

Project Report Title: A report on “Automated Smart Bin”.

OBJECTIVE

1. To learn the use of Arduino & coding.
2. To learn the measuring system of ultrasonic sensor.
3. To learn the rotation system of servo motor.

INTRODUCTION

Dustbins are small plastic containers which are used to store waste for a temporary period. They are often used in homes, offices, institutions, streets, parks etc. to collect the waste. In some places, littering is a serious offence and hence public waste containers are the only way to dispose small waste.



Fig 01: Automated Smart Bin.

In order to keep ourselves healthy and the environment neat and clean, we must put the daily wastes in a specific place. That's why we generally use dustbins. But these dustbins used in our day life are very ordinary. Because they are generally open in the environment. As a result they pollute the environment and the air beside it. Again because of heavy air flow and rain fall, the waste can be carried away making the environment more unhygienic. For this, in many place the dustbins used have cover on it. But to drop the waste, we have to pull the cover ourselves. This cover may contain many dangerous germs and pulling the cover to open is time killing too.to overcome this kind of problems, we can use the smart automated dustbin. This bin will be opened

detecting any human's presence. It will also give us feedback about the waste in it. Again it is very easy to use and it can help us to increase the beauty of the environment.

USED COMPONENTS

A lot of components were used to complete the project. But some of them are the major ones. The components are given below:

1.

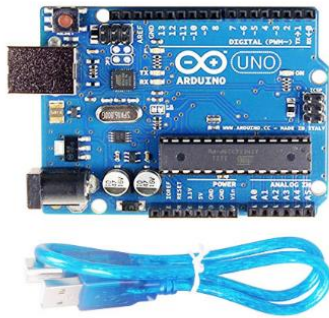


Fig 1: Arduino UNO

2.



Fig 2: Sonar Sensor

3.



Fig 3: Servo Motor.

4.



Fig 4: Jumper Wires.

5.

6.



Fig 5: Dustbin

7.



Fig 6: Glue Stick.

8.

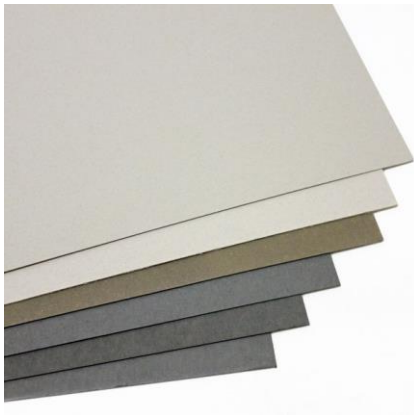


Fig 7: Card Board.



Fig 8: Scissors.

9.

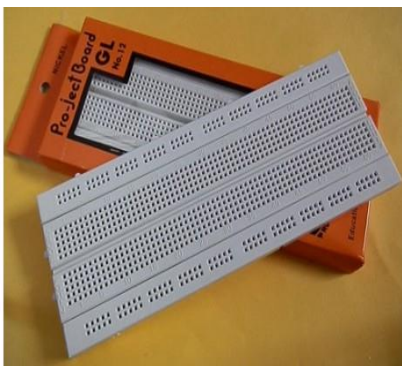


Fig: Bread Board.

ARDUINO PROGRAM:

```
#include <Servo.h> //servo library

Servo servo;

int trigPin = 5;

int echoPin = 6;

int servoPin = 7;

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(10);

    delay(2500);

    servo.write(90);

    delay(500);

    servo.detach();

  }

  Serial.print(dist);

}

```

CIRCUIT DIAGRAM

Circuit diagram of the electrical components used for the project is given below:

