

Wi-Fi Based Garbage Monitoring System

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Abstract -Collecting waste is important in order to keep the cities clean for a better environment to live in. Thus, the smarter techniques are used in the surroundings to overview and collect the important information. We have proposed a Wi-Fi based garbage monitoring system which is used to keep the cities clean. The system evaluates and shows the level of garbage collected in the bins through an android app. The android application made to support the project sends all the important information to a person in administrative department. In this way the waste management is automated.

Keywords-Wi-Fi, garbage monitoring system, Arduino, solid waste management, ultrasonic sensors, GPS.

I. INTRODUCTION

Proper waste management is an important aspect for the cleanliness of the city. The garbage also consists of the discarded substances left over from the urban area, public area, colleges, home etc. This paper helps with the minimization of the problem of garbage disposal. This project senses the data, gathers it, stores the data and processes it by connecting it with a physical device.



Figure 1:Over flowing of garbage bins

In India, the waste is managed by municipal corporation, for which the ultrasonic sensors are used to indicate the level of garbage in the bins which are placed at the top to observe the various levels of garbage in the bin. The echo signal strikes and bounces back to the sensor when they hit any object. The positioning of the garbage bin is indicated by GPS module and the system operation is controlled by Arduino, which further sends information to the municipal corporation indicating the maximum level of bin.

II. LITERATURE SURVEY

The concept of Garbage Monitoring isn't new, it has been talked about for a long time and it is being implemented in some parts of the world. Many authors have published the papers regarding the smart bins. Some of these are as follows:

Narayan Sharma, Nirman Singha, Tanmoy Dutta, "Smart Bin Implementation for Smart Cities", International Journal of Scientific & Engineering Research, Volume 6, Issue 9, September-2015. The authors have equipped the Garbage Monitoring system with ultrasonic sensors which measure the level of the wastebin. The wastebin is divided into three levels ($h/3$, $2h/3$, h) of the garbage being collected in it. Every time the garbage crosses a specific threshold level the sensors receive the data which is then further sent to the garbage analyzer as an instant message using the GSM module.

III. BLOCK-DIAGRAM

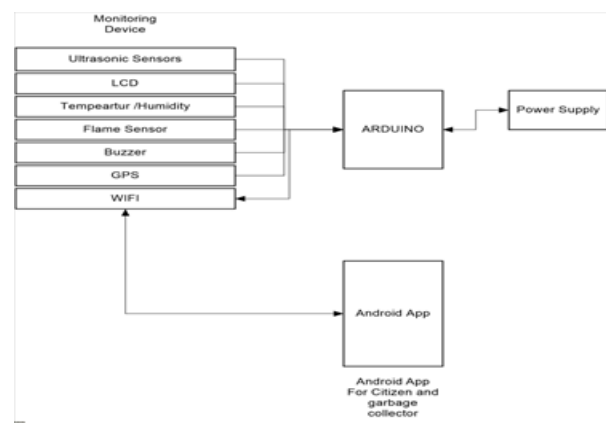


Fig.2 Block Diagram.

The block diagram shows the system which contains the bins installed with the sensor units. The Arduino will receive the information about the level of the garbage from the ultrasonic sensor and send the information to the server through the Wi-Fi module. i.e. ESP 8266.

In the service section, the residents who throw the waste in a bin, that information is collected and transferred to the administration section. After which the server will check for the threshold level and if the threshold level is high it will send the notification accordingly to the web server. The web server displays the details and also shows the status of the bin at real time. The same information is

further sent to the concerned authority to empty the filled bins in time.

IV. HARDWARE USED

1. Arduino Uno



Fig.3 Arduino Uno.

ARDUINO Uno is a microcontroller board fixed on the ATMEGA328. It has 14 input –output pins in which 6 are used as analog input, 6 pins are used as PWM output, it also has a power jack, a reset button, a 16MHZ ceramic resonator. An ICSP header and a facilitation for USB connectivity. It operates on a 16MHZ clock frequency.

2. Ultrasonic Sensor

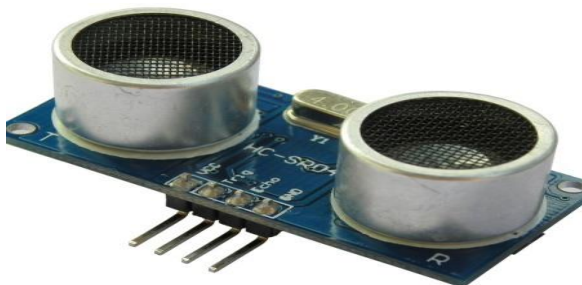


Fig.4 ULTRASONIC SENSOR

An ultrasonic sensor has a 4-pin module, and their pin names are Vcc, Trigger, Echo, Ground. This sensor is very popularly used in many applications where measuring distance and sensing the object are required. It has 2 eyes in the form of an ultrasonic transmitter and a receiver.

3. GPS (Global Positioning System):



Fig. 5 GPS (Global Positioning System)

GPS is basically a satellite-based navigation system. It works in any weather pattern all over the world, 24/7 without any charges. GPS module sends the position of the latitude and longitude with the link pattern attached by the help of SMS which is used to track the current position of trash bin.

4. Buzzer:



Fig. 6 Buzzer.

A piezobuzzer uses a material that's piezoelectric, it basically changes the shape when you apply electricity to it. By adhering a piezo-electric disc to a thin metal plate, and then further applying electricity to it, we can actually bend the metal back and forth, which in turn creates a noise.

5. ESP 8266



Fig.7 SP 8266

The ESP 8266 is a low power highly integrated microchip. It is mainly used in IOT based projects as it consumes low power. The ESP 8266EX is designed for mobile variable electronics with the objective of achieving the target of lowest power consumption with the combination of several other techniques. The real time clock can be programmed to start ESP 8266EX 01 which can be utilized by a mobile device allowing them to remain in the low power standby mode Wi-Fi is a basic need.

6.LCD



Fig.8 LCD

LCD stands for (Liquid Crystal Display) it is basically the technology used for display in other smaller devices such as computers, notebooks, the light emitting diode (LED) gas plasma technologies.

7. DHT-11



Fig. 9 DHT-11

The DHT11 is an ultra low-cost digital temperature and humidity sensor. It makes use of a capacitive humidity sensor and a thermistor which measures the surrounding air, and lets out a digital signal on the data pin. It's very simple to use, but at the same time it requires careful timing to grab the useful data. The only drawback of this sensor is that you can only get new data from it once every 2 seconds, so while using our library the sensor readings can be up to 2 seconds old.

8. Flame Sensor

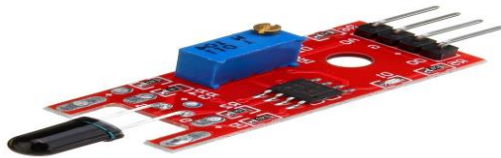


Fig. 10 Flam Sensor.

A flame detector is a sensor which is designed to detect and react to the presence of a flame or fire, allowing the detection of flame. Responses to a detected flame depends wholly on the installation, but can include sounding an alarm, deactivating a fuel line, and activating a fire suppression system.

V. APPLICATION

- Empowered Swachh Bharat Mission.
- Municipal corporations.
- Colleges.
- Factories and mills.
- Railway stations.

VI. CONCLUSION

This paper concentrates on the architecture of WI-FI, based with the objective of the improvement in the waste management system. Our approach is a holistic review of

the technique of waste management, which works upon the smartening of the waste bin to optimize the waste collection and anticipating the nature of collected waste. The architecture includes the prototyping of the different types of components and future works will offer further testing, elaboration and implementation.

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