Smart Garbage Monitoring System using IOT

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Abstract:- **Waste management is one of the primary problem that the world faces irrespective of the case of developed or developing country. The key issue in the waste management is that the garbage bin at public places gets overflowed well in advance before the commencement of the next cleaning process. It in turn leads to various hazards such as bad odour & ugliness to that place which may be the root cause for spread of various diseases. To avoid all such hazardous scenario and maintain public cleanliness and health this work is mounted on a smart garbage system. This process is aided by the ultrasonic sensor which is interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled. After cleaning the dustbin, the driver confirms the task of emptying the garbage with the aid of RFID Tag. RFID is a computing technology that is used for verification process and in addition, it also enhances the smart garbage alert system by providing automatic identification of garbage filled in the dustbin and sends the status of clean-up to the server affirming that the work is done. The whole process is upheld by an embedded module integrated with RFID and IOT Facilitation. An Android application is developed and linked to a web server to intimate the alerts from the microcontroller to the urban office and to perform the remote monitoring of the cleaning process, done by the workers, thereby reducing the manual process of monitoring and verification.**

INTRODUCTION

Things that are connected to the Internet and those devices controlled from the Internet is called Internet of Things. In this system, the smart bin is connected with the internet to display the exact information about the dustbin level and to which area it belong. In present there was a rapid growth in the population which leads to large quantity of waste disposal in the cities. The overflow of dustbin will create a unpleasant environment and it affect many people by spreading the deadly disease.

SYSTEM ARCHITECTURE
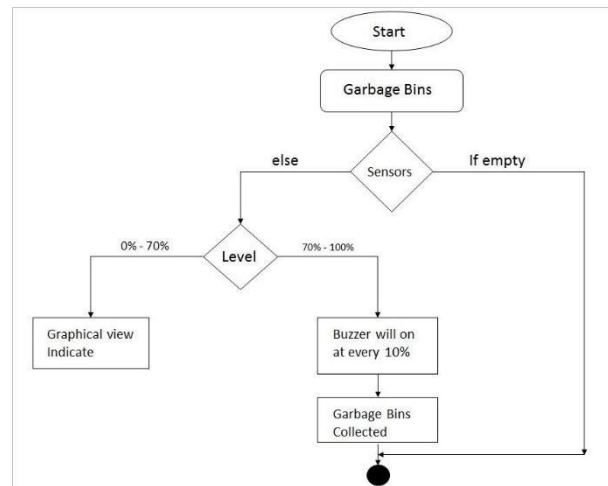
SYSTEM WORKING

The garbage containers transmit signals to indicate that they are over 80% or 90% full and should be emptied. Via the mobile communications network, the signals are sent to a web based software application used by the waste management company. In the software, the capacity of the container is indicated, which is taken as a basis to plan the best route for waste collection garbage trucks travel only to those containers that actually need to be emptied. A robust ultrasonic sensor is installed in the garbage container and detects the fill level regardless of what has been deposited inside. The whole system contains

ULTRASONIC SENSOR, ARDUINO BOARD, WI-FI MODULE, BREAD BOARD, POWER SUPPLY

(BATTERY). The sensor is fixed on to the bread board. the connection between the Arduino board and sensor is made with the help of connecting wires. The working program is fed into the Arduino board. The GSM module is also connected to the same Arduino board with the help of wires. The power supply to the system is given with the help of a battery. The sensor based dustbin will judge the level of waste in it and send the message directly to the municipal corporation. It can sense all the type of waste material either it is in the form of solid or liquid. If there is any problem with any equipment in the future, that part is easily replaceable with new one without any difficulty and delay.

ADVANTAGE

Less time and fuel consumption as the trucks go only to the filled containers. Decreased noise, traffic flow and air pollution as a result of less trucks on the roads. Our smart operating system enable two way communication between the dustbin deployed in the city and service operator. Therefore the focus is only on collection of route based fill level of the containers. The sensors installed in the containers provide real time information on the fill level. This information helps determine when and where to prioritise collection. In this way both service providers and citizens benefit from an optimized system which results in major cost savings and less urban pollution. Reduces the infrastructure (trucks, containers), operating (fuel) and maintenance costs of the service by upto 30%. Applying this technology to the city optimizes management, resources and costs, and makes it a "SMART CITY". It keeps the surroundings clean and green, free from bad odour of wastes, emphasizes on healthy environment and keep cities more beautiful Reducing manpower required to handle the garbage collection.

