Automated Dust Bin System

(based on Arduino Uno)

Project for Industrial Applications of Microcontrollers

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Problem statement

Develop a simple Arduino UNO-based Automatic Dust Bin system which can open the lid when it senses the object movement nearby. The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also ecofriendly.

Scope of the solution

This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin.

Limitations

If the dustbin is not maintained then these can cause an unhealthy environment and can cause pollute that affect our health.

Introduction

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.

Therefore, I 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.

Required components to develop solutions

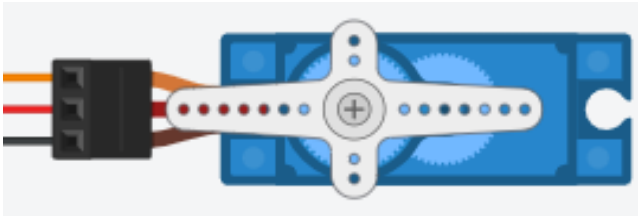
Required Software: Arduino IDE

Required hardware:

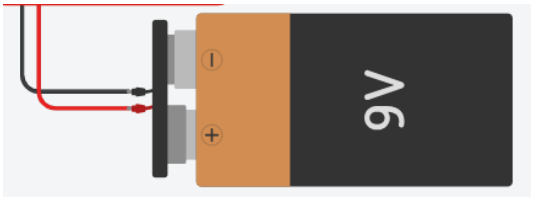
1. ARDUINO UNO

2. ULTRASONIC SENSOR (HC-SR04)

3. SERVO MOTOR

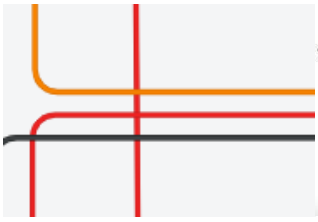


4. 9V BATTERY

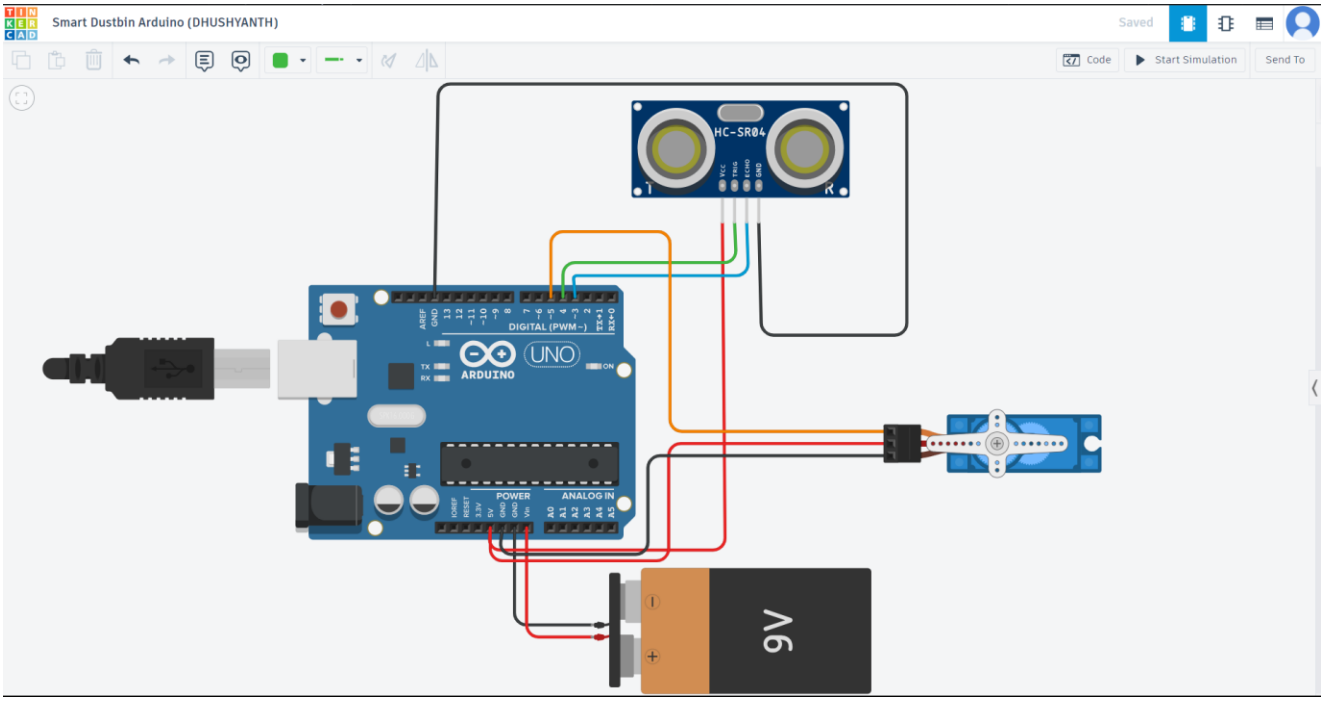


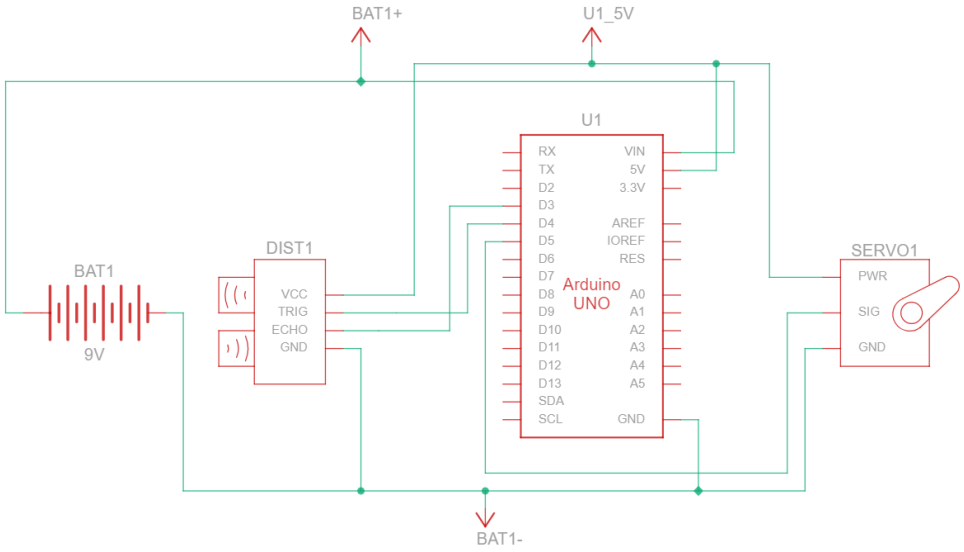
5. DUSTBIN

6. WIRES



Circuit





Components used on TinkerCad:

Name	Quantity	Component
U1	1	Arduino Uno R3
DIST1	1	Ultrasonic Distance Sensor
BAT1	1	9V Battery
SERVO1	1	Positional Micro Servo

Code:

```
#include <Servo.h>
Servo servoMain;
int trigpin = 4;
int echopin = 3;
int distance;
float duration;
float cm;

void setup()
{
   servoMain.attach(5);
   pinMode(trigpin, OUTPUT);
   pinMode(echopin, INPUT);
}

void loop()
{
 digitalWrite(trigpin, LOW);
 delay(2);
 digitalWrite(trigpin, HIGH);
 delayMicroseconds(10);
 digitalWrite(trigpin, LOW);
 duration = pulseIn(echopin, HIGH);
 cm = (duration/58.82);
 distance = cm;

 if(distance<30)
 {
  servoMain.write(180);
  delay(3000);
 }
  else{
    servoMain.write(0);
    delay(50);
  }
}
```

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 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 then it will automatically close.

The advantages of using Smart dustbin

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.

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 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.