IOT BASED SMART DUSTBIN USING ARDUINO

PROJECT REPORT

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ABSTRACT :

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also eco friendly. We are inspired from Swaach Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. If dustbin is not maintained than these can cause an unhealthy environment and can cause pollute that affect our health. In this proposed technology we have designed a smart dustbin using ARDUINO UNO, along with ultrasonic sensor, servo motor, and battery , jumper wire. After all hardware and software connection, now Smart Dustbin program will be run. Dustbin lid will when someone comes near at some range than wait for user to put garbage and close it. It's properly running or not. For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it.

PROBLEM STATEMENT :

The world today is moving fast along with the rapid know of technology.) long with it▯ people have to move fast so it not misses out by modernity technology that available in the world today. Now with changing this ▯me is need to make some application or product that very useful for all segment of society without thinking their status. If seen in the market most of dustbins are manually operated and it will use leg and hand for open the cover of dustbin that can allow a person to dispose the rubbish. It very difficult for the persons with disabilities. This dustbin is not user ,friendly system dustbin because it only can use for normal people and not for person with disabilities.
Also there are so many people not interested to use dustbin for litering because they not interested to came near the dustbin. So this project can attract attention people to use dustbin , because it very easy to use and it is a very modern system.

BLOCK DIAGRAM :
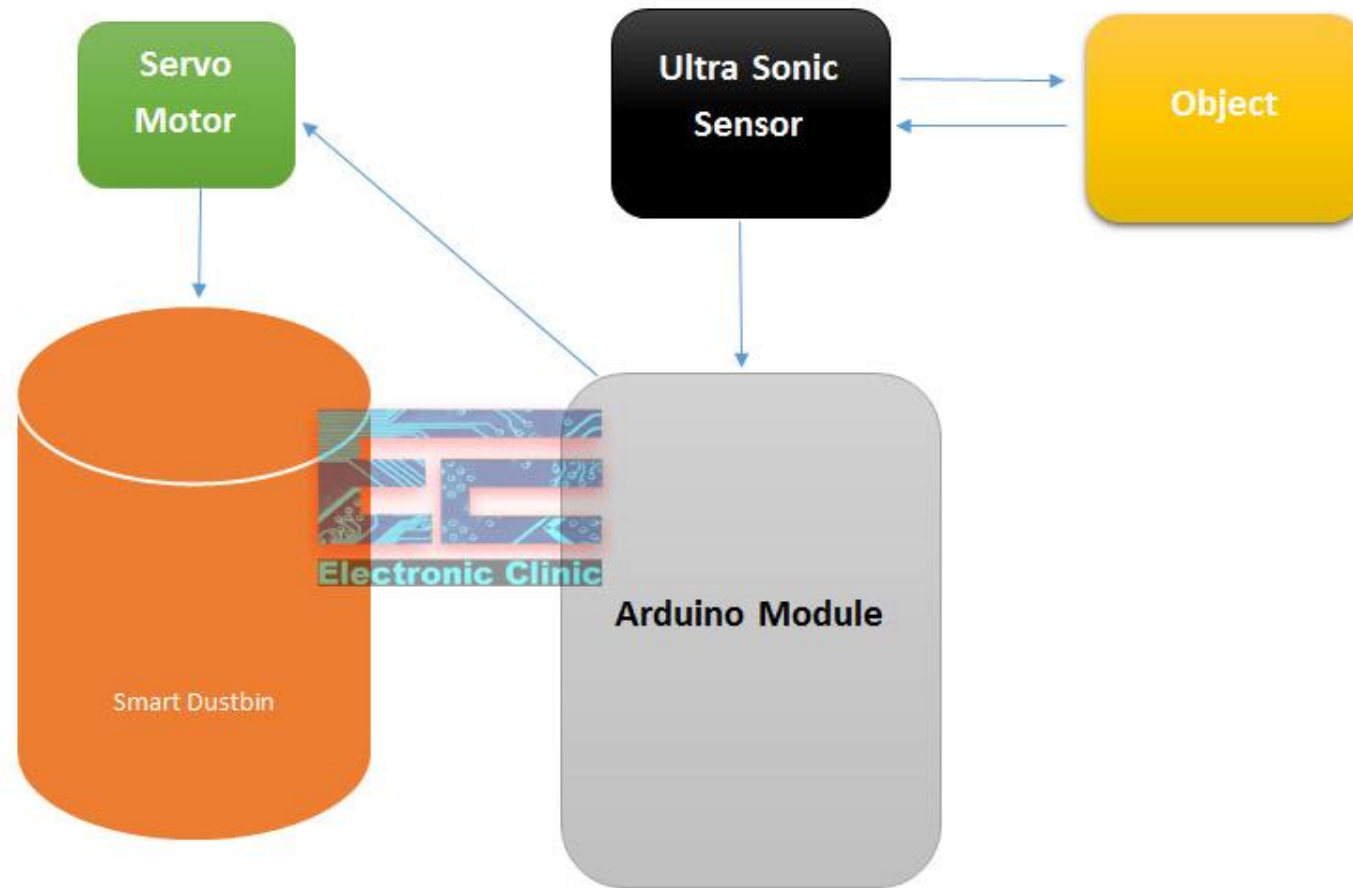
COMPONENT REQUIREMENTS :