MODULE DESCRIPTION

- *Dustbin level detection:*

We propose a smart garbage bin using cloud IOT based system to identify when the garbage bin is being fill using ultrasonic sensor we can get the volume occupied and left in the smart garbage bin. Ultrasonic distance measuring sensors provide information on an absolute position of target or moving object. For glossy surfaces, transparent objects or in environments with high degree of dust and humidity, ultrasonic technologies are often the only alternative to mechanical probing.

- *Garbage Classification*

This system a dry waste a wet waste separately for that we are using a moisture sensor if that sensor detected then the cap will open for dry waste.

- *Web Application*

After filling the dustbin, we will send a message to web application.

LITERATURE SURVEY

[1] Monika K A, NikithaRao, Prapulla S B and Shobha G, Smart Dustbin-An Efficient Garbage Monitoring System, International Journal of Engineering Science and Computing, Volume 6 Issue No. 6, June 2016, 7113- 7116.

Garbage Monitoring system, which monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. It shows the System Architecture, in which system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The proposed

system uses Arduino family microcontroller (The LPC2131/32/34//38 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with real-time emulation), LCD screen, Wi Fi modem (The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interface) for sending data and a buzzer, GSM (used to send message to the garbage depot if the Garbage Can exceeds the set threshold level) Ultrasonic Sensor (Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to reflect back. IOT Based Smart Garbage Monitoring System, in which dustbins are interfaced with microcontroller based system having Ultra sonic sensors with wireless systems. These wireless systems central system showing current status of garbage, on mobile web application with connected via Wi-Fi. This proposed system implemented using ultrasonic sensor (also known as transceivers when they both send and receive, also work on a principle similar to radar or sonar, which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively), microcontroller (AT89S52 was used and designed with static logic for operation down to zero frequency and supports two software selectable power saving modes) and Wi-Fi module. A network is established using wireless sensors, which are placed in the garbage bin, set at a particular level. Sensors will send a signal to the nearest vehicle driver if the level of garbage is crossed to set level. It shows the Architectural Diagram, which consists major three modules; Sensor Module, in which sensors are used to sense the garbage levels once and connected to the Arduino board, Communication Module, in which Bluetooth is used for communication between the sensors and Arduino Uno board, and last module is Analysis and Monitoring Module, in which collected is sent to the admin for analysis.

[2] Parkash and Prabu V, IoT Based Waste Management for Smart City, International Journal of Innovative

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Communication Engineering, Vol. 4, Issue 2, February 2016, 1267-1274.

IOT Based Smart Garbage Monitoring and Air Pollution Control System, in which system monitors the garbage bins and informs about the level of garbage via a web page. It shows the block diagram of proposed system. In this system two ultrasonic and two gas sensors are used for level of garbage and harmful gases in the air respectively. Sensors are connected to the AVR family microcontroller (ATmega328) which is interfaced with LCD display which shows the status of bins and Wi-Fi module (ESP8266) is used to transmit data for webpage applications, which is a self-contained SOC with integrated TCP/IP protocol stack.

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LIMITATIONS

Decomposition of Garbage in dustbin produces roughly 50 percent methane (the primary component of natural gas), 50 percent carbon dioxide (CO2) and a small amount of non-methane organic compounds. If decomposition starts then it attracts flies and vermin, and has the potential to add biological oxygen demand (BOD) to the leachate. So we need to detect these gases.

CONCLUSION

This project work is the implementation of Automatic smart garbage monitoring system system using Ultrasonic sensor, Arduino Uno, Buzzer and Wi-Fi module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. It will take power supply with the help of Piezoelectric Device. If the dustbin is not cleaned in specific time, then the record is sent to the Sweeper or higher authority who can take appropriate action against the concerned contractor. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the Automatic Smart garbage monitoring system makes the garbage collection more efficient.

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