SMART GARBAGE MONITORING SYSTEM USING INTERNET OF THINGS

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Abstract - *In the recent decades, urbanization has increased tremendously. At the same phase there is an increase in waste production. The spillover of waste in civic areas generates the polluted condition in the neighboring areas. It may aggravate numerous severe diseases for the nearby people. This will humiliate the appraisal of the affected area. For mitigating the garbage's and maintains the cleanness, it requires 'smartness based waste management system'. This paper is proposed IOT based smart waste clean management system which checks the waste level over the dustbins by using sensor systems. Once it detected immediately this system altered to concern authorized through IOT. For this system used microcontroller as an interface between the sensor system and IOT system. This is ensued the greenish in the environment and support for swachhbharat for cleanness.*

*Key Words***: *IOT, Arduino, GPS, Arduino IDE.*

1. INTRODUCTION

As the world's population grows at a fast pace, more and more waste is produced daily and waste management becomes more crucial matter of particular importance is the collection of solid waste from city garbage bins. In some cases unsanitary conditions that pose a risk to the surrounding communities. Such risks are presented in the form of overfilled garbage bins and foul odors. It was identified that the large number of resources used is generally due to the lack of planning data on the collections and poor infrastructure.

With the current advancement of Technology, Smart cities are on the rise. Smart cities represent a conceptual urban development model on the basis of the utilization of human collective and technological capital for the development of urban agglomerations with the popularity of the Internet of Things(IOT) growing and availability of low cost actuators and sensors, the benefits of the technologies can be used to solve the problem faced in the current methods of waste management in cities.

Internet of Things (IOT) is an ecological unit of associated corporal substance which are reachable during the internet. The 'thing' in IOT could ban physical device with sensor capabilities which are capable to send information through IP Address and ability to communicate information to Base station automatically. Internet of Things(IOT) be able to interact in various system over internet. In this project were bring new direction for integrating IOT for green environment by cleaning the waste automatically and to provide a more efficient solution. This paper discussed objective n chapter 2, literature survey in chapter 3, proposed system in chapter 4, result and conclusion in chapter 5.

2. OBJECTIVE

The basic idea in this project is to design a smart garbage detection system which would automatically notify the officials about the current status of various garbage bins in the city, with the real time monitoring capabilities, under remote controlled IOT technique, which is depicted in fig 1.

Fig-1:IOT based bin

All cities current waste collection considered here as a case work, logistics is carried out by emptying containers according to predefined schedules and routes which are repeated at a predefined frequency. Such a system has major disadvantage:

Time consuming, high costs, Greater traffic and congestion, unnecessary fuel consumption, increased noise and air pollution as a result of more trunks on the road.

All the above disadvantage are a result of lack of real time information resulting in unsuccessful collection of waste. The government itself finds this as a big problem and a big hurdle in between smart cities. There is an urgent need to optimize the management of this service. In this system, ultrasonic sensor is used to monitor the level of garbage level. IR Sensor is used to monitor the nearby persons and automatically drivers the DC Motor to open the lid of the dustbin. The dustbin are uploaded to the cloud using IOT. These helps for clearing the wastage from dustbin.

3. LITERATURE SURVEY

The literature surveyed some different papers to get information about the existing work which have been done. For the garbage detection, some paper uses weight sensor. It gives the weight of the garbage in the dustbin. But it doesn't provide any information about the level of the garbage in the dustbin. Hence, therefore used Infrared Sensor (IR) for garbage detection. IR Sensor radiates light which is invisible to the human eye because it is at infrared wavelengths, but it can be detected by electronic devices. IR transmitter consists of LED which sends the IR beam. Technology uses IR sensor, Microcontroller, Graphical user interface (GUI).

Andrei Brozdukhin, olgadolinnia and vitally pechenkin proposed system consists of two parts: software and special signaling equipment. The equipment is placed on the side walls of the bin which consists of two parts: one is the receiver-transmitter and sensor. Sensor is used to indicate the level of the bin which is connected to the transmitter that transmits a signal of fullness of the bin to the receiver at the server host. A manager is appointment at the server side whose job is to find the shortest route and intimate it to the trucker driver to collect it in short interval of time.