➢ ARDUINO

➢ SERVO MOTOR

➢ ULTRASONIC SENSOR

➢ 12 VOLTS POWER SUPPLY

➢ JUMPER WIRES

COMPONENT SPECIFICATIONS :

1) ARDUINO

- In this project Arduino board is use to become the main system that can control or conduct other device for make it function properly. The Arduino board can be programmed with the Arduino Sofware IDE. This program can control the electronic device that is used for the system. The coding of device that want be use can define in the Arduino Software system or in internet.

- Arduino is an open source computer hardware and software company project and user community that designs and manufactures single board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.
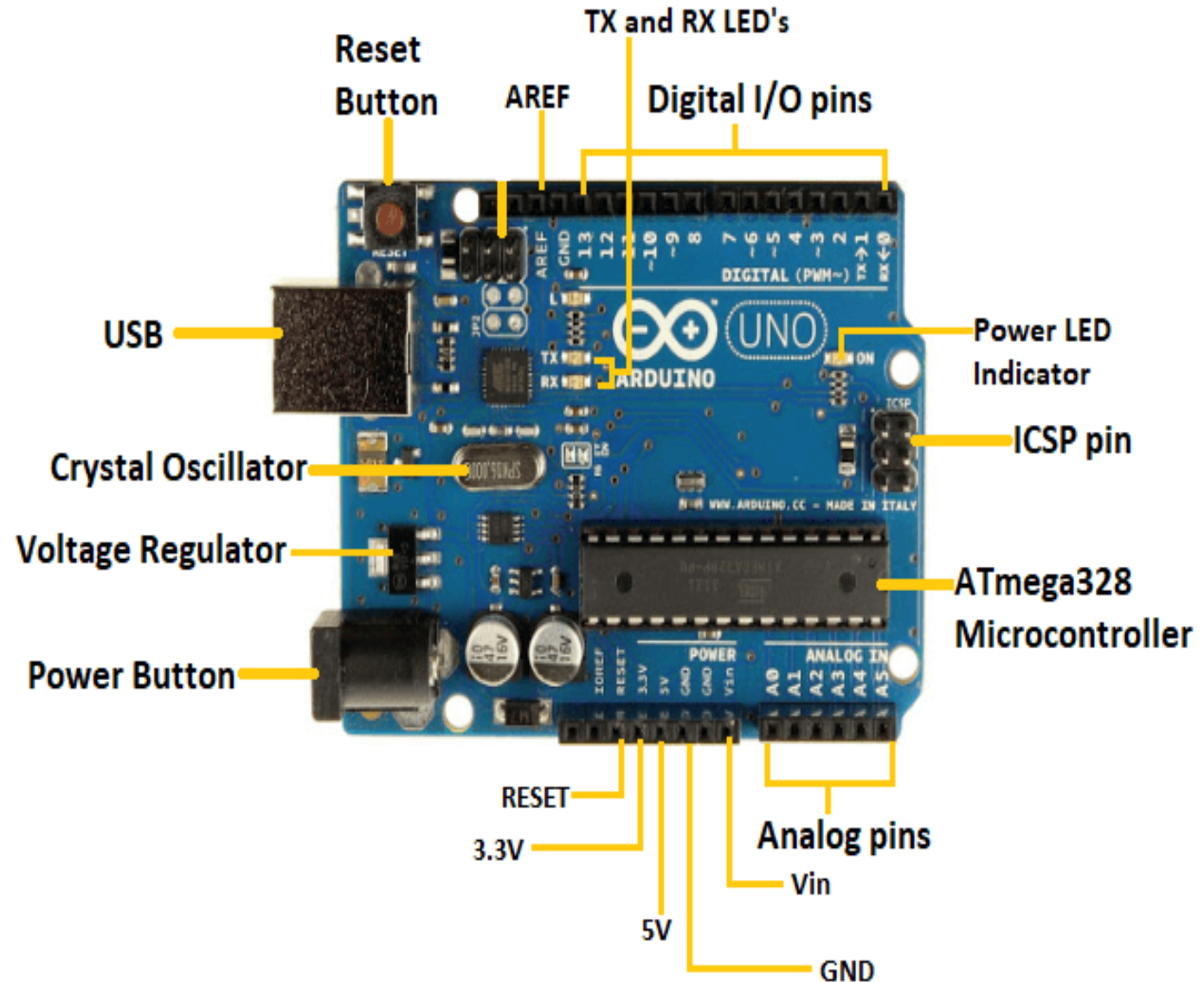
2) <u>ULTRASONIC SENSOR</u>

