

ELECTRONICS TASK

Mythra

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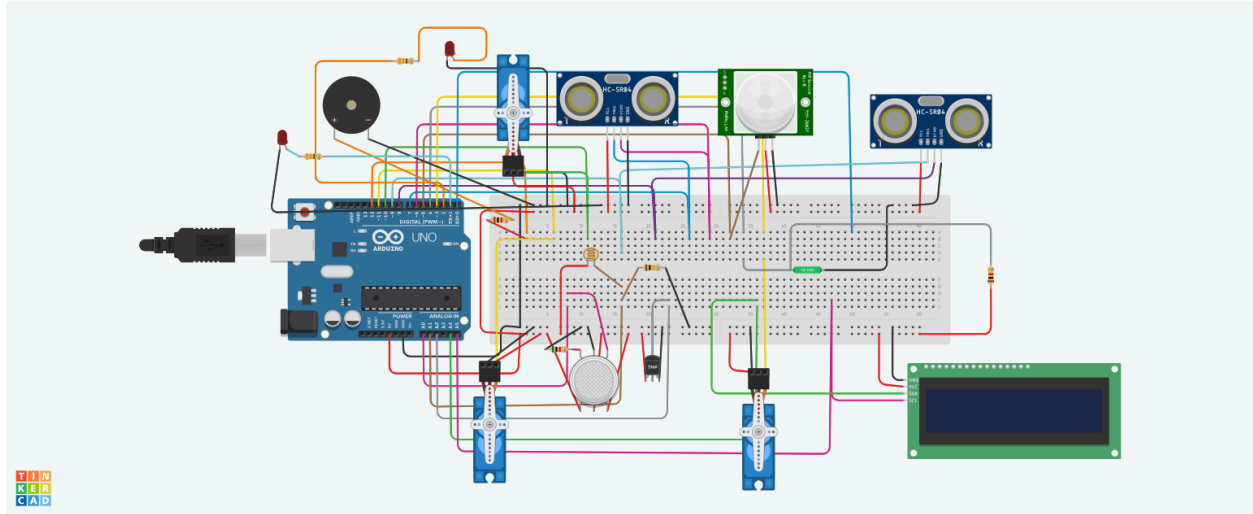
SMART DUST BIN:

The task was to use an ultrasonic sensor to detect and obtain distance data. I have used the ultrasonic sensor to sense closeness to the dustbin lid and have used an IR sensor, I have used an ultrasonic sensor to find the level of trash in the can too. Apart from this I have used other sensors like Tilt sensor to notify if bin has fallen, Gas sensor to detect harmful gases using MQ135 which is specially constructed for the same. I have used a temperature sensor and fan and heater (denoted through servo motors). Light sensor for visibility during night time. LCD I2C is used to present data too.


SIMULATION LINK:

https://www.tinkercad.com/things/bGz5uPH024A/editel?returnTo=%2Fdashboard&sharecode=_XlnP6aowTnA_IdBu66A92KBQwnj_nQMWEK9LOenr80

PICTURE:



SIMULATION VIDEO:

