SMART WASTE MANAGEMENT SYSTEM USING IOT FOR SMART CITIES

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Abstract -: *In our today's generation the primary and the important problem for our country is waste management. We can observe this anytime that the garbage bins placed at public places in the service of people are many times overloaded making the place look unhygienic with bad smell which can cause many hazardous diseases. To avoid this condition and in concern with the public health and cleanliness of surrounding we are designing "IOT based waste management for smart cities". This paper puts forward the design of the system that can show the real time status of all the dustbins located around the city is checked and accordingly the embedded device which helps in measuring the level of the garbage generates the alert signal. When the level of the garbage will reach its maximum limit the signal will be send to the concern authorities with the help of the internet and cleaning of dustbin will be made in action. An android application for mobile and web server for municipality use is also made where the status of each dustbin can be checked and verified before the next cleaning process.*

***Key Words*: Aurdino UNO, Ultrasonic sensor HCsr04, Wifi module ESPN8266, Temperature sensor LM35, Gas sensor MQ4.**

1. INTRODUCTION

As we are moving forward in the new Era, we need new ways to keep our cities clean. Our country comes under the category of developing nations. however, there are still some things lacking in our progress and one of the main issue is management of waste. As we are well aware of the new government plans of "Swachh Bharat Abhiyan" there are many innovative ways to contribute in this mission. And also, there is huge increase in population continuously and so in the needs of the people and in return which causes more waste disposal. There are many dangerous problems that can arise due to improper waste management like health issues, spreading of diseases, air pollution, toxic gases creating respiratory problems. As we know that it is hard for MNC to take care of garbage in a city area at regular interval of times. It is unknown to the garbage disposal company and municipal corporation of the city that how much the garbage bins are filled and which one needs to be picked up first or which ones are empty.

Our project is a needed solution of this problem.in this project we have made a monitoring module which will calculate that how much the bin is filled and does it need to carry out. It will measure the level of garbage in the bin and continuously send the signal to the web server and the data

can be also seen by the mobile application. The server will keep track of it in every microsecond. the mobile application will have two login, one for the driver of MNC and the other for the common people or users. If the maximum limit is shown of the garbage of any dustbin then the driver assigned for that area for garbage collection will get a notification on his mobile for cleaning of that particular dustbin.

2. LITERATURE SURVEY

After the IOT field found its grip in our lives. This is a modern plan for designing a smart garbage bin one by one very well within the following sections. The main controller that is the aurdino ATmega 328 microcontroller primarily based board. It operates on 16 Mhz clock frequency. Its operational frequency of 5V and input voltage as 7-12V. It consists of total fourteen digital I/O pins and analog I/O pins. ATmega 328 has 32kb of nonvolatile storage 5KB memory is employed by boot loader. Aurdino UNO board consists of external power provide reset switch USB plug etc. Aurdino is one of the best designed single board computer and it is easy to be handled by the person who is initially not an expert in the field of electronics.

[1] GARBAGE ALERT SYSTEM USING AURDINO UNO-

Dr. N. Satish Kumar: This paper proposes a smart alert system for garbage clearance by giving an alert signal to the municipal webserver for instant cleaning of dustbin with proper verification based on level of garbage filling. The whole process is upheld by an embedded module integrated with RFID in addition to this a GSM module is also interfaced.

3. COMPONENT DESCRIPTION

AURDINO UNO

Arduino UNO is the microcontroller is used here. It can be easily communicate with computers. The Atmega328p is microcontroller based on a 8-BIT AVR RISC. 32 kb flash memory is provided here with read-write capabilities. Also a 1 kb EPROM and 2 kb SRAM is provided. It has 23 general purpose I/O lines, three flexible timer/counters also internal and external interrupts, 32 general purpose working registers, also a serial programmable USART, 2-wire serial interface, SPI serial port and 6-channel 10-bit A/D convertor.

ULTRASONIC SENSOR HCSR04

The Ultrasonic Sensor sends frequency sound pulse of high range and then measures the time taken by the sound to reflect back. The front side of the sensor has 2 openings. Ultrasonic wave is transmitted by one opening and received by the other. The distance of the object is calculated by the difference between sending and receiving sound pulse. Here, HC-SR04 ultrasonic sensor is used which provides non-contact measurement function of 2cm to 400cm.