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear).
As the name indicates, **ultrasonic** / level **sensors** measure distance by using **ultrasonic** waves.
The **sensor** head emits an **ultrasonic** wave and receives the wave reflected back from the target. **ultrasonic** / level **sensors** measure the distance to the target by measuring the time between the emission and reception.
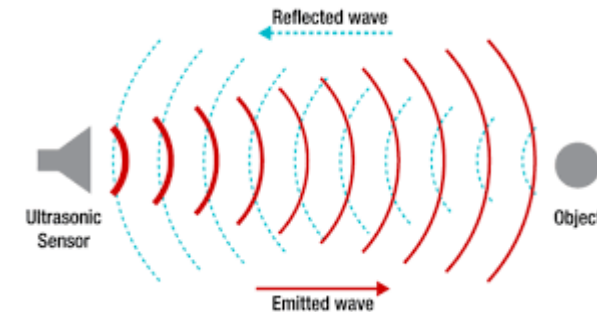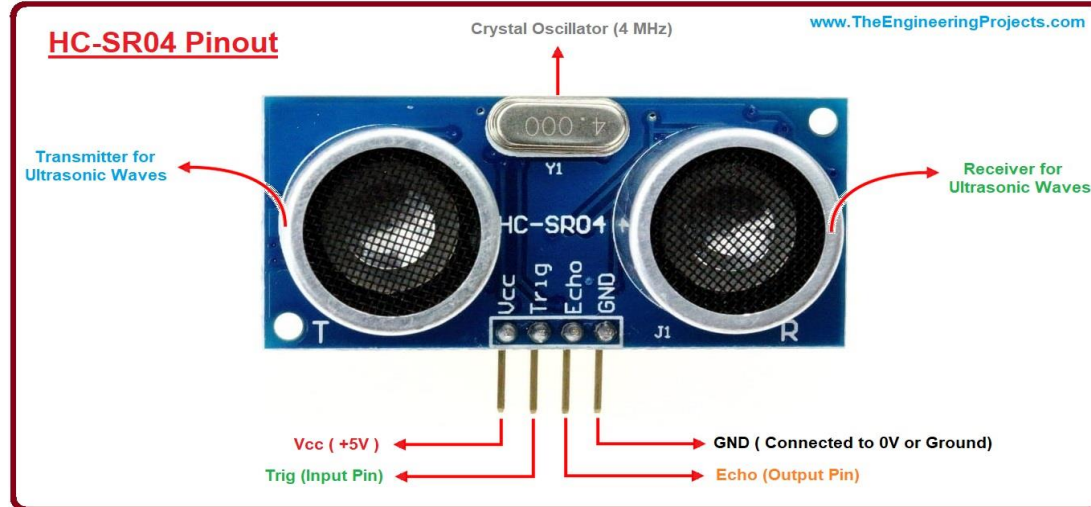
3) <u>PIR SENSOR</u>

