A
Practical Activity Report
Submitted for

ENGINEERING DESIGN-II (UTA014)

Assignment II Report
(smart dustbin)

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ABSTRACT

Dustbins (or Garbage bins, Trash Cans, whatever you call them) are small plastic (or metal) containers that are wont to store trash (or waste) on a short-lived basis. They are often used in homes, offices, streets, parks etc. to collect the waste.

In some places, littering may be a serious offence and hence Public Waste Containers are the sole thanks to dispose small waste.

Usually, it's a standard practice to use separate bins for collecting wet or dry, recyclable or non-recyclable waste.
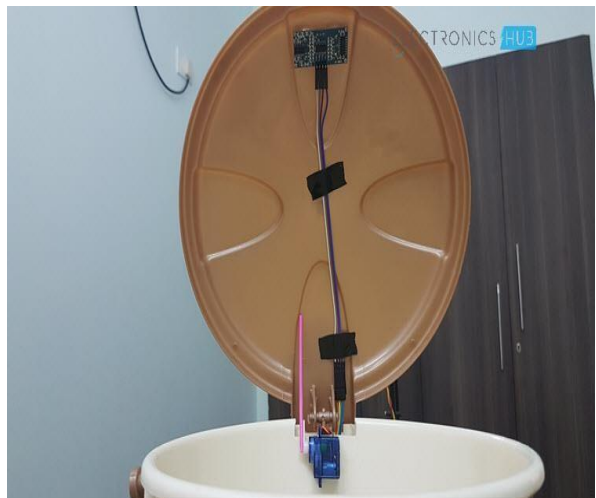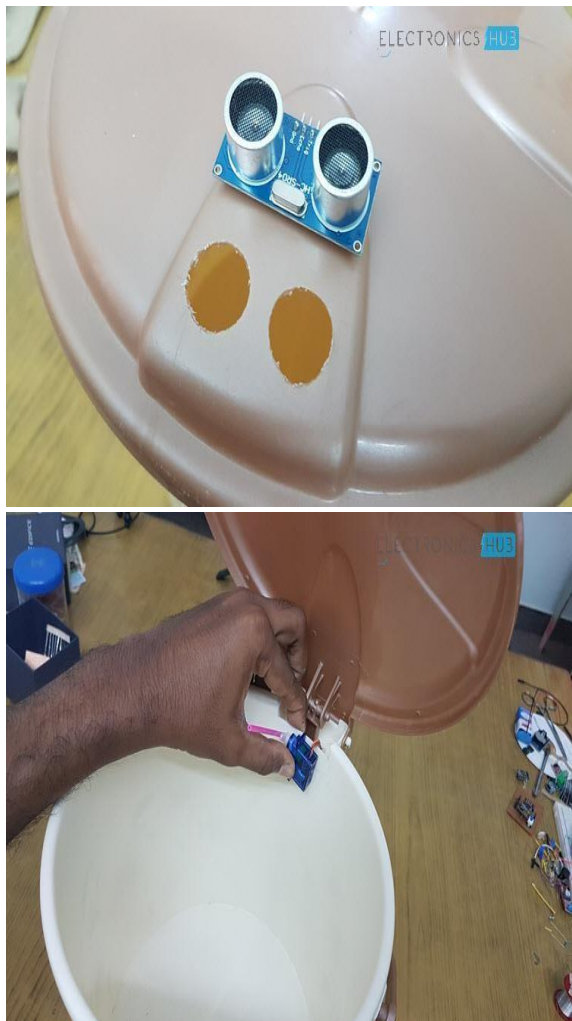
In this project, I even have designed an easy system called Smart Dustbin using Arduino, Ultrasonic Sensor and Servo Motor, where the lid of the dustbin will automatically open itself upon detection of human hand.
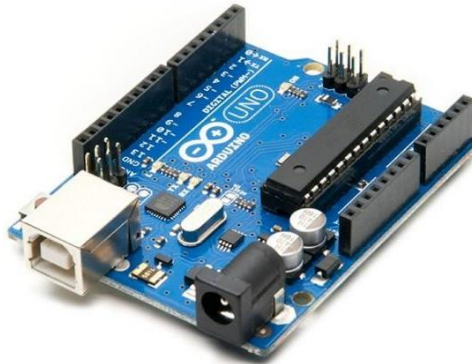
The main idea behind the using garbage can victimization Arduino project is Object Detection. I even have already used ultrasonic device in Object Avoiding automaton, wherever upon detective work associate object, the automaton can amendment its course of direction.

A similar methodology is enforced here, wherever the inaudible device is placed on prime of the dustbin's lid and once the device detects any object sort of a human hand, it'll trigger Arduino to open the lid.

Arduino UNO: The **Arduino Uno** is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by **Arduino**.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

HC-SR04 Ultrasonic Sensor Module: The HC-SR04 uses non-contact ultrasound sonar to measure the distance to an object, and consists of two ultrasonic transmitters (basically speakers), a receiver, and a control circuit. The transmitters emit a high frequency ultrasonic sound, which bounce off any nearby solid objects, and the receiver listens for any return echo. That echo is then processed by the control circuit to calculate the time difference between the signal being transmitted and received. This time can subsequently be used, along with some clever math, to calculate the distance between the sensor and the reflecting object

TowerPro SG90 Servo Motor: The **TowerPro SG90** 9g Mini **Servo** is a 180° rotation **servo**. It is a Digital **Servo Motor** that receives and processes PWM signal faster and better. It equips sophisticated internal circuitry that provides good torque, holding power, and faster updates in response to external forces.

