

Smart Dustbin



B.Rajapandian, K.Madhanamohan, T.Tamilselvi, R.Prithiga

ABSTRACT--- *An exponential increase in Human population possess a huge challenge to garbage management system and hence in sustaining a clean Environment. Many Cities around the World are endangered due to poor garbage management. Our project aims to find a solution by using a Smart Dustbin which is GSM and GPS enabled. It employs an ‘Ultrasonic Sensor’ to prevent overflow of garbage from the dustbin and a ‘Gas sensor’ to sense the presence of bad odour and ensures timely disposal of the unhygienic contents of the Dustbin. Thus our project aims at prevention of overflowing garbage from the dustbin and also ceasing unhygienic condition from prevailing near it. Thus our project aims to have an effective and efficient garbage disposal system.*

Keywords- *Ultrasonic sensor, Arduino-UNO ,gas sensor, GSM module ,GPS modem, mobile.*

I. INTRODUCTION

Solid waste management has become an ever lasting problem due to the population explosion and under this scenario it is a tough call to have a clean environment . In many cities around the World Garbage bins or Dustbins are dumped beyond their capacity and they tend to be ineffective. As the place gets dirtier. Modern techniques for better solid waste segregation, collection and disposal is the need of the hour.

II. OBJECTIVES

The salient feature of this method is to build a clean environment and to empower the “SWACHH BHARATH” Mission.

Revised Manuscript Received on August 30, 2019.

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III. EXISTING SYSTEM

In existing method the ULTRASONIC SENSOR and MOTION SENSOR is used .Automatic lid opening and closing method is used in smart dustbin and microcontroller programming is done in th system.

IV. PROPOSED SYSTEM

One of the sensor uses an Ultrasonic signal to monitor the level of garbage in the dust bin and If the level exceeds the set point a warning signal is sent to the concerned Authorities based on an Arduino program and another sensor senses the odour around the dust bin. Thus an hygiene environment is maintained. GSM module and GPS modem are used for signal transmission and for tracking the location respectively.

V. DESIGN SPECIFICATIONS

The Controller employed here is the Arduino unit that receives the measurement signals from the two sensor units and in turn sends command signals to the concerned authorities for the requisite actions to be taken for effective solid waste management. Two Arduino units are employed here with one being a Master unit and the other being a slave unit. Master unit are capable of receiving the input signals while the slave unit receives the command.



Ultrasonic Sensor:

The Electromagnetic signals transmitted by the Ultrasonic sensor are reflected back by the garbage whose level relative to the height of the dustbin need to be measured. The difference in time between transmission and receiving the signal helps to know the exact level of the garbage in the dustbin andl “HC SR-04” sensor is employed in our model.



Gas Sensor:

A gas sensor or an Odour detector consists of a sensing element that responds to the volatile nature of the garbage being collected and thus provides an electrical output which can be used to know the odour prevailing around the dustbin.



Gsm Module:

GSM Module is the Standard used for Communication and interfaces a terminal and another GSM system. The entire signal transmission and receiving of signals from the controller to other device and to the controller from other device is achieved by the GSM system.



Gps Module:

The GPS system in our model helps in locating the various garbage filling points in a locality. As the garbage inside a particular dustbin in a locality gets filled to an alarming level the Controller aided by the dustbin sends a command or warning signal to the required authorities aided by the GPS system.

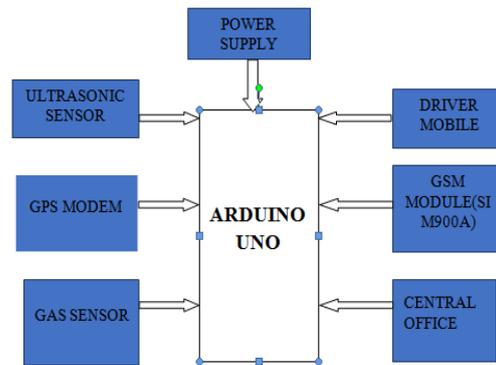


VI. METHODOLOGY AND WORKING

This method is proposed to make the city clean and neat. In this method the Ultrasonic sensor senses the level of the garbage in the dustbin and as it reaches alarming levels a message is sent to the concerned authorities. In some cases the level is not full but it causes some bad smell in that situation also the dustbin needs to be cleaned and it is detected by using gas sensor and it will send message to the registered mobile number these interfaces are connected to the ARDUINO.

