International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 02 | Feb 2020 www.irjet.net p-ISSN: 2395-0072

Garbage waste monitoring and management in smart cities

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Abstract -*Nowadays, many times we see that the garbage bins or dust bins are placed at public places in the cities are overflowing due to increase in the waste every day. To access the concern authorities from their place with the help of Internet and an immediate action can be made to clean the dustbins. The proposed system will consist of waste bins that are equipped with ultrasonic sensor, DTH11, gas sensor which are interfaced with Arduino Uno and a Wi-Fi module. The system will collect the waste fill level status and upload the data to database. The data will be used to represent the bin level of the of all bins on the android application. Normally the electromagnetic waves or passive infrared radiation are emitted from the living body that is human body. This rays are observed by the PIR sensor. In here the dustbin are open when the human is arriving in front of the dustbin, otherwise it will be in closed condition. The ultrasonic sensor will detect depth of waste present in the dustbin and send it to the web server, through the mobile application the collected information is forwarded to concerned person mobile phone through the notification from developed application. Once a bin gets filled, notification will be sent to the appropriate client based on their location and the dustbin will be automatically closed. If the smart card is swipe in the dustbin it will open.*

***Key Words*: Ultrasonic sensor, PIR sensor, DHT sensor, gas sensor, Arduino UNO, smart card, OLED screen**

1. INTRODUCTION

Nowadays the Internet of Things (IOT) is the most commonly used in substantial plans, vehicles, house appliance and other embedded by electronics, software, sensor, actuators, motors and network connectivity which allow these things to bond and exchange data. The IOT allows objects to be sensed or embarrassed remotely transversely active set of connections infrastructure, creating the opportunity for added direct integration of the substantial planet into computer based system and consequential in enhanced efficiency, correctness and economic benefit in addition to reduced human intervention. As dustbin is considered as a basic need to maintain the level of cleanliness in the city, so it is very important to clean all the dustbins as soon as they get filled. We will use ultrasonic sensors for this system. The concept of IOT when used in this field will result in a better environment for the people to live in. No more unsanitary conditions will be formed in the city. With the help of this system minimal number of smart bins can be used around the whole city and the city will still be much cleaner. There has been an unprecedented growth in the number of devices being connected to the Internet since past few years. All these devices connected to the internet are part of the IOT infrastructure which can communicate with each other. The IOT network consists of embedded electronics, sensors and software that allows these devices to send and receive data among each other. This is why it is beneficial to use such an existing infrastructure for designing the proposed security system. The disadvantages of the existing system are that the employees have to go and check the bins daily whether they are filled or not, it results in high cost.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

In the existing system IR sensor was used. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. The Infrared sensor was used for identify the waste depth and will be produced the notification for consent person. Real time data transmission and access is difficult for this system and high cost of the hardware system with the project.

2.2 PROPOSED SYSTEM

This project uses Arduino UNO r3, ultrasonic sensor HC-SR04, PIR sensor HC-SR501, DHT 11 sensor, gas sensor MQ-6, Wi-Fi module, smart card and cloud. The ultrasonic sensor is fix in the dustbin. This is notified the presence of waste and dust level in the dustbin at every minute. PIR sensor is used to access the dustbin, that means the human will be standing the dustbin the dustbin will be open, other times the dustbin will be closed. The DHT sensor monitor the presence of temperature and humidity level in the dustbin and gas sensor is used to detect the presence of combustible, flammable and any toxic gases present in the dustbin. When the dustbin gets filled it will be automatically closed and send the notification to either appropriate person or truck on board. While the consent person will use the smart card to swipe in the dustbin, it will be open. The card reader will be insert on the dustbin. If smart gets damaged, the dustbin lock is unlocked or undo by passing comment through the cloud (with the help of IOT technology).

3. SYSTEM ARCHITECTURE

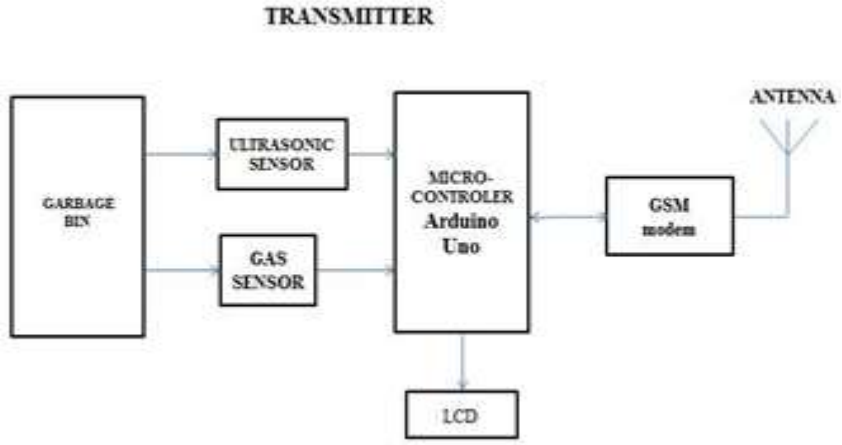

Figure -1: Block diagram of transmitter section

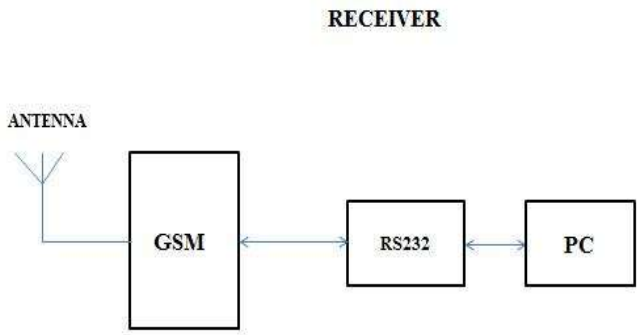

Figure -2: Block diagram of receiver section

4. ADVANTAGES AND DISADVANTAGES

Advantages

This system is easier to operate automatically

More flexibility

Disadvantage

It is costlier

5. CONCLUSIONS

The Ultrasonic sensor will detect depth of waste present in the dustbin and send it to the web server, through the mobile application the collected information is forwarded to concerned person mobile phone through the notification from developed application. Once a bin gets filled, notification will be sent to the appropriate client based on their location and the dustbin will be automatically closed. Although the development of the automated garbage monitoring system is good there are things to be recommended to add camera to the system to capture the image of surrounding when the people try to drops the garbage outside the bin which we will be used for penalty and to add smell sensor.

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