Connecting Wires: Connecting wires provide a medium to an electrical current so that they can travel from one point on a circuit to another. In a basic circuit, the **wire** comes from one terminal of a power source, then **connects** to a switch that determines whether the circuit is open or closed.
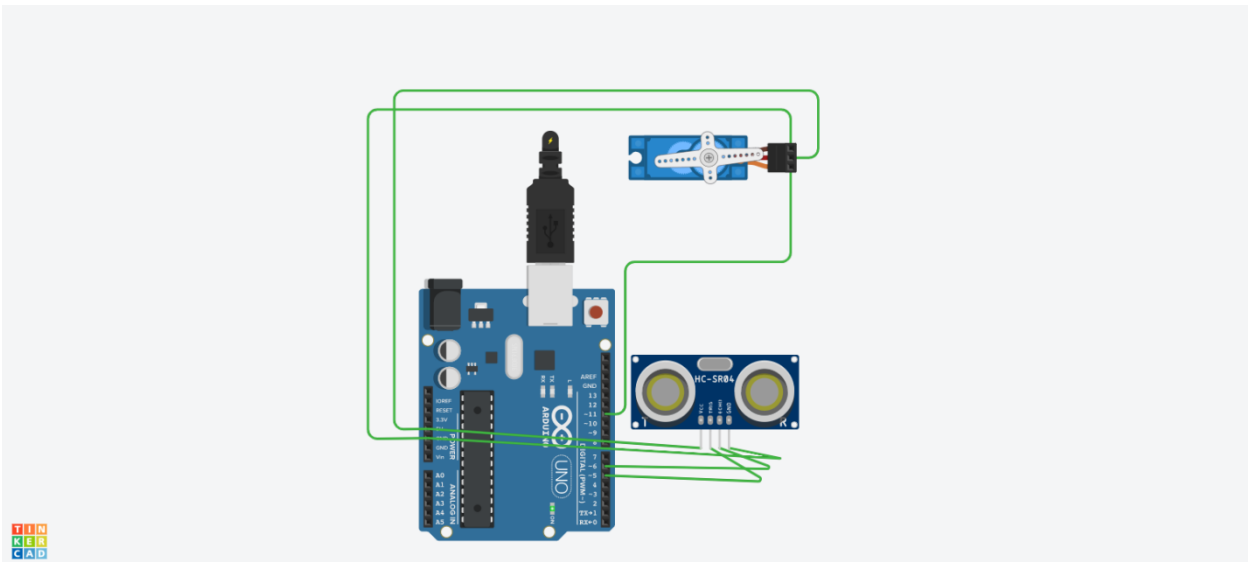

5V Power Supply:5V DC power supply is provided to the Arduino ,in order to function, it also supply the power to the motor.

A small dustbin with hinged lid: waste container is a container for temporarily storing waste, and is usually made out of metal or plastic. Some common terms are dustbin,garbage can, and trash can.

CIRCUIT DIAGRAM

Working:

After setting up the Smart Dustbin and making all the necessary connections, upload the code to Arduino and provide 5V power supply to the circuit. Once the system is powered ON, Arduino keeps monitoring for any object near the Ultrasonic Sensor.

If the Ultrasonic Sensor detects any object like a hand for example, Arduino calculates its distance and if it less than a certain predefined value, Arduino will activate the Servo Motor and with the support of the extended arm, it will list the lid open.

After certain time, the lid is automatically closed.

```
#include <Servo.h>
Servo myservo;
int pos;
const int trigPin = 5;
const int echoPin = 6;
const int led = 11;

long duration;
float distance;

void setup()
{
 myservo.attach(11);
 pinMode(trigPin, OUTPUT);
 pinMode(echoPin, INPUT);
 pinMode(led, OUTPUT);
 myservo.write(pos);
}

void loop()
{
 digitalWrite(trigPin, LOW);
 delayMicroseconds(2);
 digitalWrite(trigPin, HIGH);
 delayMicroseconds(10);
 digitalWrite(trigPin, LOW);

 duration = pulseIn(echoPin, HIGH);
 distance = 0.034*(duration/2);
 if (distance < 27)
 {
  digitalWrite(led,HIGH);
  myservo.write(pos+160);
  delay(1000);
 }
 else
 {
  digitalWrite(led,LOW);
   myservo.write(pos);
 }
 delay(300);
}
```

x

CONCLUSION

A simple but useful project called Smart Dustbin using Arduino is designed and developed here. Using this project, the lid of the dustbin stays closed, so that waste is not exposed (to avoid flies and mosquitos) and when you want dispose any waste, it will automatically open the lid

MY TINKERCAD LINK:
- https://www.tinkercad.com/things/00M4R7mAio1-super-crift

MY GOOGLE DRIVE LINK:
- **https://drive.google.com/file/d/1sWUqtUikkwFB6VdFt McHx9E6L6V4-smv/view?usp=sharing**

REFERENCES:
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- https://www.electronicshub.org/smart-dustbin-using-arduino/