International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 11 | November - 2022 Impact Factor: 7.185 ISSN: 2582-3930

# Design and Manufacturing of Automation in Residential Building for Waste Collection

**S. N. Gadhave[1 2],Dr. Mukesh Kumar Gupta[1], Dr. Niraj Kumar[1], Dr. B.R.Borkar[2], H. P. Pathade[1 2], P. B. Wakchaure[1 2], M. P. Pathade[1 3], Dr. A. V. Markad[2]**

[1] Suresh GyanVihar University, Jaipur, Rajasthan, India
[2]AmrutvahiniCollege of Engineering, Sangamner, Maharashtra, India
[3] Tata Technologies, Pune, India

## ABSTRACT

This project is designed for the effective dry and wet waste collection using multistory residential building for apartment. In multistory residential building the amount of garbage produced is too large and the manual efforts required to process it is very tedious with evaluation technology in every field. The waste segregator is designed to provide ease in the disposal of waste that is collected. The system consists of two bins, wet and dry waste bins.

The littering of garbage bins makes serious unhygienic conditions in any type of surroundings. It leads to several health issues. To overcome this problem and make the waste management system more efficient and reliable, we need a smart solution similar to the smart waste management and hence that is designed in this project work.

**Keywords**-Dry and wet waste, disposal, segregator

## 1. Introduction

This project is designed for the effective dry and wet waste collection using in apartment.To overcome this problem and make the waste management system more efficient and reliable, we need a smart solution similar to the smart waste management and hence that is designed in this project work.

The environment should be clean and fresh that leads India for a better life and progress. The wastes formed in India is extremely higher than most of the other developing countries.In the present situation, many times it is observed that the trash bins are placed at open places in the cities are overflowing due to increase in the waste every day. These overflowing garbage bins can produce a nunbearable smell and make an unhealthy environment. These are the signs of rapid growth of bacteria and viruses which can affect different types of diseases. Waste can be solid, liquid, and gaseous and each type has different methods of disposal and management. Waste management deals with all types of waste, containing industrial, biological and household. Waste management is projected to reduce adverse effects of waste on human health, the environment.

The primary way of effective waste management is to make sure proper segregation of waste at source. At present situation, the garbage is collected in most of the municipal corporation in India. The new Government

movement like “Swachh Bharat Abhiyan” provides more awareness on garbage separation in India. The aim of this mission is to clean and cover all the rural and urban areas of the country. Garbage separation doing very vital role to keep dry and wet garbage separately so that different processes-composting, reutilizing shall be applied to different types of garbage.

Household garbage can be transformed into biogas and can be consumed in cooking purpose at home. This will decrease the amount of waste produced by each family, which supports in planning, distributed waste management solutions.

The proposed system shall be beneficial for garbage separation in Residential areas, apartment Institutions, Campuses, Industries, Hospitals, Commercial offices etc.

# 2)Literature Review

### 1) Vikrant Bhor, 2015-

The waste management are engaging cities and the citizens alike in the project of enhancing our waste practices more sustainable (Optimizing garbage collection routes based on actual disposal unit fill levels as measured by unit fill level sensors is one application that, sproving to be impactful today (Asomani-Boateng,2015). Waste management companies track consumption patterns in their service areas based on historical patterns, identify their availability to collect materials and schedule their operations accordingly (Shyam, 2014).

### 2) Dr. Sandeep M. Chaware, Shriram Dighe-

This general practice follows across the industry, from municipal waste management teams to specialized companies that focus on commercial and industrial markets. Smart waste management could turn this model on its head, giving organizations real-time visibility into the status of collection receptacles so they can avoid unnecessary pickups and optimize operations. The news source also highlighted sensors that alert teams to how full containers are, and even vehicles that connect to the internet to access and transmit telematics data are becoming popular.

### 3) Nimisha singh, Prajakta Wagh-

Operational gains are not the only advantage of enabled recycling and waste management solutions (Amoah, 2017). The ability to embed connected technologies intoreceptacles is also allowing for the use of artificial intelligence, machine learning, and cameras to eliminate some long-standing problems in the recycling industry. Smithsonian reported that emerging recycling bins using computer vision can process the type of material placed in the container and automatically sort it. This simultaneously eliminates human error and makes it much easier for downstream recycling.

## 3. Objective

To main objective to suggest for garbage monitioring and control system for multistory residential building. The following are important points regarding these objectives of study-

a. The main objective is to maintain the level of cleanliness in the city and forman environment which is better for living.

b. Monitors the garbage bins and informs about the level of garbage collected in the garbage bins.

c. To keep our Environment clean & green.

d. The cost & effort are less in this system.

e. Sorting dry and wet garbage by using moisture sensor.

## 4. Problem Definition

The rapid growth in the population has also led to the surge in the volume of waste being generated on a daily basis. This increase in the generation of waste due to continuous growth in the urbanization and industrialization has become a severe problem for the local and the national government. It is also posing a serious problem for the local authorities to manage the wastes being dumped everywhere as landfill. To ensure the minimal risk to the environment and human health, it is necessary to take meticulous measures when segregating and transporting waste. Segregation of waste in a proper manner brings to the limelight actual economic value of the waste.

The traditional method used for segregating of waste in India is through rag pickers which are time-consuming and can have adverse effects on the health of the people who are exposed to such wastes. Here we propose the use of an Auto Waste Segregator (AWS) which is cheap and also an easy to use solution for segregation of household waste. It is designed to segregate the waste into two categories dry and wet waste. The system makes use of moisture sensor for the segregation of wet and dry waste and LCD display for displaying the result of segregation. It is evident from experimental reports that segregation of waste using AWS has been successful.

It is the responsibility of the urban local body to ensure segregation of waste at source as per the Municipal Solid Waste (MSW) Rules, 2015. This means the body must get citizens to segregate waste at the household level and then ensure that this segregated waste wet and dry, compostable and recyclable is collected separately and transported separately for processing.

