DESIGN AND DEVELOPMENT OF AN EFFECTIVE SMART GARBAGE SYSTEM USING THE INTERNET OF THINGS

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Abstract. Garbage management has become the most pressing challenge in today's world, particularly in countries with significant population growth rates. Excess of gas can be formed in the environment which causes production of greenhouse gas in the environment. We employed this technology to monitor the level of waste in the garbage, as well as fire and gas emissions. When there is a fire or a significant volume of hazardous gas in the waste, the location will be updated in the web and the buzzer will give an alert. The whole process used to reduce greenhouse gas in the environment. And also, it detects the level of garbage, when the level is high it shares the location to IOT.

Key words: IOT, Smart City, Garbage Monitoring

1. Introduction

The Internet of Things (IoT) has quickly become the most popular invention of our time. IoT is a technology that allows all physical devices to communicate with one another over a wireless network connection with minimal human intervention in order to maintain a clean environment. In some areas the toxic gas produced by the waste are high, to reduce gas formation and fire detection system used to reduce production of greenhouse gas in the environment. By 2030, many portions of the cosmos will have evolved and become more populous, resulting in a rise in rubbish production. As a result, the execution of this research could be beneficial in resolving this issue. This study also suggests a route tracking system that will show the truck's journey while collecting rubbish and visiting the most overflowing bins. This paper helped to reduce travel and helped in reducing the use of fuels will be saved[1]. This research presents an air pollution and monitoring model that uses a data mining method to detect pollution in the air. Sensor values from many gas sensors are detected using the sensor grid. The values from the ADC are transferred to the server using a microcontroller. The controller is connected to the client through Bluetooth, and the client communicates with the server using web services[2]. This system architecture created remote detection terminal, control master station, and mobile monitoring terminal communication protocol based on Zigbee technology, GSM technology, and supplemented by the master-slave wireless network. The site environment and gas concentration are detected via a remote monitoring terminal. Scene conditions and gas concentration state are detected using remote sense terminals. The control station is used to
manage the main station's connection to the network of remote detection terminal data, as well as to provide timely alert information to your phone through GSM module monitoring terminal. In addition, data can be transferred to a computer monitor server via the serial port, allowing for data analysis and control of each remote terminal[3].

2. Design Analysis

In the current system, when a fire or dangerous gas is detected, the existing system uses a buzzer to inform the user. To transmit the data, they employ a Bluetooth module. The existing technology uses Bluetooth and can only be used for a certain distance, which is a disadvantage. In this work, we use IoT to send the data of the garbage to the corporation. The location of the garbage also sends through the IoT. Also, the buzzer will be beep when the fire is detected. It detects the level of the garbage. The benefit of this work is that when the location is discovered, immediate action will be conducted, and the gas and temperature values will be updated in real time.

2.1 Requirements & Circuit Arrangement

Hardware used for implementation of the proposed work are Arduino Uno, Power Supply, Ultra-sonic Sensor, Fire Sensor, Gas Sensor, GPS Module, ESP8266 Module and Buzzer. Software utilized for the execution are Arduino IDE, Embedded C and PHP.

Figure 1. System Architecture

Figure 2. Circuit Arrangement
2.2 Working Plan

In this project we are developing the smart garbage system for the smart City, garbage system means you need to maintain the level of garbage and you need to check the Garbage weight of the dustbin and need to check the fire and gas level in garbage system. If u go for smart City means we need to update data of garbage like dustbin into the cooperation, so while using IOT if you provide internet to IOT means it will always store data from the dustbin level like gas fire weight of garbage level etc

For fire sensor, if the fire is detected means some door is going to open in dustbin it is why because in every smart City the dustbin is fully covered with door. Whenever we go to dustbin, we can open the door and put the dust in dustbin. When the dustbin is on fire the door will automatically open. Weight cell is there if we use ultrasonic sensor the best idea for it will call the level of dustbin and we can know the dustbin is full or empty for that we are using weight sensor.

3. Results and Discussion

After installing hardware and software, System ready for the trial working checkup, checking with gas sensor fire sensor and all other software working operations. All sensors are working smoothly, cloud storage and software running smoothly.

4. Conclusion

Finally, we completed the working prototype of the smart garbage system using IOT. All sensors and other working operation go smoothly. This small idea will help to build a smart garbage system in every developing smart city.

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