GAS SENSOR
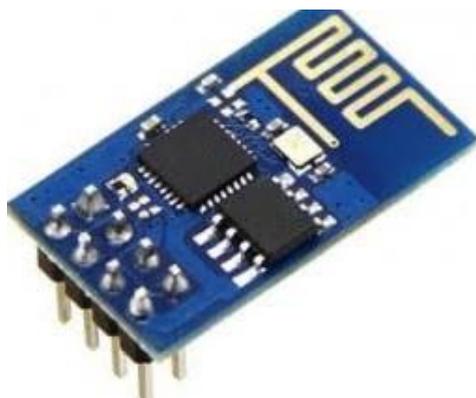
Different types of gases present around the air is detected by gas sensor. Here, it is used to detect or sense the harmful gases present around the dustbin and shows the % of harmful gases. It is cheap and has variety of applications like harmful gases detection.

TEMPERATURE SENSOR LM35

1 4-20V
2 OUT
3 GND
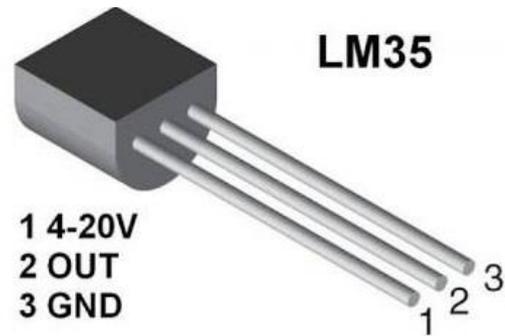
LM35 is a temperature sensor where its output proportional to the temperature. Oxidation and other processes are not carried out here as the sensor circuitry is sealed. LM35 measures more accurate temperature as compared to thermistor.

WIFI MODULE ESPN8266

The ESP8266 WiFi Module is used here. It has integrated TCP/IP protocol stack with self- contained SOC which easily gives any microcontroller access to your WiFi network. The ESP8266 can host an application or offload all Wi-Fi networking functions from another application processor.

4. WORKING

As we can see from the above diagram its divided in following parts:

1. Garbage monitoring module
2. Web server
3. Mobile application

The monitoring module will exchange signal with the sensors and sends the data to the server and mobile application. The monitoring module consist of Aurdino , ultrasonic sensor, temperature sensor, gas sensor, wifi module. The ultrasonic sensor will measure the level of the garbage comparing it with the height of the bin. Temperature sensor will help in detecting the temperature higher than the predefined temperature and Gas sensor will detect the toxic gases produced which can be harmful for the living creatures. These sensors will work accordingly and aurdino will read the data from all the sensors and then it will transmit this data to the web server using Wi-Fi.

The web page here is made to show the real time status of the garbage in the dustbins to the user monitoring it. The web page will have access only by the municipal corporation people and it will be showing the graphical representation of all the dustbins and all the data related to its condition. As soon as the level of the garbage, temperature or smell will rise above the set limit, the web page will generate alert notification for that specific dustbin demanding cleaning process.

The mobile application has two logins, one is driver login which can be used by the drivers of municipal corporation to check the status of the bins and also they will be getting notifications on that application by the web page admin. Another is the user login which is made for the use of common people to know the locations and status of the bins placed in their area.

5. CONCLUSION

The main aim of this project is to maintain the hygienic and dirt-free environment in the city which in turn creates an environment for better living. By implementing this project in real time basis, it assures the improved database for garbage collection time and waste management amount at each location. It also improvises the cleaning of the garbage bins until it reaches its maximum. If the respective bins are not emptied in the allotted time then all the record is sent directly to the higher authority then they can take appropriate actions accordingly against the allotted contractor. This system also helps to monitor and additionally helps to observe the fake reports and thereby one cannot deny. By implementing this system, it will also set a cut back against the corruption in the overall management system. This in turn reduces the entire journeys of garbage loaded vehicle which ultimately minimizes the expenditure. Also, it helps to keep cleanliness within the society. Therefore, the sensible garbage management system makes the waste assortment additional economical.

6. REFERENCES

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