# 5. Design

## 5.1.Design

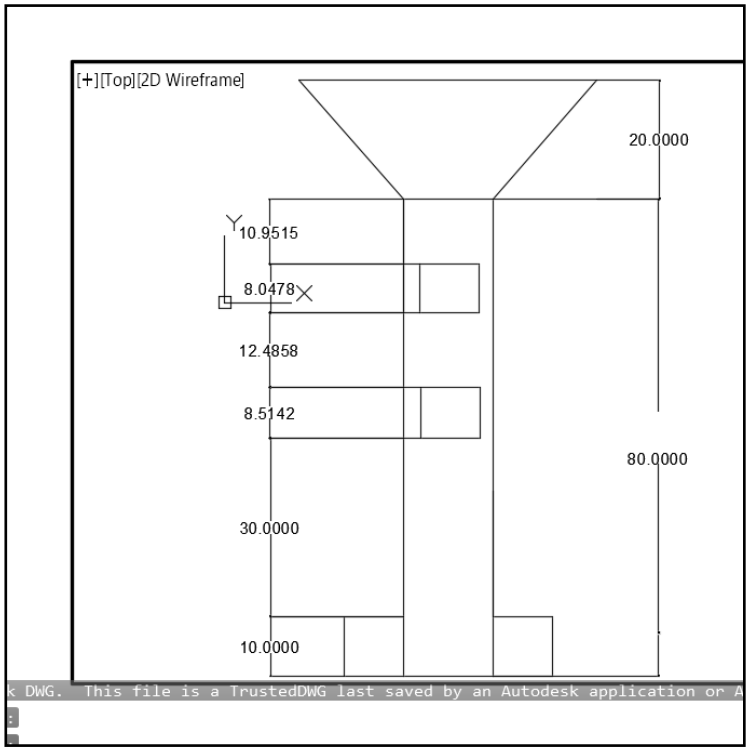


**Fig.5.1Design**

## 5.2Project 3Dfigure

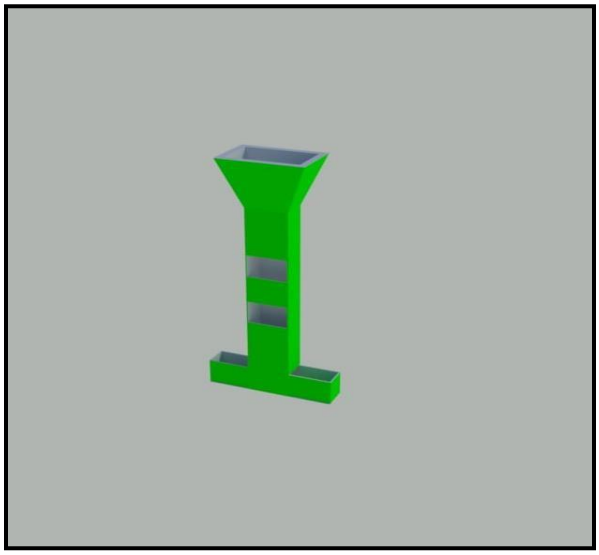

**Fig.5.2.Project3Dfigure**

### 5.3. Photograph

**Fig5.3.Photograph**

### 5.4. Calculation

1) Window 1-

l=10cm, b=8cm

Area of window= l*b = 10*8 = 80cm$^2$

2) Window 2-

l=10cm, b=8cm

Area of window= l*b =10*8 =80cm$^2$

3) Dry dust-bin-

l=15cm, b=10cm, h=10cm

Area of dust bin= l*b*h= 15*10*10= 1500cm$^2$

4) Wet dust-bin-

l=15, b=10, h=10

Area of dust bin= l*b*h= 15*10*10= 1500cm$^2$.

5) Overall area-

l=15, b=15, h=100
Area of overall= l*b*h= 15*15*100= 22500cm$^2$

## 6. Component

6.1. Power supply

6.2. DC Motor

6.3. IR Sensor

6.4. Moisture Sensor

6.5. Ultrasonic Sensor

6.6. Relay

6.7. Transformer

6.8. Capacitor

6.9. LED Indication

6.10. Microcontroller

6.11. Piezo-electric buzzer

6.12. Resistor

### 6.1. Power Supply-

A power supply is the backbone of electronic system. Power supply provides electric current to the component. Power converts alternating current (AC) to direct current (DC) power supplies. We use 10-12 v power supply in our project. It is mainly used to provide DC voltage to the component.
Almost all electronic circuits require a DC source for power supply unit may be defined as a piece of equipment, which converts the alternating waveforms from the power lines (AC supply) into an essentially direct voltage. A rectifier with filter gives out unregulated supply, An unregulated power – supply consists of a transformer, a rectifier, and filter circuit. There are three reasons why such a simple system is not good enough for same.

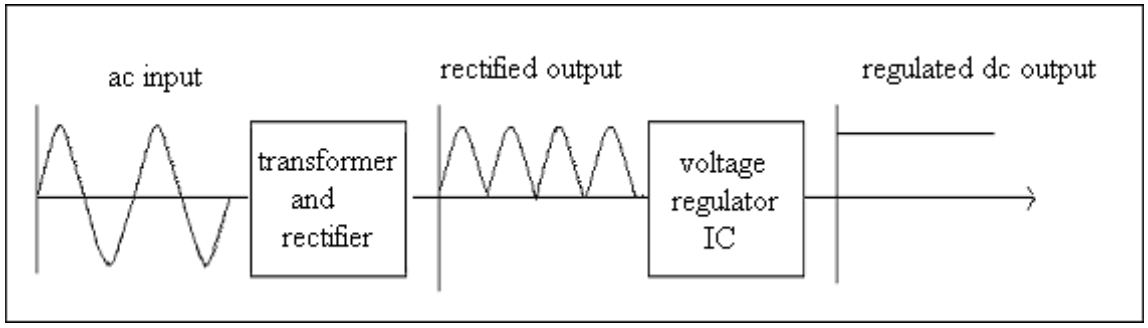


**Fig6.1-Powersupply**

1) The first is its poor regulation i.e. the output voltage is for from constant as the load varies.

2) The second is that the D.C output voltage varies with the A.C input directly in many locations the line voltage for nominal value 230 v may vary as wide a range as 150v to 270v and yet it is necessary that the D.C voltage remains essentially constant.

3) The third is that the D.C voltage varies with temperature particular if semi-conductor devices are used.