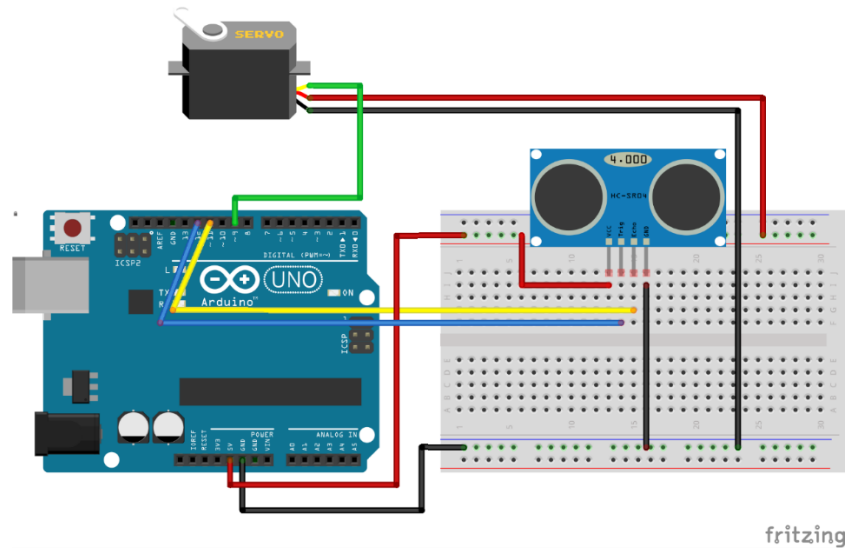


Figure 2: Circuit diagram for sonar and servo with Arduino UNO.

SETTING COMPONENT:

The Arduino Uno was set on the back side of the bin using card board. The sonar was put on the top of the lid cutting some part of the lid. Glue was used to restrict the sonar. The servo motor was kept into the bin so that it can open the lid according to the coding. A piece of card board was attached with the motor and the lid in order to do the work perfectly. Some jumper wires were used to make connection among the sonar, servo motor and other components.

WORKING PROCEDURE

When an object comes in front of the sonar, the sonar detects the distance and sends signal to the Arduino. If the distance is found positive according to the coding, then it sends signal to the servo motor. The motor starts rotating. The angle of rotation has already been put into the Arduino and it is 90 degree. This angle of rotation can also be changed according to our need. When the servo starts rotating, the card board attached to the servo and the lid puts pressure on the lid. As a result the lid gets opened. It will keep open for 2.5 seconds. Then the servo will go to its previous position rotating on the reverse angle. As a result the lid of the bin will be closed.

If anyone wants to open the bin again, he will have to wait for .5 seconds after closing the lid for the first time. Then he will have to come near the sonar. The procedure of opening the bin will occur again in the same way described before.

PROJECT COST

SL no	Components Name	Pieces or size of the components	Price for per unit	Price
1.	Arduino UNO	1	420	420
2.	HC-SR05 Ultrasonic Sensor	1	100	100
3.	Servo Motor	1	480	480
4.	A Dustbin	1	140	140
5.	Card Board			30
6.	Glue Stick	2	10	20
7.	Jumper Wires	20	1	20
8.	Adaptor	1	120	120
			TOTAL	1330

INDUSTRIAL PRODUCTION COST

If we want to make this project as industrial production, the whole cost will decrease. Because in industrial production the manufacturing process will be automated, for this the production cost will decrease. Again for industrial production we will be able to use Arduino NENO instead of Arduino UNO, IR sensor instead of ultrasonic sensor. Moreover for industrial production the authority will buy a lot of components from other company. This will decrease the production cost too. And if the company manufacture all the components themselves, this will be much effective to decrease production cost.

So, we can hope if we try to manufacture the project in industry, the total cost will be decreased and we will get the product at a price of 65% that has been cost to make the project.

CONCLUSION

Our environment is getting polluted day by day. We must be aware of it. We should use dustbin to put our daily wastes. It will be really helpful to keep ourselves and the environment neat and clean, healthy and hygienic. The automated smart bin will help us in it. It will bring interest to people to use it. Next, the bin has also to be updated. We can use more sensor so that it can detect the wastes in it and send mail to the owner so that the owner can get the news of getting the dustbin full of wastes. The line follower robotic concept can be used here so that the dustbin can go to where the owner wants it go. Using this dustbin we can hope to decrease the environment pollution rate and keep our society clean.