 SMART DUSTBIN SIMULATION.mp4

CODE:

```
#include <LiquidCrystal_I2C.h>
```

```
#include <Wire.h>
```

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

```
LiquidCrystal_I2C lcd(0x27, 16, 2);
```

```
const int TranUI_PIN = 9;  
const int RecUI_PIN = 8;  
const int Waste_Tran = 7;  
const int Waste_Reci = 6;  
const int Servo_Lid_PIN = 3;  
const int temp_PIN = A2;  
const int Gas_PIN = A0;  
const int Light_PIN = A1;  
const int Tilt_PIN = 4;  
const int Fan_PIN = 10;  
const int Heater_PIN = 11;  
const int Buzzer_PIN = 12;  
const int LED_LIGHT = 2;  
const int LED_WASTE=1;  
const int IR_PIN = 5;
```

```
Servo lidServo;  
Servo fanServo;  
Servo heaterServo;
```

```
void setup() {  
  Serial.begin(9600);  
  lcd.init();  
  lcd.backlight();  
  
  pinMode(TranUI_PIN, OUTPUT);  
  pinMode(RecUI_PIN, INPUT);  
  pinMode(Waste_Tran, OUTPUT);  
  pinMode(Waste_Reci, INPUT);  
  pinMode(Gas_PIN, INPUT);  
  pinMode(Light_PIN, INPUT);  
  pinMode(Tilt_PIN, INPUT);  
  pinMode(Buzzer_PIN, OUTPUT);  
  pinMode(LED_LIGHT, OUTPUT);  
  pinMode(LED_WASTE, OUTPUT);  
  pinMode(IR_PIN, INPUT);  
  pinMode(temp_PIN, INPUT);  
  lidServo.attach(Servo_Lid_PIN);  
  fanServo.attach(Fan_PIN);  
  heaterServo.attach(Heater_PIN);  
}
```

```
    lidServo.write(0);
    fanServo.write(0);
    heaterServo.write(0);
}
```

```
int distancedata(int TranPin, int ReciPin) {
    digitalWrite(TranPin, LOW);
    delayMicroseconds(2);
    digitalWrite(TranPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(TranPin, LOW);
    long duration = pulseIn(ReciPin, HIGH);
    return duration * 0.034 / 2;
}
```

```
void loop() {
    int personDistance = distancedata(TranUI_PIN, ReciUI_PIN);
    int wasteLevel = distancedata(Waste_Tran, Waste_Reci);
    int gasValue = analogRead(Gas_PIN);
    int lightLevel = analogRead(Light_PIN);
    int tiltState = digitalRead(Tilt_PIN);
    int IRValue = digitalRead(IR_PIN);
    int tempinc = map(((analogRead(temp_PIN) - 20) * 3.04), 0, 1023, -40, 125); // Fixed
temp_PIN usage
```

```
    lcd.clear();
```

```
    lcd.setCursor(0, 0);
```

```
if (personDistance > 0 && personDistance < 30) {
    if (IRValue == HIGH) {
        lidServo.write(90);
        lcd.print("BIN IS OPEN");
    }
    else {
        lidServo.write(0);
```

```
        lcd.print("BIN IS CLOSED");
    }
}
else {
    delay(2000);
    lidServo.write(0);
    lcd.print("BIN IS CLOSED");
}
```

```
lcd.setCursor(0, 1);
lcd.print("Waste Level: ");
lcd.print(wasteLevel);
```

```
if (wasteLevel < 10) {
    Serial.println("BIN IS FULL, PLEASE REMOVE");
    digitalWrite(LED_WASTE, HIGH);
}
else {
    Serial.println("BIN HAS SPACE");
    digitalWrite(LED_WASTE, LOW);
}
```

```
delay(2000);
lcd.clear();
```

```
lcd.setCursor(0, 0);
lcd.print("Gas Level: ");
lcd.print(gasValue);
```

```
if (gasValue > 600) {
    lcd.setCursor(0, 1);
    lcd.print("harmful gas, Remove trash");
}
```

```
    digitalWrite(Buzzer_PIN, HIGH);  
}  
else {  
    lcd.setCursor(0, 1);  
    lcd.print("No Harmful gas");  
    digitalWrite(Buzzer_PIN, LOW);  
}
```

```
delay(2000);  
lcd.clear();
```

```
lcd.setCursor(0, 0);  
lcd.print("Temp: ");  
lcd.print(tempinc);  
lcd.setCursor(0, 1);
```

```
if (tempinc > 30) {  
    lcd.print("HOT");  
    fanServo.write(90);  
    heaterServo.write(0);
```

```
}  
else if (tempinc < 10) {  
    lcd.print("COLD");  
    fanServo.write(0);  
    heaterServo.write(90);
```

```
}  
else {  
    lcd.print("MODERATE");  
    fanServo.write(0);  
    heaterServo.write(0);  
}
```

```
delay(2000);  
lcd.clear();
```

```
lcd.setCursor(0, 0);  
lcd.print("Light Level: ");  
lcd.print(lightLevel);
```

```
if (lightLevel < 300) {  
    digitalWrite(LED_LIGHT, HIGH);
```

```
        lcd.setCursor(0, 1);
        lcd.print("LED ON");
    }
    else {
        digitalWrite(LED_LIGHT, LOW);
        lcd.setCursor(0, 1);
        lcd.print("LED OFF");
    }

    delay(2000);
    lcd.clear();

    lcd.setCursor(0, 0);
    if (tiltState == 1) {
        lcd.print("BIN HAS FALLEN!!!");
        digitalWrite(Buzzer_PIN, HIGH);
    }
    else {
        lcd.print("BIN IS STABLE :)");
        digitalWrite(Buzzer_PIN, LOW);
    }

    delay(2000);
    lcd.clear();
}
```