### 6.2. DC motor:

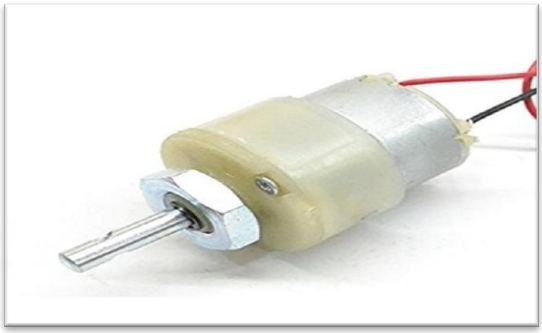

**Fig6.2DC Motor**

A DC motor is an electrical machine which converts electrical energy into mechanical energy. The basic working principle of the DC motor is that whenever a current carrying conductor places in the magnetic field, it experiences a mechanical force. A direct current motor is fairly simple electric motor that uses electricity and magnetic field to produce torque which turns the rotor and hence give mechanical work. The basic working principle of the DC motor is that whenever a current carrying conductor places in the magnetic field, it experiences a mechanical force. We can use the speed of motor is 30 RPM and 12 v DC current.

**Fleming's Left Hand Rule**:

If we stretch the first finger, second finger and thumb of our left hand to be perpendicular to each other, and first finger represents the direction of the magnetic field, the second finger represents the direction of the current, then the thumb represents the direction of the force experienced by the current carrying conductor. DC motor used for various applications like robotics, momentary projects etc. The output shaft has a hold for best mounting for wheels and pulleys.

Specification:

- Output RPM: 100 rpm
- InputVoltage: 6-12V
- Stall Current: 500 -600mA
- Shaft length: 2.4cm
- Shaft diameter: 6mm with internal hole
- Motor weight:~100gms

### 6.3. IR Sensor

Proximity Sensor are used to detect objects and obstacles in front of sensor. Sensor keeps transmitting infrared light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contactless tachometer by measuring RPM of rotation objects like fan blades.

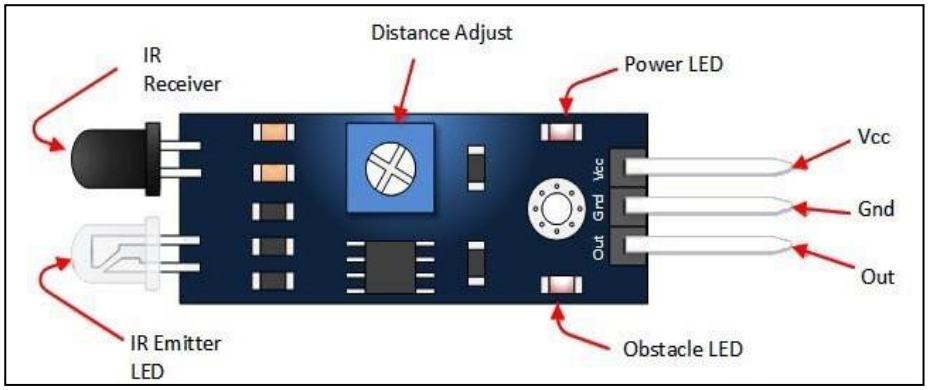


**Fig.6.3IRSensor**

**Applications**

- Proximity Sensor
- Obstacle Detector Sensor.

### 6.4. Moisture Sensor

The purpose of moisture sensor is used to detect whether the substances are wet and dry. This sensor uses two probes to pass current trough the substance, and read the resistance to get the moisture level. We use the 4-5v DC current is required.

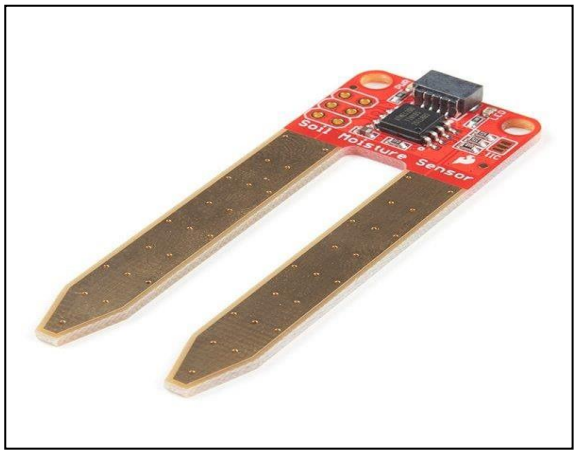


**Fig.6.4MoistureSensor**

### 6.5. Ultrasonic Sensor

Ultrasonic ranging module HC-SR04 provides 2cm-400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:

1. Using IO trigger for atleast 10 us high level signal,
2. The Module automatically sends eight 40kHz and detect whether there is a pulse signal back.
3. IF the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning.


**Fig 6.5 Ultrasonic Sensor**

### 6.6 Relay:

A relay driver circuit is a circuit which can drive, or operate, a relay so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close, according to the needs of the circuit and its operation. In this project, we will build a relay driver for both DC and AC relays. Since DC and AC voltages operate differently, to build relay drivers for them requires slightly different setup. We will also go over a generic relay driver which can operate from either AC or DC voltage and operate both AC and DC relays.

Now that we're using a transistor to drive the relay, we can use considerably less power to get the relay driven. Because a transistor is an amplifier, we just have to make sure that the base lead gets enough current to cause a larger current to flow from the emitter of the transistor to the collector. Once the base receives sufficient power, the transistor will conduct from emitter to collector and power the relay. With no voltage or input current applied to the transistor's base lead, the transistor's emitter-to-collector channel is open, hence blocking current flow through the relay's coil. However, if sufficient voltage and input current are applied to the baselead, the transistor's emitter-to-collector channel will close, allowing current to flow through the relay's coil. The benefit of this circuit is a smaller and arbitrary (DC or AC) current can be used to power the circuit and the relay.

Suppose the supply is =12V, the coil resistance is 400 Ohms, then Relay current I=12/400=0.03 or 30 mA. Also the Hfe of any standard low signal transistor may be assumed to be around 150. Applying the above values in the actual equation we get,

R= (Ub-0.6)× Hfe ÷ Relay Current

R= (12 – 0.6)150/0.03

= 57,000 Ohms or 57 K, the closest value being 56 K.

The diode connected across the relay coil thoug his now ay related with the above calculation, it still cannot be ignored. The diode makes sure that the reverse EMF generated from there lay coil is shorted through it, and not dumped into the transistor.