- PIR sensors are more complicated than many of the other sensors (like photocells, FSRs and tilt switches) because there are multiple variables that affect the sensors input and output. To begin explaining how a basic sensor works.

- The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a *positive differential* change between the two halves. When the warm body leaves the sensing area, the reverse happens, whereby the sensor generates a negative differential change. These changed pulses are what is detected.

- **ADVANTAGES :**

- 1) Small in size
- 2) Wide lens range
- 3) Easy to interface
- 4) Inexpensive
- 5) Low-Power
- 6) Easy to use
- 7) Do not wear out

ARDUINO CODE :

```
#include <Servo.h>   //servo library
Servo servo;
int trigPin = 5;
int echoPin = 6;
int servoPin =7;
int led= 10;
long duration, dist, average;
long aver[3];   //array for average


void setup() {
   Serial.begin(9600);
   servo.attach(servoPin);
   pinMode(trigPin, OUTPUT);
   pinMode(echoPin, INPUT);
   servo.write(0);        //close cap on power on
   delay(100);
   servo.detach();
}
```

```
void measure() {
 digitalWrite(10,HIGH);
digitalWrite(trigPin, LOW);
delayMicroseconds(5);
digitalWrite(trigPin, HIGH);
delayMicroseconds(15);
digitalWrite(trigPin, LOW);
pinMode(echoPin, INPUT);
duration = pulseIn(echoPin, HIGH);
dist = (duration/2) / 29.1;   //obtain distance
}

void loop() {
  for (int i=0;i<=2;i++) {   //average distance
    measure();
   aver[i]=dist;
    delay(10);            //delay between measurements
  }
 dist=(aver[0]+aver[1]+aver[2])/3;
```

```
if ( dist<50 ) {
//Change distance as per your need
 servo.attach(servoPin);
  delay(1);
 servo.write(0);
 delay(3000);
 servo.write(150);
 delay(1000);
 servo.detach();
}
Serial.print(dist);
}
```

