

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. Now a days 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 open 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.

Signature of Guide

Signature of Head, Department of Mechanical Engineering

INTRODUCTION

The rate increasing population in our country has increasing rapidly and also we have increase in garbage which have increased environmental issue. Dustbin is a container which collects garbage's or stores items which recyclable or non-recyclable, decompose and non-decompose. They are usually used in homes, office etc, but in case they are full no one is there to clean it and the garbage are spilled out. The surrounding of a dustbin is also conducive for increasing the pollution level. Air pollution due to a dustbin can produce bacteria and virus which can produce life harmful diseases for human. Therefore, we have designed a smart dustbin using ARDUINO UNO, ultrasonic sensor which will sense the item to be thrown in the dustbin and open the lid with the help of the motor. It is an IOT based project that will bring a new and smart way of cleanliness. It is a decent gadget to make your home clean, due to practically all offspring of home consistently make it grimy and spread litter to a great extent by electronics, rappers and various other things. Since the smart dustbin is additionally intriguing and children make fun with it so it will help to maintain cleanliness in home. It will be applied for various type of waste. Dustbin will open its lid when someone/object is near at some range then it will wait for given time period than it will close automatically.

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OBJECTIVE:

- Automatic open close lid.
- Detected the level of the trash inside the dustbin.
- No contact touch between dustbin and person so, prevention from germs and disease.
- Keeping our environment clean and also eco friendly.

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Hardware Required:

- Arduino UNO
- HC-SR04 Ultrasonic Sensor Module
- TowerPro SG90 Servo Motor
- Jumper Wires
- 9V Battery
- A small bucket and cardboard

Miscellaneous (glue, Cotton wire, Bolt etc)

Arduino Uno: Arduino Open-Source Single Board Computer Boards - Arduino Education A000066, The Arduino Uno Board A000066 R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.



Ultrasonic Sensor: 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). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from to the target).



Servo Motor: The Tower Pro SG90 9g mini servo motor is the most commonly used servo motor in RC applications. The servo motors are used for control applications which require precision control like robot arm positioning, tool position in machining equipment. The servo motors usually provide control over 180° range.



Jumper Wires: A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.



9V Battery: The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top.



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Software Requirement:

Coding: After doing the hardware design, the next step is to design the software. Software programming using the Arduino IDE (Integrated Development Environment) before starting programming the board settings in the Arduino application through the tools menu and adjusting. The program code below is specific to the mini-smart dustbin system.

```
#include <Servo.h> Servo servo;
```

```
int trigPin = 5;
```

```
int echoPin = 6;
```

```
int servoPin = 7;
```

```
long duration, dist, average;
```

```
long aver[3]; //
```

```
array for average void setup(){
```

```
servo.attach(servoPin);
```

```
pinMode(trigPin, OUTPUT);
```

```
pinMode(echoPin, INPUT);
```

```
servo.write(0);
```

```
delay(1000);
```

```
servo.detach();
```

```
}
```

```
void measure(){
```

```
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;
```

```

}

void loop(){
  for (int i=0; i<=2
    ;i++){ measure();
aver[i]=dist;
delay(50);
}
  dist=(aver[0]+aver[1]+aver[2])/3;
  if (dist<20){
servo.attach(servoPin);
  delay(1);
  servo.write(90);
  delay(3500);
  servo.write(0);
  delay(100);
servo.detach();
  }
}

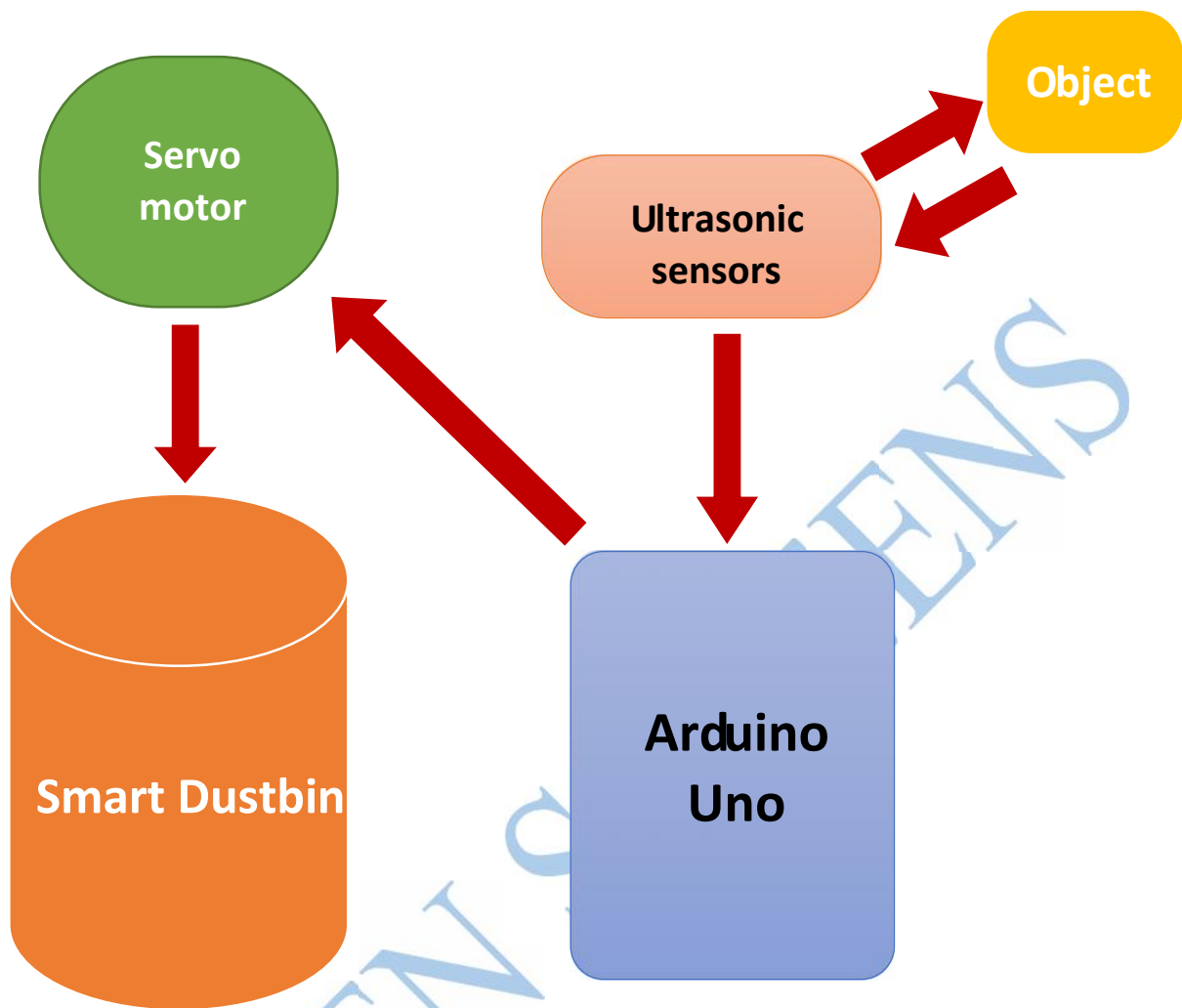
```