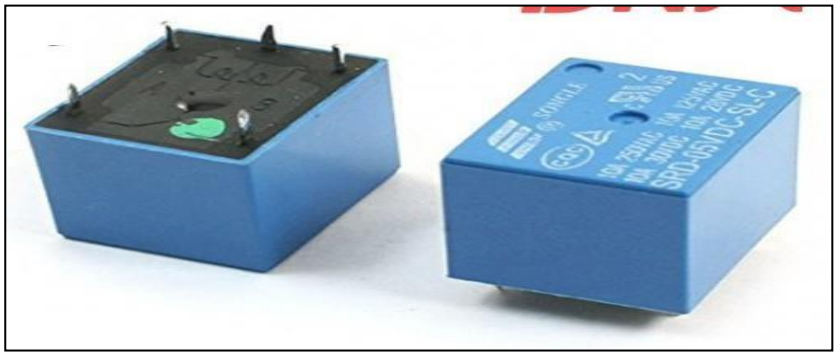


**Fig.6.6. Relay**

### 6.7. Transformer

Transformer is of ten used to reduce the voltage of convential power circuits to operate low-voltage devices and raise the voltage from electric generators so that electric power can transmitted over long distances.

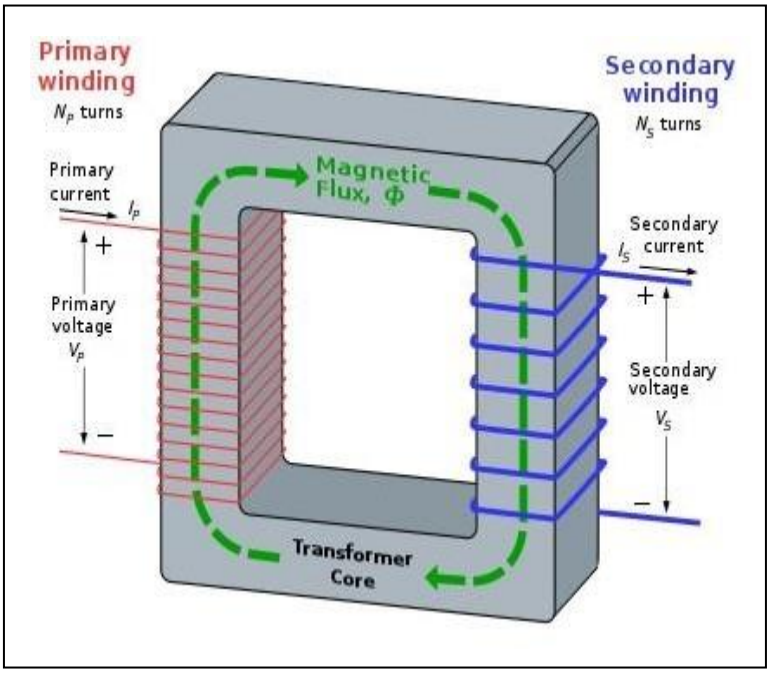


**Fig.6.7. Transformer**

Required o/p voltage will depend upon the Vm rating of transformer Selected step down transformer of rms voltage rating 0-9V/500ma or 0-12V.

### 6.8. Capacitor

Capacitors are commonly used for energy storage in a wide range of electrical devices. Capacitors are devices which store electrical charge. The most common use for capacitors is energy storage.

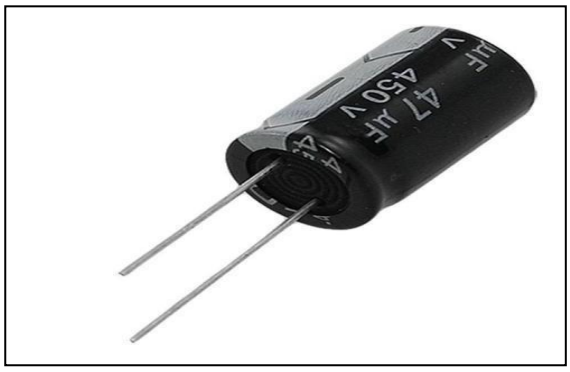


**Fig.6.8.Capacitor**

o/p voltage may have extreme change from 5.5V to 4.5V means capacitor can charge upto 5.5V (V1) and discharge to 4.5V (V2).

0.7V considered as on state drop across diode.

Capacitor will discharge upto 4.5V after 90 degas from the waveform of full wave rectification.
Hence selected capacitor maybe higher than this capacity 2200 uf/ 25V.

### 6.9. LED for Indication

The main function of the LED indicators is to illuminate. Some versionis capable of producing not only continuous but also flashing light.

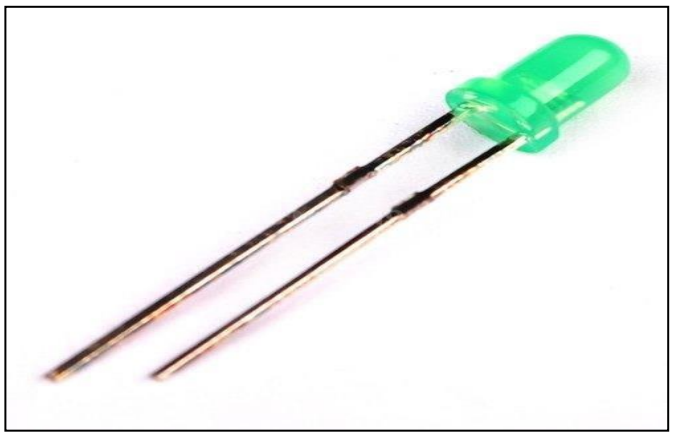

**Fig.6.9 LED Light**

At the output of power supply led in series with 330 for 5 V is connected to indicate the on state of power supply.

### 6.10. Microcontroller

Transformer is a major class of coils having two or more windings usually wrapped around a common core made from laminated iron sheets. It has two cols named primary and secondary. If the current flowing through primary is fluctuating, then a current will be inducted into the secondary winding. A steady current will not be transferred from one coil to other coil.

