
Ultrasonic Buzzer Alarm System

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Introduction

The Ultrasonic Buzzer Alarm System is an Arduino UNO based project used to detect nearby objects and generate an alarm sound using a buzzer. The system uses an HC-SR04 ultrasonic sensor to measure the distance between the sensor and an object.

When an object comes within a specified distance range, the buzzer automatically turns ON and alerts the user. This project is simple, cost-effective, and useful for security and obstacle detection applications.

Principle

This project works on the principle of ultrasonic distance measurement. The ultrasonic sensor sends ultrasonic sound waves and receives the reflected waves from nearby objects. The Arduino UNO calculates the distance using the time taken for the echo signal to return.

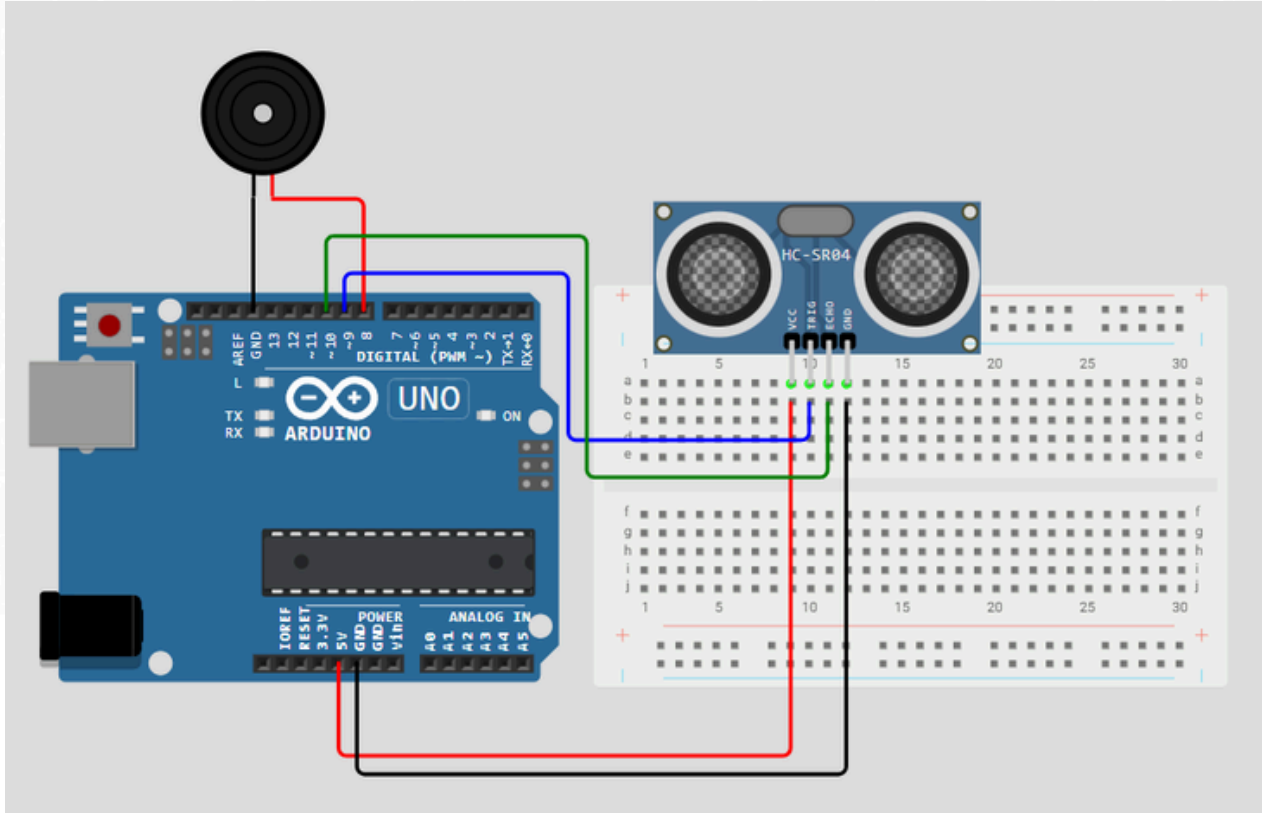
If the detected distance becomes smaller than the predefined limit, the Arduino activates the buzzer automatically. When the object moves away, the buzzer turns OFF.



Components Required

- 1) Arduino UNO
- 2) Ultrasonic Sensor
- 3) Buzzer
- 4) Jumper wires
- 5) Breadboard
- 6) Arduino UNO Port (For uploading code)

Circuit Diagram



Code

```
#define trigPin 9
#define echoPin 10
#define buzzer 8

long duration;
int distance;

void setup() {

  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(buzzer, OUTPUT);
  Serial.begin(9600);
}

void loop() {

  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;

  if (distance < 25) {
    digitalWrite(buzzer, HIGH);
  } else {
    digitalWrite(buzzer, LOW);
  }
  delay(200);
}
```



Code Explanation

The Arduino UNO controls the ultrasonic sensor and buzzer. The ultrasonic sensor continuously measures the distance between the sensor and nearby objects.

The Arduino calculates the distance using the echo signal received from the sensor. If the distance becomes less than 25 cm, the buzzer turns ON automatically. Otherwise, the buzzer remains OFF.

The process continuously repeats inside the loop function, making the system automatic and responsive.

Applications of this Project

- Security alarm systems
- Obstacle detection systems
- Smart parking systems
- Industrial safety systems
- Smart automation projects



Conclusion

The Ultrasonic Buzzer Alarm System using Arduino UNO was successfully designed and tested. The system can automatically detect nearby objects and generate an alert sound using a buzzer.

This project is simple, reliable, and useful for security and automation applications. It also helps beginners understand ultrasonic sensing and Arduino programming concepts.

Thank You.....!

