IoT Based Garbage Bin Monitoring System

Shaikh Sana Shafee[1], Prof. Dr. A. M. Rawate[2], Prof. Sumera Ali[3]

[1]*Student of CSMSS Chh. Shahu College of Engineering,Aurangabad,Maharashtra,India.*
[2]*Head of Department&Associate professor of Electronics & Telecommunication Engineering of
CSMSS Chh. Shahu College of Engineering.*
[3]*Associate professor of Electronics & Telecommunication Engineering of CSMSS Chh. Shahu College of Engineering.*

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**Abstract -*:* India is a second highest population country in the world, and it is a developing nation. It is our responsibility to keep our surrounding clean. In our society, we can see the overloaded garbage bins, which makes unhealthy environment. It leads to spread serious diseases in people living in that area. To solve this problem we are introducing an IoT Based Garbage Bin Monitoring System. The corporation workers can easily handle this system, because it is an IoT based system. This paper gives an idea about a Garbage Bin Monitoring System, which is IoT Based. In this given system, we use sensors inside a garbage bin to detect the level of garbage inside the bin. It also measures the humidity, temperature, and detects the presence of hazardous gases in the bins. The system is useful in every area such as rural, urban, corporate sector, hospitals, and industrial areas.

Key Words:Arduino, Blynk App, Garbage bin, Gas Sensor, GPS Module, Humidity Sensor, IoT, Ultrasonic Sensor, Wi-Fi Module.

1.INTRODUCTION

Nowadays many systems are in use to maintain cleanliness in society. People are also contributing in "SWACCH BHARAT ABHIYAAN". This new system is to notify the corporation workers to empty the garbage bins on real time basis.

This system is an IoT Based Garbage Bin Monitoring System to help maintain cleanliness in the country. As we see, in our surrounding, garbage bins are overloaded leaded to an unhygienic atmosphere, it leaves foul smell and spread serious diseases.

To overcome this situation we introduce a Garbage Bin Monitoring System, which is IoT Based. In this given system, we use sensors inside a garbage bin to detect the level of garbage inside the bin. It also measures the humidity, temperature, and detects the presence of hazardous gases in the bins.

These sensors are interfaced with Arduino. Sensors like Ultrasonic sensor, Humidity sensor, Gas sensor are used to observe the real time status of garbage bin on Blynk App with the help of a Wi-Fi module, also a GPS module.

The given system detects hazardous gases, measures temperature, humidity and level of garbage bins. Therefore, helping the corporation workers manage the garbage bin system effectively.

2. LITERATURE SURVEY

An intelligent alert system, which is embedded based, is devise for the correct monitoring and proper maintenance of the garbage.

The given system averts their regular cleaning of the garbage bins through alerts sent to the respective individual at given regular intervals. In addition it improves the system, as it additionally endorses the status of cleaning at real time and also measures the performance of the group. Hence, the given system becomes useful in a proper solution in environmental maintenance. In addition, it also helps to eradicate the need of large human interference into the garbage maintenance system of the municipality and pollution supervising system[1]. The given project works on the implementation of a garbage bin monitoring system, which is IoT based -using Arduino, ultrasonic sensor, gas sensor, humidity sensor, GPS module and Wi-Fi module. This system assures the cleaning of dustbins soon when the level of garbage reaches to its maximum point. If the garbage bin is not cleaned in the specified time period, then this record is send to the authority which is higher, who will take proper actions against the respective contractor. The given system also help in monitoring the fraud reports and can therefore bring down the corruption in the management system overall. Hence, it brings down the total count of trips taken by the vehicle for garbage collection and can therefore bring down the totalcostrelated to the garbage collection. This finally helps in keeping cleanliness and hygiene in the society. Hence, the smart garbage management system helps in making the garbage collection more easy and efficient. Systems like these are prone to pillaging of components in the system in various ways, that requires to be worked on [2]. The system which is developed provides a improvised database for garbage collection time and wastage amount at every location. As we analyzed the ideas presently available for the application of IoT. Through implementation of this project, we will steer clear from the over flowing of garbage from the bin at a residential area which was loaded manually in the past or by using loaders in the traditional trucks. It can monitor the level of garbage automaticallyandthen transfer this information to the collection truck. The technologies which are used in the proposed system are satisfactory enough to guarantee the perfect and practical execution for solid garbage collection, monitoring of process and green environment management [3].The results obtained in this way would aid in understanding the current situation of the garbage management in the city and villages, the necessary number of dustbins required to stop pollution in the environment [4].
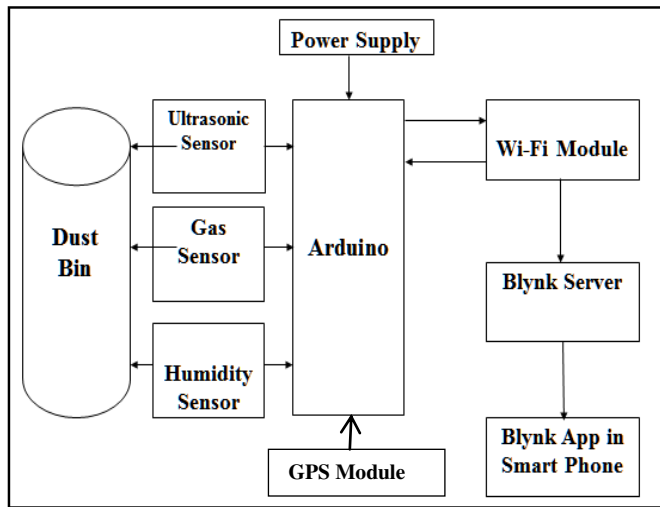
3.BLOCK DIAGRAM