CIRCUIT DIAGRAM :
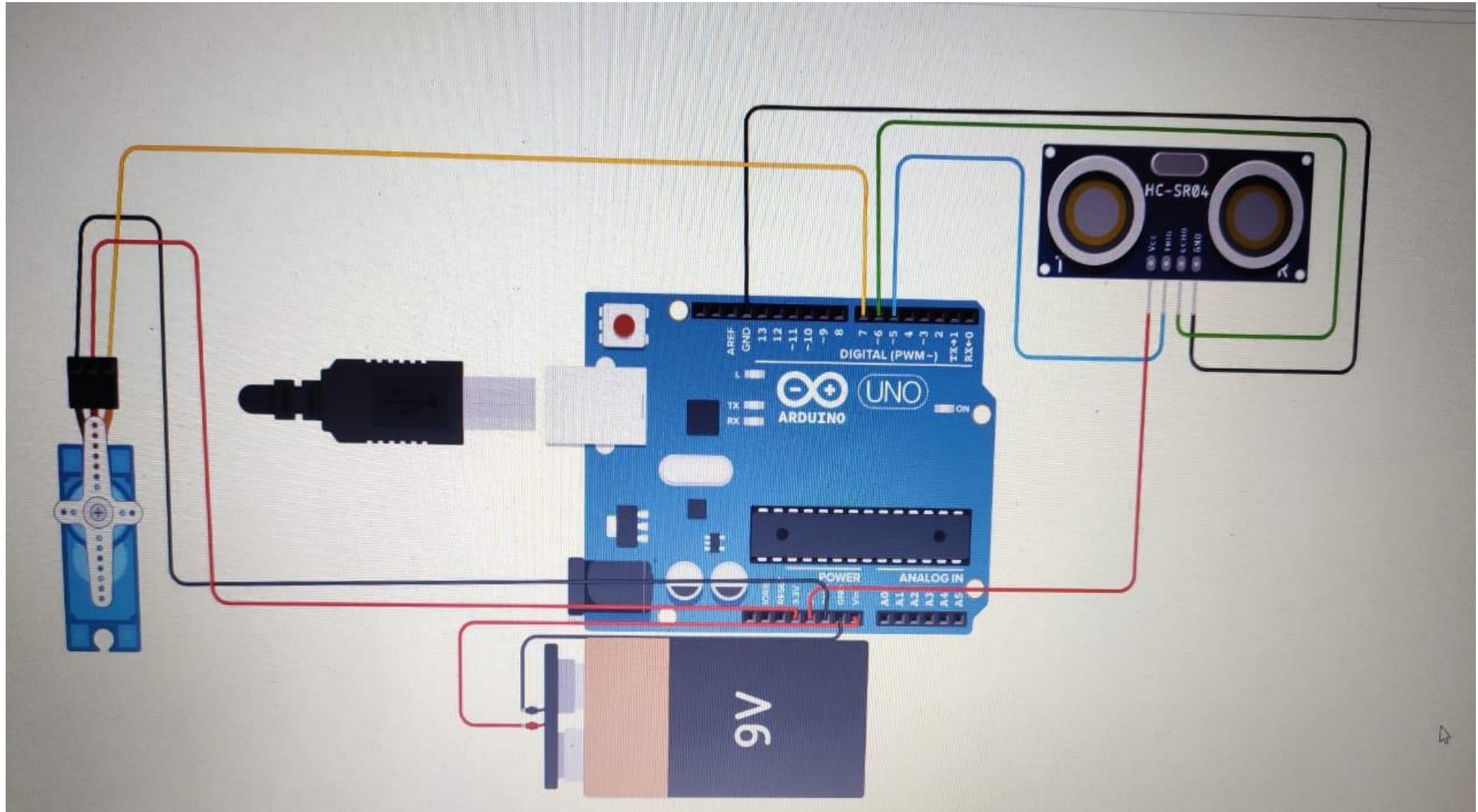
WORKING :

After wiring and attaching all the devices and
setting up to the Smart Dustbin, now observe all
the important setup whether they are well
connected or something missed. After connection set up now next step is to submit/upload code in Arduino and supply power
to the circuit. When system is powered ON, Arduino keeps monitoring for any things that come near the sensor at give range.
When Ultrasonic sensor detect any object for example like hand or others, here Arduino calculates its distance and if it less than
a certain predefined value than servo motor get activate first and with the support of the extended arm of the lid.
Lid will open for a given time than it will automatically close.

ADVANTAGES :
Following are the advantages of using Smart dustbin:
1)A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions,
    fuel use and traffic congestion.
2) A reduction in the number of waste bins needed.
3)Maintain environment hygiene (i.e. no overflowing of waste and less unpleasant odor).
4) It will help in bringing evolution by technology in term of cleanliness.

CONCLUSION AND SUGGESTION:

Here we are going to make an evolution changes toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensor, Arduino etc. Lid of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid. For social , it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology . So our next work will be adding one more sensor which will sense whether our dustbin is full or not. And there will be a display will be added so that user can notify that dustbin is full or Not.

`Video link :` https://drive.google.com/file/d/1FbUolyU1GooQ5ya7-6LCZWgxgRgbjUNE/view?usp=sharing

References : https://www.researchgate.net/publication/343530056_SMART_DUSTBIN_USING_ARDUINO

https://www.academia.edu/34131562/My_project

THANK YOU