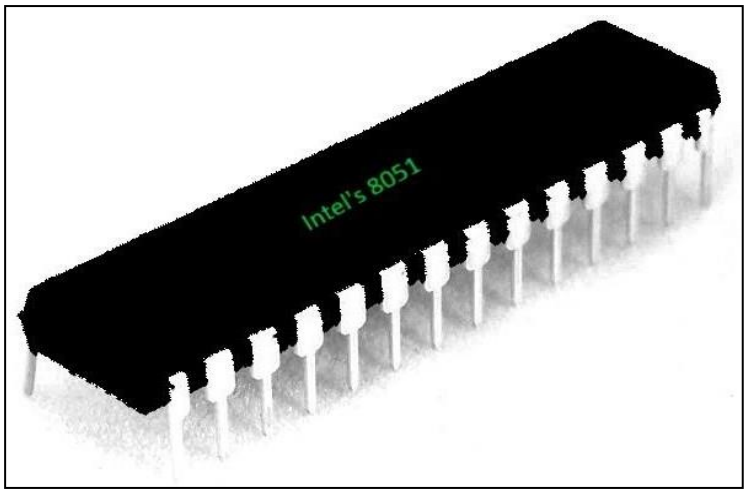


**Fig.6.10. Microcontroller**

### 6.10.1. PIC18F4520

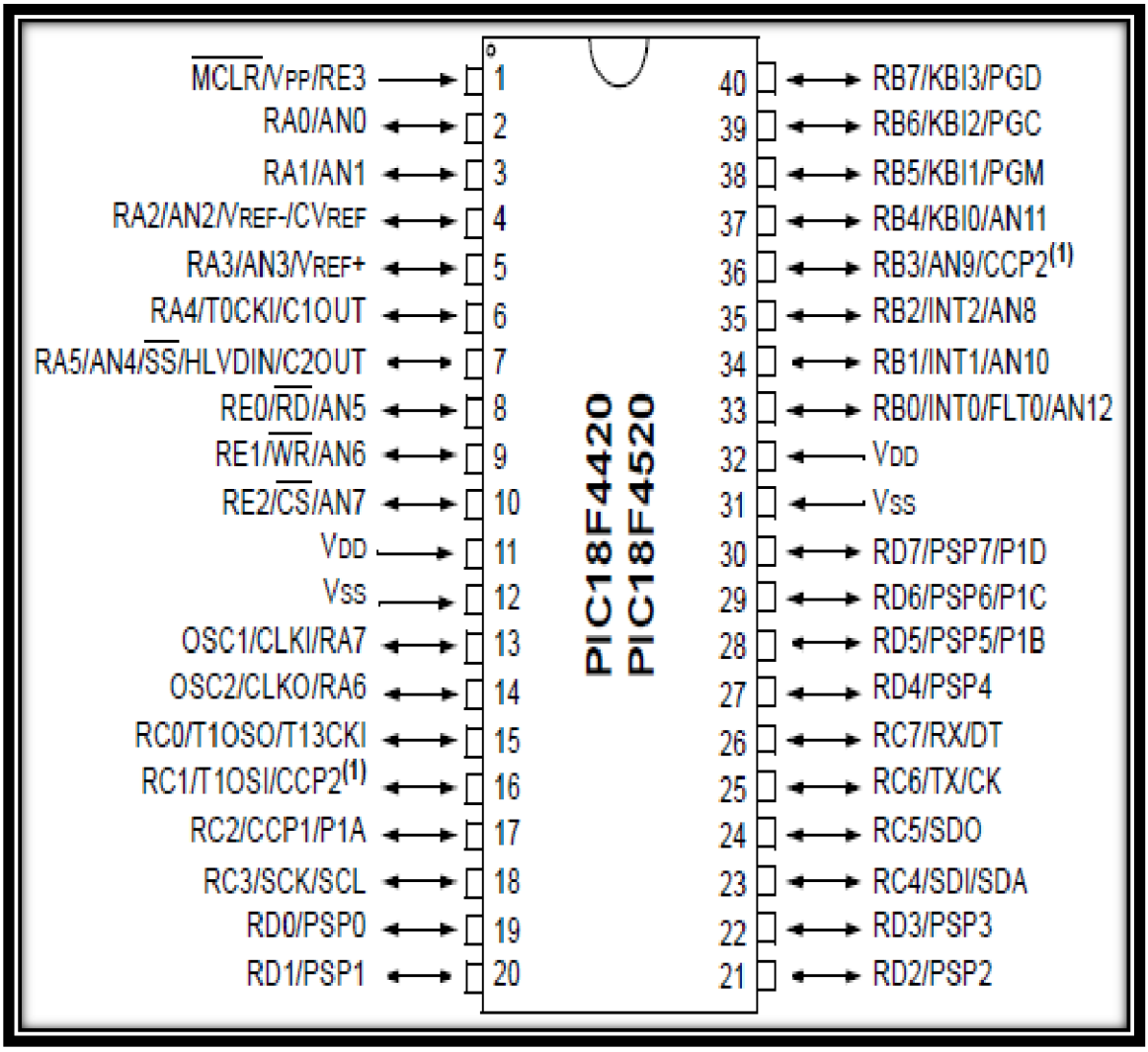


**Fig.6.10.1.PIC18F4520**

It is an 8-bit enhanced flash PIC microcontroller that comes with nano Watt technology and is based on RISC architecture. Many electronic applications house this controller and cover wide areas ranging from home appliances, industrial automation, security system and end-user products. This microcontroller has made are now nedplace in the market and becomes a major concern for university students for designing their projects, setting them free from the use of a plethora of components for a specific purpose, as this controller comes with inbuilt peripheral with the ability to perform multiple functions on a single chip.

- **PIC18F4520** is a PIC microcontroller, introduced Microchip, and mainly used in automation and embedded systems. It comes in three packages known as PDIP, QFN, and TQFP where the first one is 40-pin (mostly used) while other two come with a 44-pin interface.
- This microcontroller version comes with CPU, timers, 10-Bit ADC and other peripherals that are mainly used to develop a connection with external devices.
- This PIC version, like other models in the PIC community, contains everything that is required to make an embedded system and drive automation.
- The PIC18F4520 contains 256 bytes of EEPROM data memory, 1536 bytes of RAM, and program memory of 32K.
- It also incorporates 2 Comparators, 10-bit Analog-to-Digital (A/D) converter with 13 channels, and houses decent memory endurance around 1,000,000 for EEPROM and100,000 for program memory.
- The Enhanced Universal Asynchronous Receiver Transmitter (EUSART) feature is useful for developing the serial communication with other devices.

