CONTACTLESS DUSTBIN USING ARDUINO

A MINI PROJECT REPORT

Submitted by

ANUSHKA KADAM (RA2011031010069)

YASH SINHA (RA2011031010077)

UDAY BHARADIYA (RA2011031010102)

Under the Guidance of

Dr. P. Visalakshi

(Assistant Professor Selection Grade Department of NWC)

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BONAFIDE CERTIFICATE

Certified that this mini project report **"Contactless Dustbin using Arduino"** is the bonafide

work of **Anushka Kadam (RA2011031010069), Yash Sinha (RA2011031010077)** and

Uday Bharadiya (RA2011031010102) who carried out the project work under my

supervision.

SIGNATURE

Dr. P. Visalakshi
Assistant Professor (Selection Grade)
Department of Networking and Communications
SRM Institute of Science and Technology

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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.

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. Here lid will close when you don't want to use and it will only open when it required.

Objective

The objective of a smart dustbin using Arduino and ultrasonic sensors is to create a system that can automate the process of opening and closing the dustbin lid without the need for physical contact, thereby promoting hygiene and efficient waste management. The system aims to detect the presence of the user through the use of ultrasonic sensors and use this information to trigger the opening and closing of the lid. The project also aims to reduce the amount of littering, especially in public spaces, by providing a more convenient and accessible way to dispose of waste. Additionally, the project aims to be cost-effective, easy to install and maintain, and environmentally friendly.

Advantages

- A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions, fuel use and traffic congestion.
- A reduction in the number of waste bins needed.
- Maintain environment hygiene (i.e. no overflowing of waste and less unpleasant odor).
- It will help in bringing evolution by technology in term of cleanliness.

Hardware and Software Requirements

Required Software:

- o Arduino Ide

Required Hardware:

- o Arduino Uno
- o Ultrasonic Sensor
- o Servo Motor
- o 9v Battery
- o Dustbin
- o Jumper Wires

Concept

i)   Principle

Ultrasonic sensor module: The ultrasonic sensor module is used to detect the presence of waste or object in front of the dustbin. It works by sending out ultrasonic waves and then measuring the time it takes for the waves to bounce back after hitting an object.

Arduino: The Arduino board is used as the brain of the system. It receives the signal from the ultrasonic sensor module and processes it to control the servo motor.

Servo motor: The servo motor is responsible for opening and closing the lid of the dustbin. The motor is connected to the lid through a linkage mechanism

that translates the rotational motion of the motor into linear motion of the lid.

Battery: The battery provides power to the system.

When an object is detected by the ultrasonic sensor module, it sends a signal to the Arduino board. The Arduino board then activates the servo motor, which rotates the lid of the dustbin to open it. Once the waste has been disposed of, the ultrasonic sensor module detects that the object is no longer present, and the Arduino board sends a signal to the servo motor to close the lid.

ii)   Block Diagram
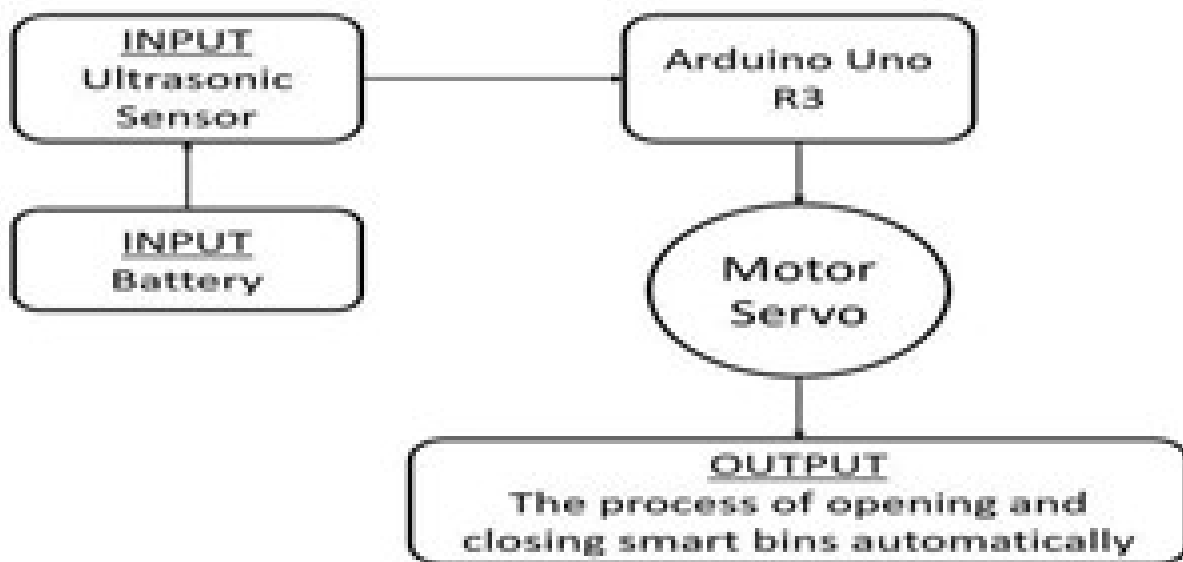
1. Arduino Code

```
#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);
}
```

<u>Output</u>

After the detection of object by the ultrasonic module sensor, the kid of the dustbin opens.

<u>Conclusion</u>

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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