provided to monitor the level of the garbage in the bin. First sensor will sense the 50% filling of the bin and the next is to sense the bin full. If the level of the garbage reaches the above said limits, it will send the alert to the municipal authorities through the IOT using WSN and ZigBee module. Temperature sensor is used to alert the temperature level of the garbage. While drizzling the level sensor will sense the rain and close the garbage bin automatically.

All the information which are monitored by the sensors are transmitted to the respective authorized person and stored in the server for future use and analysis. If the garbage bin is not cleared by the authorities within the days, the server will alert the person continuously.

#### 4.1 Applications

- ✓ Trash management
- ✓ Smart drainage
- ✓ Water level management

### V. CONCLUSION

An IOT based garbage monitoring system is used for proper and regular maintenance of garbage in the bin. It sends the alert signals to the respective authorities for the proper management.

Automating the garbage monitoring will help us to maintain the environment odorless, neat and hygienic. It reduces the human effort spent for monitoring the garbage bins in all the streets. It helps the authorities to plan the resources for garbage collecting work

### VI. FUTURE WORK

The future enhancement can be made in the garbage management system module will help us to add GPS and configure it with Android mobile app, so that the application can be used by municipal garbage collecting workers and take immediate action without waiting for the information from municipal authorities. This system also can be linked with the garbage collecting transport vehicle and alert for reserving the vehicle to a location for immediate garbage disposal.

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