### 6.11. Piezo-electric Buzzer

This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and require interval. This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and require interval.

**Fig. 6.11. Piezo-Electric Buzzer**

**Specifications**

- Tone type: Single
- Operating Voltage: 3-6V DC
- Rated Voltage: 5V DC
- Current Consumption: 25 mA
- Frequency: 3.2 kHz
- Sound Level: 87dB
- Body Color: Black

Buzzer or beeper is an audio signaling device, which maybe Mechanical, Electromechanical and Piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Early devices were based on an electromechanical system identical to an electric bell without the metal gong. Similarly, a relay may be connected to interrupt its own actuating current, causing the contacts to buzz. Often these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that electro-mechanical buzzers made. The buzzer consists of an outside case with two pins to attach it to power and ground. When current is applied to the buzzer it causes the ceramic disk to contract or expand. Changing this then causes the surrounding disc to vibrate. That's the sound that you hear.

### 6.12. Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, terminate transmission lines.

**Fig6.12 Resistor**

# 7. Program

In this project we use the Embedded C is a set of language extensions for the C Programming language by the C standards committee to address commonality issues that exit between C extension for different embedded systems.

Embedded C programming typically requires non standard extension to the language in order to support enhanced microprocessor features such as fixed point arithmetic, multiple distinct memory banks, and basic input or output operations.

It includes a number of features not available in normal C, such as fixed point arithmetic, named address spaces and basic input and output hardware addressing. Embedded C uses most of the syntax and semantics of standards C, e.g. main() function, variable definition, data types declaration, conditional statement (if, switchcase), loops while, for), functions, array and string, structures and union, bit operation, macros etc.

