الكلية التقنية الهندسية
قسم هندسة تقنيات الأجهزة الطبية

Design and Implementation of Alarm System for Security and Surveillance Applications

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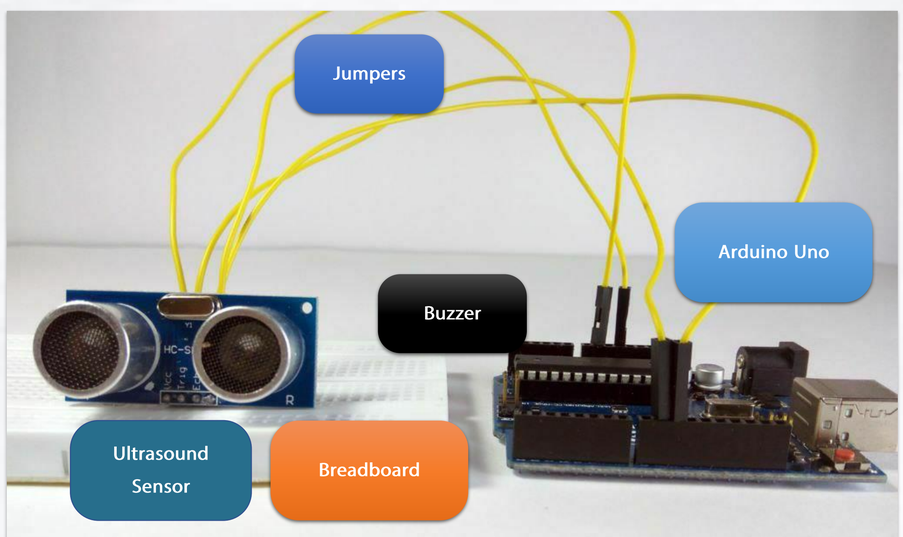
ABSTRACT :

When someone enters a protected place or crosses through the door or window, an alarm circuit is activated sounding an alarm. The circuit contains an Arduino, an ultrasonic sensor, and a buzzer. The task of the sensor is to send and receive ultrasonic waves. When there is a cut in the path of these ultrasonic waves, the resultant value changes in the serial port monitor commanding the Arduino circuit to signal the buzzer for alarm.

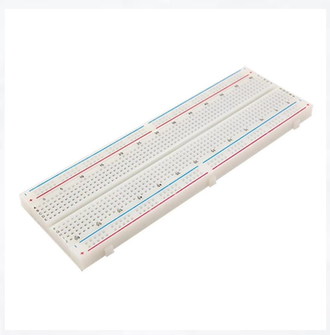
Operation :

This project is an ultrasonic-based security alarm. It is distance sensitive, so the buzzer beeps faster if the object is near and it beeps slowly if the object is far. The buzzer and ultrasonic sensor are mounted on the breadboard. Take two wires from the Arduino one for 5V and the other for GND and connect it to the breadboard. (Trig pin - pin 6 of Arduino) (Echo pin - pin 5 of Arduino) (GND - GND pin). The positive terminal of the buzzer was connected to pin 2 and the negative terminal was connected to GND.



Components :

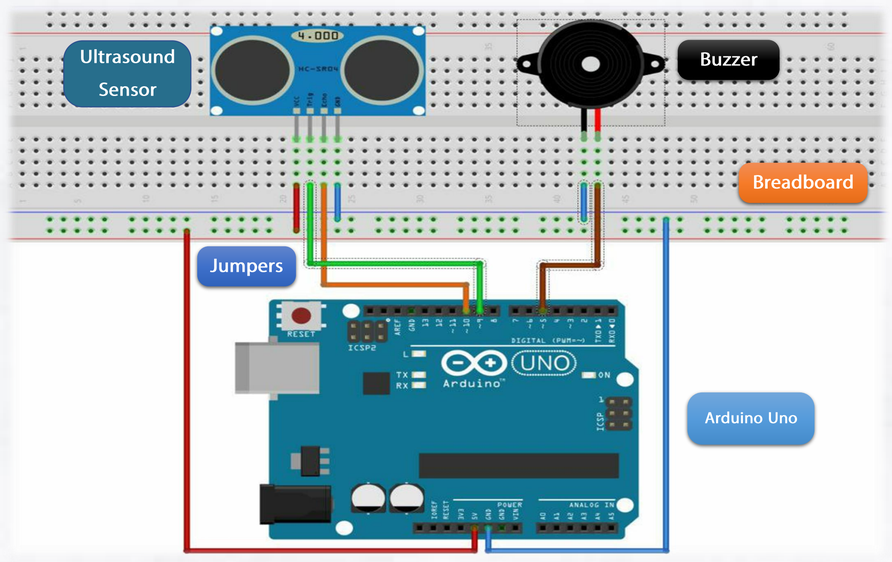
1. Arduino uno
2. Breadboard
3. Ultrasonic sensor
4. Jumper cables
5. Buzzer



Programming Code :

```
#define trigPin 11

#define echoPin 12

int Buzzer = 8;

int led = 10;

void setup() {

Serial.begin (9600);

pinMode(trigPin, OUTPUT);

pinMode(echoPin, INPUT);

pinMode(Buzzer, OUTPUT);

pinMode(led,OUTPUT);

}

void loop() {

int duration, distance;

digitalWrite(trigPin, HIGH);

delayMicroseconds(1000);

digitalWrite(trigPin, LOW);
```

Circuit Diagram :



References :

1.Jerry Silver, 2009, 125 Physics Projects for the Evil Genius, 1st Ed., McGraw-Hill.

2. Hubert Henry Ward, 2022, Programming Arduino Projects with the PIC Microcontroller: A Line-by-Line Code Analysis and Complete Reference Guide for Embedded Programming in C, APress, USA.