VII. BLOCK DIAGRAM

The block diagram for smart dustbin is represented as



VIII. IMPLEMENTATION & RESULTS

Arduino program:

```
#include <SoftwareSerial.h>
SoftwareSerial sms(4,5);//RX,TX
char str[70];
String gpsString="";
char *test="$GPGGA";
String latitude="No Range ";
String longitude="No Range ";
int i;
boolean gps_status=0;
int gaspin=A0;
const int trigPin = 2;
const int echoPin = 3;
long duration;
int distance;
int a=1;
```



```

int b=1;                                }
void setup() {                          }
pin Output                              if(distance>28)
pin Mode(echoPin, INPUT); // Sets the echoPin as an Input {
Serial.begin(9600); // Starts the serial communication   Serial.println("LOW");
sms.begin(9600);                                       delay(1000);
}                                                    }
void loop() {                                       if(gas>300)
  Serial.print("Latitude:");                       {
  Serial.println(latitude);                       Serial.println("GAS DETECTED");
  Serial.print("Longitude:");                     if (b==1){
  Serial.println(longitude);                     gasmsg();
int gas=analogRead(gaspin);                       delay(1000);
Serial.print("GAS: ");                             b=0;
Serial.println(gas);                               }
digitalWrite(trigPin, LOW);                       }
delayMicroseconds(2);                             if(gas<300)
digitalWrite(trigPin, HIGH);                       {
delayMicroseconds(10);                             Serial.println("NO GAS DETECTED");
digitalWrite(trigPin, LOW);                         delay(1000);
duration = pulseIn(echoPin, HIGH);                 }
distance= duration*0.034/2;                       }
Serial.print("Distance: ");                       void full()
Serial.println(distance);                          {
if(distance < 8 && distance !=0)                   get_gps();
{
  if (a==1)
  {
    full();
    delay(1000);
    Serial.println("FULL");
    a=0;
  }
  sms.println("AT+CMGF=1"); //Sets the GSM Module in
  Text Mode
  delay(1000); // Delay of 1000 milli seconds or 1 second
  sms.println("AT+CMGS=\"+919445846498\"r"); //
  Replace x with mobile number
  delay(1000);
}
}

```

Smart Dustbin

```

sms.println("DUST BIN FULL");// The SMS text you
want to send

delay(100);

sms.print("Latitude:");

sms.println(latitude);

delay(500);

sms.print("Longitude:");

sms.println(longitude);

delay(500);

sms.println((char)26);// ASCII code of CTRL+Z

delay(1000);

}

void gasmsg()

{

get_gps();

sms.println("AT+CMGF=1"); //Sets the GSM Module in
Text Mode

delay(1000); // Delay of 1000 milli seconds or 1 second

sms.println("AT+CMGS=\"+919445846498\"\\r");//
Replace x with mobile number

delay(1000);

sms.println("GAS DETECTED");// The SMS text you
want to send

delay(100);

sms.print("Latitude:");

sms.println(latitude);

delay(500);

sms.print("Longitude:");

sms.println(longitude);

delay(500);

sms.println((char)26);// ASCII code of CTRL+Z

delay(1000);

}

```

```

void gpsEvent()

{

gpsString="";

while(1)

{

while (Serial.available(>0) //checking serial data
from GPS

{

char inChar = (char)Serial.read();

Serial.print(inChar);

gpsString+= inChar; //store data from GPS
into gpsString

i++;

if (i < 7)

{

if(gpsString[i-1] != test[i-1]) //checking for
$GPGGA sentence

{

i=0;

gpsString="";

}

}

if(inChar=='\\r')

{

if(i>65)

{

gps_status=1;

break;

}

}

else

{

i=0;