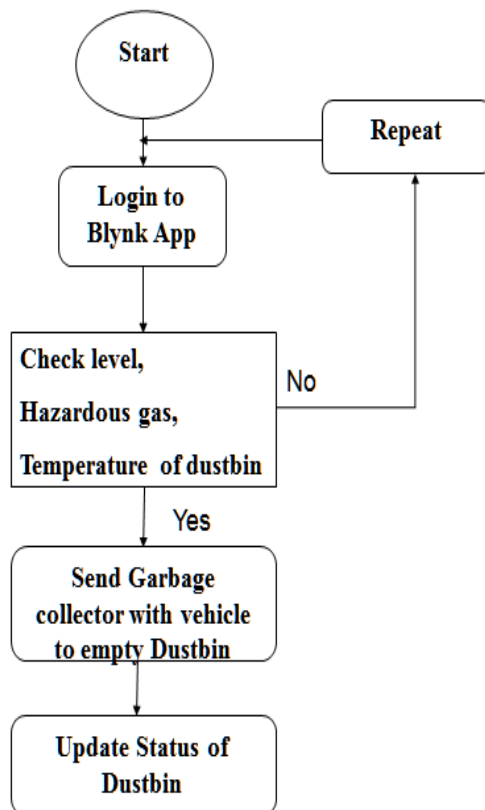Fig.1. Block Diagram

4. FLOW CHART

Fig.2. Flow Chart.

5.WORKING OF BLOCK DIAGRAM

Working of IoT based Garbage Bin Monitoring System based on three sensors. To measure level of garbage, Ultrasonic sensor is used. Gas sensor is usedto sense any hazardous gas present in the garbage bin produced by chemical or bio-medical garbage, Humidity sensor is requiredto measure the humidity and temperature in summer season or in rainy season. Arduino is usedto control and process the data sent by the sensors, Wi-Fi Module, GPS Module and Blynk App. Wi-Fi Module for wireless interfacing with garbage bin and garbage collector through Blynk App. GPS Module is to give the exact location of garbage bin on map.

As soon as the level of garbage bin reaches its threshold limit, the Ultrasonic Sensor gives a status of the bin as "FULL".

When, due to some chemical or bio-medical waste, the garbage bin contains some hazardous gas, at that time Gas Sensor will give a status of the bin as "DANGER".

During summer season due to high temperature, as soon as the garbage in the garbage bin goes up to a high temperature and when in rainy season due to high humidity it decays faster, at that time Humidity Sensor will gives a Status of the bin as "HIGH HUMIDITY".

6.SOFTWARE

Blynk App: Blynk App is designed for Internet of Things. Hardware is controlled remotely by the Blynk App. This App can display and store sensor data. It can visualize the sensor data and can do many things.

There are three main parts in this platform

1] Blynk App: It allows us to create many interfaces for our project.

2] Blynk Server: This helps us to establish communication between smartphone and hardware. It is an open source platform.

3] Blynk Libraries: For all main hardware platform, Blynk Libraries make communications with server and process all the input and output commands.

7. HARDWARE

1] Arduino UNO: It is a microcontroller with a single board used to access applications very easily. It is an open source based hardware board which is designed by the help of an 8-bit Atmel AVR Microcontroller and a 32-bit Atmel ARM. It has a USB interface, 6 analog input pins and 14 digital I/O pins that are useful for interfacing many boards to it.

2] Wi-Fi Module: It is a low power integrated circuit designed on a single microchip. It can program with the help of Arduino through receiver and transmitter. It has a self-containing SOC with an integrated TCP/IP protocol stack which gives access to our Wi-Fi network.

3] GPS Module: It is a Global Positioning System based on satellite-based navigation system. It works in all-weather seasons.

4] Ultrasonic Sensor: This sensor uses sound waves for detection of an object and for measuring the distance between an object and the sensor. It is having transmitter and receiver for calculating the distance. It measures the distance from 1 to 13 feet.

5] Humidity Sensor: It is a cost effective humidity and temperature sensor to provide stability, and high

reliability.Humidity and Temperature Sensor is made up of three major components.

1. A humidity sensor of resistive type,

2. An NTC (negative temperature coefficient)thermistor (to measure the temperature) and

3. An 8-bit microcontroller, that takes the analog signals from both the sensors and sends out single digital signal. Thedata from the sensor consists of integral and decimal parts for both Relative Humidity (RH) andtemperature.

6] Gas Sensor: Gas sensor senses the change in the exhausted smell and smoke. Gas sensor is used to recognize the quantity of fire emitted smoke.

8. CONCLUSION

The major objective of this system is to make the environment clean and help in "SWACCH BHARAT ABHIYAAN". Real time status of garbage bins can be easily checked on smartphones by corporation workers to empty the garbage bins on time. If the level of garbage bin reaches to its maximum point or any hazardous gas is found in it or if the temperature or humidity of bin is high then the corporation worker will get updates of garbage bins time to time. Therefore, the worker can empty it on time to reduce human efforts and labor cost. It also provides exact location of garbage bins. This system will help us in garbage decomposition and its fertilization.

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BIOGRAPHIES

Shaikh Sana Shafee, completed B. E. from Dr. BAMU University. Currently pursuing M. Tech in Electronics and Telecommunication, CSMSS Chh. Shahu College of Engineering.(Dr. BATU University), Aurangabad, Maharashtra, India.

Guide- **Prof. Dr. A. M. Rawate,** Associate Professor and Head of Department Electronics and Telecommunication. CSMSS Chh. Shahu College of Engineering. Dr. BATU. University, Aurangabad, Maharashtra, India.

Co-Guide- **Prof. Sumera Ali,** Associate Professor, Electronics and Telecommunication. CSMSS Chh. Shahu College of Engineering. Dr. BATU. University, Aurangabad, Maharashtra, India.