## 7.1. Program

```
#include <18f4520.h>#DEVICEADC=10
#fuses INTRC_IO, NOPROTECT,BROWNOUT,NOMCLR,NOCPD,NOWDT,NOPUT,FCMEN
#use delay(clock=8000000)//, restart wdt)

#users232(baud=9600,xmit=PIN_C6,rcv=PIN_C7)
#defineBUZZ_ONOUTPUT_HIGH(PIN_A0);#defineBUZZ_OFFOUTPUT_LOW(PIN_A0);
#define RS_HIOUTPUT_HIGH(PIN_B5);#defineRS_LOOUTPUT_LOW(PIN_B5);

#define EN_HIOUTPUT_HIGH(PIN_B4);#defineEN_LOOUTPUT_LOW(PIN_B4);
#define D4_HIOUTPUT_HIGH(PIN_B3);#define D4_LOOUTPUT_LOW(PIN_B3);#define
D5_HIOUTPUT_HIGH(PIN_B2);#define D5_LOOUTPUT_LOW(PIN_B2);#define
D6_HIOUTPUT_HIGH(PIN_B1);#define D6_LOOUTPUT_LOW(PIN_B1);#define
D7_HIOUTPUT_HIGH(PIN_B0);#defineD7_LOOUTPUT_LOW(PIN_B0);

#definetrigg_ON OUTPUT_HIGH(PIN_A1);#definetrigg_OFF OUTPUT_LOW(PIN_A1);
#definetrigg2_ON OUTPUT_HIGH(PIN_A3);#definetrigg2_OFF OUTPUT_LOW(PIN_A3);

#defineRLY1_ON OUTPUT_HIGH(PIN_C0);#defineRLY1_OFF OUTPUT_LOW(PIN_C0);
#defineRLY2_ON OUTPUT_HIGH(PIN_C1);#defineRLY2_OFF OUTPUT_LOW(PIN_C1);
#defineRed1_OFF OUTPUT_HIGH(PIN_A4);#defineRed1_ON OUTPUT_LOW(PIN_A4);
#defineGreen2_OFF OUTPUT_HIGH(PIN_A5);#defineGreen2_ON OUTPUT_LOW(PIN_A5);

#defineRed2_OFF OUTPUT_HIGH(PIN_E0);#defineRed2_ON OUTPUT_LOW(PIN_E0)
#defineGreen1_OFF OUTPUT_HIGH(PIN_C3);#defineGreen1_ON OUTPUT_LOW(PIN_C3);
#definemotor_ON OUTPUT_HIGH(PIN_D3);#definemotor_OFFOUTPUT_LOW(PIN_D3);
#definemotor2_ON OUTPUT_HIGH(PIN_D2);#definemotor2_OFF OUTPUT_LOW(PIN_D2);
int8y=0;

int16uiGas_adc=0;int8ucvar1 =0;
```

```
int8 i = 0;

int16 ui1SecCNT = 5;//11;int16 uiVltg=0;
int8ucRxTimOut = 0;int16 uimoistadc = 0;
int16 ui4SecCNT = 0;int8 ucmetalf = 0;//1;//10;
int8ucdisplayf=0; int16 ui10SecCNT = 0;
int16 ui2SecCNT = 0;int16uiLcd10Sec=80; int8ucuser_f=0;

BYTECONSTucWelcm_1_Array[17]        ="IOT BASEDWASTE";//22
BYTECONSTucWelcm_2_Array[17]        ="MANAGEMENTSYSTEM";//23

   BYTECONSTucCITY1_Array[17]   ="DRYBIN:     %     ";//25
   BYTECONSTucCITY2_Array[17]   ="WETBIN:     %     ";//25
#INT_TIMER1

voidtimer1_int()

{

SET_TIMER1(40536); // timer of 200ms//;//40536); // timer of
200ms//(64286);//10msectimer//(64911);1msec
if(ui1SecCNT>1)

{

ui1SecCNT--;

}

if(ui4SecCNT>1)

{

ui4SecCNT--;

}

if(ucRxTimOut>1)

{

ucRxTimOut--;

}

}

voidmain(void)

{

//int8ucVar =0;
```

```
SETUP_ADC (ADC_OFF);                    //disable ADC i/p SETUP_ADC_PORTS(NO_ANALOGS);
                                        //disable analog i/p setup
comparator(NC_NC_NC_NC);SETUP_CCP1(CCP_OFF);
SET_TRIS_A(0x44);//01100110

SET_TRIS_B(0x00);//00000111

SET_TRIS_C(0x80);//10000010

SET_TRIS_D(0xF3);//11110011

SET_TRIS_E(0x06);//00000111


SETUP_TIMER_1(T1_INTERNAL|T1_DIV_BY_8);//enablestimer1SET_TIMER1(40536); // timer of
200ms(64286);//10msecenable_interrupts(INT_RDA);ENABLE_INTERRUPTS(INT_TIMER1);ENABLE_I
NTERRUPTS(INT_EXT);


setup_ccp1(CCP_PWM);//ConfigureCCP1asaPWM


setup_timer_2(T2_DIV_BY_16, 30, 1);//(1/10000000)*4*16*32= 204.3 us or 3.1 khzset_pwm1_duty(0);//ok
INIT_LCD();


ENABLE_INTERRUPTS(GLOBAL);

//ENABLE_INTERRUPTS(GLOBAL);RLY1_ON;
RLY2_ON;

Red1_ON; Red2_ON;

Green1_ON;Green2_ON;
BUZZ_ON;

delay_ms(500);BUZZ_OFF;RLY1_OFF;RLY2_OFF;
Red1_OFF;Red2_OFF;Green1_OFF;Green2_OFF;
uiLcd10Sec=30;
ui1SecCNT=100;

LCD_WRITE_Const_ARRAY(1,0,15,16);//BlankLCD_WRITE_Const_ARRAY(2,0,16,16);//Blank

ucSmsNo='1';

for(ucArrPtr=0;ucArrPtr<77;ucArrPtr++)
```

```
{
ucRxARR[ucArrPtr]=0;
}
ucdisplayf=1;
index=0;
ucvar1=70;
ui1SecCNT=700;
ucsel_hi=1;
ucpowerf=1;
uc2ndpowerf=1;
uiLcd10Sec =
30;LCD_WRITE_Const_ARRAY(1,0,17,16);//BlankLCD_WRITE_Const_ARRAY(2,0,18,16);//BlankRed1_
OFF;
Red2_OFF;Green1_ON;Green2_ON;while(1)
{
if(uiLcd10Sec==1)
{
uiLcd10Sec=50;INIT_LCD();
LCD_WRITE_Const_ARRAY(1,0,17,16);//BlankLCD_WRITE_Const_ARRAY(2,0,18,16);//Blank
}
Get_Key();if(INPUT(PIN_D0)==0)
{
RLY1_ON;
RLY2_OFF;
}
elseif(INPUT(PIN_D1)==0)
{
RLY2_ON;
RLY1_OFF;
}
else
```

```
{
RLY1_OFF;RLY2_OFF;
}
trigg_ON;delay_us(10);
trigg_OFF;delay_ms(7);
ADC_CALL(2);//water leveluiprev_xaxis=current_adc_val;
Show_Float_No_ONLine_At_Offset_IntDig_FltDig(1,7,ucdust1,3,0);
trigg2_ON;delay_us(10);
                                        trigg2_OFF;delay_ms(7);ADC_CALL(7);
uiprev_zaxis = current_adc_val;Show_Float_No_ONLine_At_Offset_IntDig_FltDig(2,7,ucdust2,3,0);
Show_Float_No_ONLine_At_Offset_IntDig_FltDig(1,0,ucKeyPressed,1,0);


Show_Float_No_ONLine_At_Offset_IntDig_FltDig(1,13,ucfloor1,1,0);

Show_Float_No_ONLine_At_Offset_IntDig_FltDig(2,13,ucfloor2,1,0); if(ucKeyPressed==3)
{
BUZZ_ON;
delay_ms(500);BUZZ_OFF;
Rotation0_1();Red1_OFF;Red2_OFF;Green1_ON;Green2_ON;ucfloor2=0;
}
if(ucKeyPressed==4)
{
BUZZ_ON;
delay_ms(500);BUZZ_OFF;

if(ucfloor1 ==0)
{
Rotation180_1();ucfloor2 = 1;Red1_ON;Red2_OFF;Green1_OFF;Green2_ON;
}
}
```

```
if(ucKeyPressed==2)
{
BUZZ_ON;
delay_ms(500);BUZZ_OFF;
if(ucfloor2 ==0)
{
Rotation0();ucfloor1=1;

Red1_OFF;Green1_ON;Red2_ON;Green2_OFF;
}

}
if(ucKeyPressed==1)
{
BUZZ_ON;
delay_ms(500);BUZZ_OFF;

Rotation180();ucfloor1 = 0;Red1_OFF;Red2_OFF;Green1_ON;Green2_ON;
}

if(uiprev_xaxis>=40)
{
ucdust1=0;
}
elseif((uiprev_xaxis<=39)&&(uiprev_xaxis> 34))
{
ucdust1=10;
}
elseif((uiprev_xaxis<=34)&&(uiprev_xaxis> 29))
{
ucdust1=30;
```

```
}
elseif((uiprev_xaxis<=29)&&(uiprev_xaxis> 20))
{
ucdust1=50;
}
elseif((uiprev_xaxis<=20)&&(uiprev_xaxis> 15))
{
ucdust1=70;
}
elseif((uiprev_xaxis<= 15)&&(uiprev_xaxis> 10))
{
ucdust1=90;
}
elseif((uiprev_xaxis<=10))//&&(uiprev_xaxis> 14))
{
ucdust1=100;
}

if(uiprev_zaxis> 40)
{
ucdust2=0;
}
elseif((uiprev_zaxis<=39)&&(uiprev_zaxis>34))
{
ucdust2=10;
}
elseif((uiprev_zaxis<=34)&&(uiprev_zaxis>29))
{
ucdust2=30;
```

```
}
elseif((uiprev_zaxis<=29)&&(uiprev_zaxis>20))
{
ucdust2=50;
}
elseif((uiprev_zaxis<=20)&&(uiprev_zaxis>15))
{
ucdust2=70;
}
elseif((uiprev_zaxis<=15)&&(uiprev_zaxis>10))
{
ucdust2=90;
}
elseif(uiprev_zaxis<=10)
{
ucdust2=100;
}
if(INPUT(PIN_A6)== 1)//ir
{
ucir=1;
ui2SecCNT=30;
}
else
{
ucir=0;
}

ADC_CALL(6);//ldruimoistadc=current_adc_val;
```

```
Show_Float_No_ONLine_At_Offset_IntDig_FltDig(1,15,ucmoist,1,0);

if(uimoistadc<612)//moist
{
ucmoist= 1;

}
else
{
ucmoist= 0;
}
Show_Float_No_ONLine_At_Offset_IntDig_FltDig(2,15,ucir,1,0); if(ui2SecCNT==1)
{
ui2SecCNT=0;
if((ucmoist==1))//&&(uiprev_zaxis>9))
{
ui2SecCNT=0;BUZZ_ON;
delay_ms(500);BUZZ_OFF;RLY1_ON;RLY2_OFF;
delay_ms(1000);

RLY1_OFF;RLY2_OFF;
delay_ms(1000);delay_ms(1000);
RLY1_OFF;RLY2_ON;
delay_ms(1000);
//delay_ms(500);RLY1_OFF;RLY2_OFF;
}
else//if(uiprev_xaxis>9)
{
ui2SecCNT=0;BUZZ_ON;
delay_ms(100);BUZZ_OFF;
delay_ms(200);BUZZ_ON;
delay_ms(100);BUZZ_OFF;
RLY2_ON;
RLY1_OFF;
```

```
delay_ms(1000);

RLY1_OFF;RLY2_OFF;
delay_ms(1000);delay_ms(1000);RLY2_OFF;RLY1_ON;
delay_ms(1000);

RLY1_OFF;RLY2_OFF;
}


}
if(ui1SecCNT==1)
{
ui1SecCNT = 1500;BUZZ_ON;
delay_ms(500);BUZZ_OFF;
Send_Sms_Action();printf("AT+CGATT?\r\n");delay_ms(500);
printf("AT+SAPBR=3,1,\"CONTYPE\",\"GPRS\"\r\n");
delay_ms(500);printf("AT+HTTPINIT\r\n");
delay_ms(500);

printf("AT+HTTPPARA=\"URL\",\"api.thingspeak.com/update?api_key=Y4NCRFDGIZIG 8P9D&field1=");
putc(((ucdust1/100)%10)+0x30);putc(((ucdust1/10)%10)+0x30);putc(((ucdust1/1)%10)+0x30);printf("&field
2=");
putc(((ucdust2/100)%10)+0x30);putc(((ucdust2/10)%10)+0x30);putc(((ucdust2/1)%10)+0x30);putc("");
putc('\r');
putc('\n');delay_ms(500);
printf("AT+HTTPACTION=0\r\n");delay_ms(500);printf("AT+HTTPTERM\r\n");delay_ms(500);
Send_Sms_Action();
}
}
}
```