The Waste management is built around several element Waste item, domestic bin, trash bag, collecting vehicles. The waste flow start from the waste item and the domestic bin to end in the collecting vehicles. Based on RFID technology new trash bag is added in a collective container. The technology use radio frequency identification (RFID) smart vehicular and trash bag. And this also an failure model.

The arduino with IOT technique overcome all those disadvantages which are use of minimum route, low cost, fuel use and clean environment.

4. PROPOSED SYSTEM

In proposed system, ultrasonic sensor is used to monitor the level of garbage level. IR sensor is used to monitor the nearby persons and automatically drives the DC motor to open the lid of the dustbin. The dustbin data are uploaded to the cloud using IOT. These helps for clearing the wastage from dustbin.

4.1 HARDWARE REQUIREMENTS

- Arduino UNO
- DC Motor
- LED(Indicator module)
- IR Sensor
- IOT.

4.2 SOFTWARE REQUIREMENTS

- Arduino IDE
- Embedded C

4.3 ULTRASONIC MODULE:

Ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

It is used to monitor the level of garbage level. It consists of

- Trigger pulse (Input)
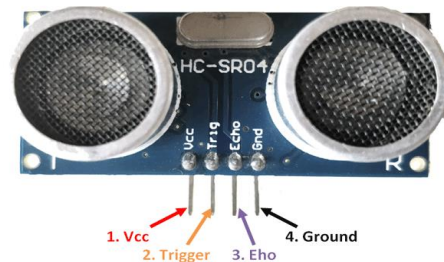- Echo pulse(output)
- 5V supply
- 0V Ground

Fig- 2: Ultrasonic

Ultrasonic sensor vibrates at a frequency above the range of human hearing. This sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.
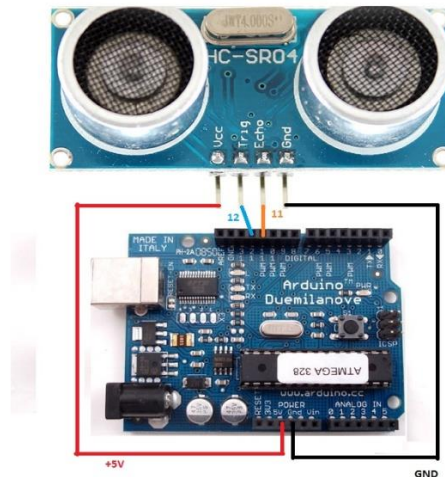

Fig-3:PIN DIAGRAM ULTRASONIC SENSOR WITH ARUDINO

4.4 DC MOTOR

It converts electrical energy into mechanical energy. It wastes are unloaded periodically. The motor terminals will have a positive and negative polarity and this helps the motor to rotate in clockwise direction. And the motor opens and close the lid of garbage at feasible timings.

Fig-4: Dc motor:

4.5 IR SENSOR:

An infrared sensor circuit is one of the basic and most popular circuit in an electronic devices. This sensor that detects the heat of an object as well as detects the motion. Sensor is analogous to human visionary senses. This circuit comprises of LED with,

- Red
- Green
- Yellow

5. IMPLEMENTATION

This system is implemented with the help of IOT module that act as interfaced between human and the garbage. Once the user opens the application, it get registered using his name and password. In the page, if entered information matches the data in database then login is successful. User would be able to access the information like status and location of the bin. When the bin is filled, then the red LED is lit up and the green LED for empty. This information is also represented on the web server and is stored in the database.

Fig-5: Sensor indication.

6. RESULT AND CONCULSIO

The hardware components should be connected properly. Also ensure that the android phone and the server should be connected to the internet. As soon initially the dustbin is empty LED is on, Hence displayed in LCD. And the map button detects the location of the bin which is filled. In the server, the information regarding the bin such as volume with Date and time is updated on database.

In the entire world, waste management is a major challenging one. If it is not properly dispose or cleaned which will cause lot of diseases and spoil the green environment. Technology is been used to provide better garbage disposal methods in urban areas. This creates a direct connection where every citizen is doing his part in maintain a clean environment around him.

In our project, future enhancement can be made as follows,

- Two bins can be placed to collect wet and dry waste separately.wet waste can be decomposed and used for making biogas.
- All the components and controlling unit can be embedded on the bin.
- It can be made durable, by making it compact and cost effective.

7. REFERENCES

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