After setting up Arduino, the IDE starts the program immediately. After the program is created, the next step is to check whether the program is in accordance with the Arduino standard by clicking the Verify menu, then the final step is to upload the program to the microcontroller by clicking the upload menu on the Arduino IDE.

Methodology:

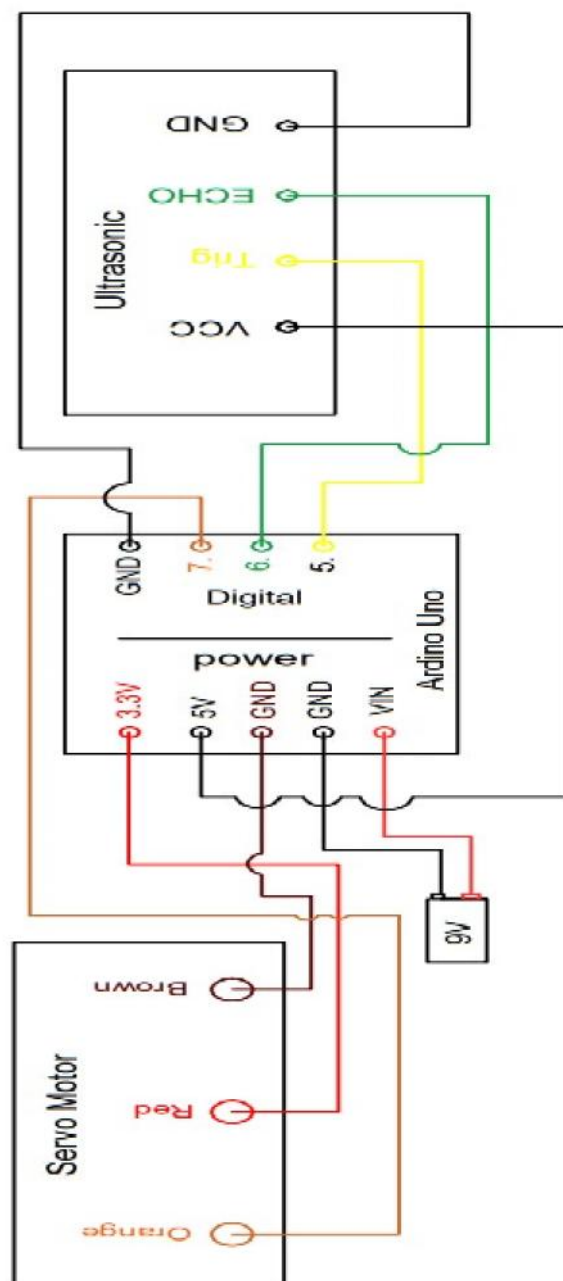
After wiring and attaching all the devices and setting up to the Smart Dustbin, now observe all the important setup whether they are well connected or something missed. After connection set up now next step is to submit/upload code in Arduino and supply power to the circuit. When system is powered ON, 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 predefines 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.

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Block diagram

GR



Smart Dustbin Circuit Diagram



Budget Details

S.No.	Instrument	Price
1	Arduino Uno	760
2	Ultrasonic Sensor	140
3	Servo Motor	120
4	9V Battery	50
5	Jumper Wire	80
6	Plastic Bucket	50
7	Traveling Cost	200
	Total	1,400

Conclusion:

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 Arduinoetc.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.

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FUTURE SCOPE

- It can made durable by making it compact and cost effective.
- Two bins can be placed to collect wet and dry waste separately.
- Wet waste can be decomposed and used for making biogas.
- Solar panel can be used.
- Water proof circuit design.

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BENEFITS OF VILLAGE

- Overflowing of dustbin can be stopped.
- The overflowing and cleaning of smart bins will be continuously monitored and effectively manage thus making clean and empty bins available to common people.
- Economically effective techniques if once implement successfully.
- It also intended at building a clean as well as green soundings.

BENEFITS OF THE INSTITUTE

- Through such kind of technology advancement our institution can promote national level schemes like Swachh Bharat Abhiyan , Digital India etc.
- This technique can also be implemented in our institute to keep its campus clean and healthy.
- Customization of such kind of techniques in our campus motivate our students to think about the latest techniques domain.
- Student can start their own start up in which they can make such kind of commercial products.