## 8. Advantages, Disadvantages & Application

**10.1) Advantages:-**

1) Improves environment quality-fewer smells cleaner cities.
2) Reduced energy consumption.
3) Effort are less in this system.

**10.2) Limitation:-**

1) Maintenance needed.
2) Spend some cost on it.

**10.3) Application:-**

1) Useful for residential apartment.
2) Hospitals
3) Hotels
4) Schools/College

## 9. Conclusion

The scope for the future work is this system can be implemented with timestamp in which real-time clock shown to the concern person at what time dust bin is full and at what time the waste is collected from the smart dustbins.

The moisture sensor can be implemented hand in hand with the other sensors and the compartments for segregating the dry and wet waste can be created which will solve the issues related to waste segregation.

Based on the result of the analysis, design and implementation that has been done above, some conclusion are obtained as follows:

Waste management is an issue in present there is very little awareness exists regarding this issue in our society. With the help of this project to reduce the time of waste management in residential building.

## 10. Reference

[1] Vikrant Bhor (2015)-Smart Dustbin-An Efficient Garbage Monitoring System International Journal of Engineering Science and Computing6 7113-16

[2] Navghane S S, Killedar M S and Rohokale D V 2016 Smart Garbage and Waste Collection Bin International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)51576-78

[3] Kasliwal Manasi Hand Suryawanshi Smith kumar B2016 A Novel approach to Garbage Management Using Internet of Things for smart cities International Journal of Current Trends in Engineering & Research 2348-53.

[4] Nimisha Singh, Prajkta Wagh (2017) Waste management as smart cities In Conference on Smart

Spaces Springer International Publishing 104-15.

[5] Prof. R.M.Sahu, Akshay Godase, Pramod Shinde, Reshma Shinde, "Garbage and Street Light Monitoring System Using Internet of Things" INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING, ISSN (Online) 2321 – 2004, Vol. 4, Issue 4, April 2016.

[6] Twinkle sinha, k.mugesh Kumar, p.saisharan, "SMART DUSTBIN", International Journal of Industrial Electronics and Electrical Engineering, ISSN: 2347-6982 Volume-3, Issue-5, May2015.

[7] Murugaanandam .S, Ganapathy .V and Balaji .R, "Efficient IOT Based Smart Bin for Clean Environment International Conference on Communication and Signal Processing (ICCSP), pp. 715-720, 2018.

[8] Mrs.Pallavi Nehete, Dhanshri Jangam, Nandini Barne ,Prajakta Bhoite , Shalaka Jadhav , "Garbage Management using Internet of Things", Second International Conference on Electronics, Communication and Aerospace Technology (ICECA), pp. 1454-1458, 2018.

[9] Shinjini Ray, Suhrid Krishna Chatterjee, Sudipta Saha, Sayan Tapadar, Robin Karlose, Dr.Himadri Nath Saha, "Optimizing Routine Collection Efficiency in IOT based Garbage Collection Monitoring Systems", IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), pp. 84-90, 2018.

[10] Eyhab Al-Masri, Ibrahim Diabate, Richa Jain, Ming Hoi Lam and Swetha Reddy Nathala School, "A Serverless IOT Architecture for Smart Waste Management Systems", IEEE International Conference on Industrial Internet (ICII), pp.179-180, 2018.

[11] Saadia Kulsoom Memon, Faisal Karim Shaikh, Naeem Ahmed Mahoto, Abdul Aziz Memon, "IOT based smart garbage monitoring & collection system using WEMOS & Ultrasonic sensors",2nd International Conference on Computing, Mathematics and Engineering Technologies (ICOMET), pp. 1-6, 2019.

[12] Gigli, M. and Koo, S. (2011). Internet of Things, Services and Applications Categorization. Advances in Internet of Things, 1, 27-31. Retrieved June 10, 2020.

[13] Sequeira, N. (2019). Smart Garbage Monitoring System Using Internet of Things (IoT). Journal of Technology and Communication.