```

```

}
}
}
if(gps_status)
break;
//break;
}
}

int l1=latitude.length();
latitude[l1-1]=' ';
l1=longitude.length();
longitude[l1-1]=' ';
i=0;x=0;
str_lenth=0;
delay(2000);
}
}
}

```

```

void get_gps()
{
gps_status=0;
int x=0;
while(gps_status==0)
{
gpsEvent();
int str_lenth=i;
latitude="";
longitude="";
int comma=0;
while(x<str_lenth)
{
if(gpsString[x]==' ')
comma++;
if(comma==2) //extract latitude from string
latitude+=gpsString[x+1];
else if(comma==4) //extract longitude from string
longitude+=gpsString[x+1];
x++;
}
}
}

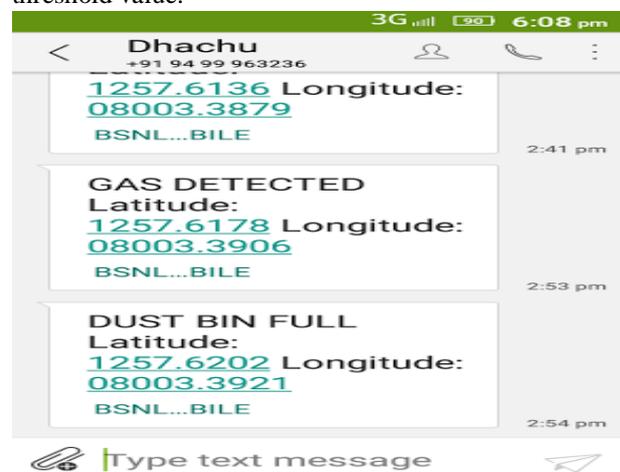
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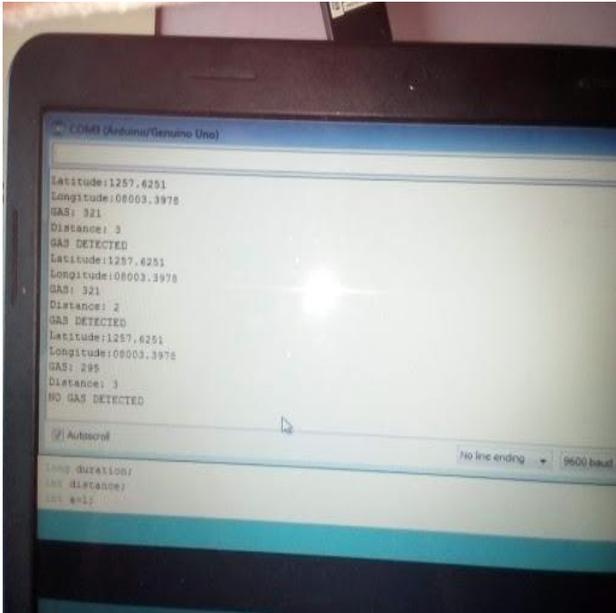
IX. CONCLUSION

The proposed model ensures that the solid waste management is done in an effective manner. The effectiveness lies in the fact that the real time monitoring of solid waste management helps in timely removal of garbage and prevention of any harmful waste from harming the environment. The usage of advanced Controller in the form of Arduino along with GSM and GPS enabled system enhances the effectiveness of the overall solid waste segregation, collection and disposal system. Thus the smart dustbin can play a major role in accomplishing a clean and green environment.

X. TEST RESULT

The ultrasonic sensor is giving the details about the waste present in the dustbin. The status of the waste is transferred to the municipal authority whenever it is exceeding the threshold value.





XI. FUTURE PLANS

Smart dustbin can be improvised to a large extent to include automatic segregation of different waste into biodegradable and non-biodegradable wastes so that a major issue hampering the solid waste management system can be resolved. With further improvement mechanism to shoo away animals and birds from feeding and polluting the environment can be done. Thus these measures can reduce Human cost involved and helps in reducing the overall cost of solid waste management aided by solid waste segregation at source itself and also by reducing the spread of pollution to a great extent. Moreover from a social point of view the persons involved in garbage collection, segregation and disposal will be prevented from being infected and paves the way for their healthy well-being.

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