INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 05 (2025)

DESIGNING A SIGNALING SYSTEM USING ARDUINO UNO

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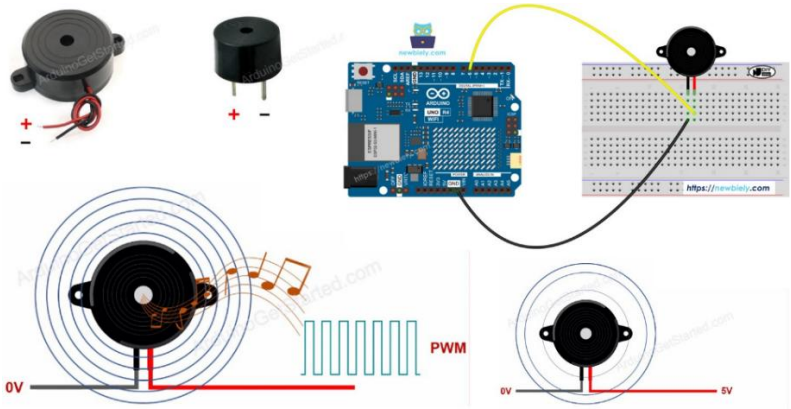
Abstract: Today, security systems have become an integral part of our lives. This Arduino Uno microcontroller in the article using simple but effective alarm system system how create possible seeing We will go out. This project is HC-SR04 ultrasonic sensor and alarm using devices (buzzer and LED) security to provide help gives.
Keywords: Arduino Uno, HC-SR04 ultrasound sensor, alarm system, security, microcontroller, buzzer, LED, distance measurement, automation, programming, electronics, real -time monitoring, open coded platform, sensor technology, cost-effective solution.
Annotation: V sovremennom mire systemy bezopasnosti steel neotemlemoy chastyu nashey jizni. V dannoy state rassmatrivaetsya, kak sozdat simple, no effective system signaling with the use of microcontroller Arduino Uno. This project uses an ultrasonic sensor HC - SR 04 and signaling devices (buzzer and light diode) to ensure safety.
Keywords: Arduino Uno, ultrasonic sensor HC-SR04, system signaling, security, microcontroller, buzzer, LED, distance measurement, automation, programming, electronics, monitoring and real time, platform with open source code, sensor technology, economic solution.
Abstract: In today's world, security systems have become an integral part of our lives. This article explores how to create a simple yet effective alarm system using the Arduino Uno microcontroller. The project utilizes the HC-SR04 ultrasonic sensor and signaling devices (buzzer and LED) to ensure security.
Keywords: Arduino Uno, HC-SR04 ultrasonic sensor, alarm system, security, microcontroller, buzzer, LED, distance measurement, automation, programming, electronics, real-time monitoring, open-source platform, sensor technology, cost-effective solution.
Introduction: Security systems modern in life important place This in the article Arduino Uno microcontroller and HC-SR04 ultrasound sensor based on simple, but effective alarm system system design theoretical basics seeing is issued. System object when approaching provides audible and visual signals, ensuring safety provides.
Research Relevance : Modern under the circumstances security systems private and public property protection in doing important importance has. Technologies development with cheap, effective and flexible alarm system to systems need increasing Arduino Uno microcontroller and HC- SR04 ultrasound sensor based on alarm system system design economical solution as security provide with together, electronics automation in the field innovative approaches to develop service This will do. research open coded from platforms use through small business, home farms and education institutions for comfortable alarm system systems create opportunity gives. From this except for the project students and engineers for microcontrollers and sensors with work according to practical skills in formation important place The research relevance security needs satisfaction, technological education development and cheap automation solutions offer in doing manifestation will be.
Alarm system system external in the environment certain situations, for example, the object approaching identify the user warning automated is a system. Alarm system Arduino Uno sensors in the system coming information read to them corresponding signaler controls devices (buzzer, LED). Arduino Uno is based on ATmega328P microcontroller based open coded microcomputer

platform. It is simple electronic projects done increase for used in sensors, motors, displays and other devices management opportunity Arduino Uno following to the features has :

- Digital input / output pins: 14 (6 PWM output) as used).
- Analog entrance pins: 6.
- Power: 5 V (USB) or 7-12 V external source via).
- Programming: is done using a language similar to C/C++ via the Arduino IDE.

A buzzer module is a small device used to produce a sound signal in electronic circuits, and is widely used in Arduino projects, including alarm systems with the HC-SR04 sensor. There are two main types: passive and active. A passive buzzer emits sounds of different frequencies via an external signal, the tone and pitch are controlled by software, more flexible, but requires programming. An active buzzer has a built-in oscillator, emits a constant sound when powered on, simple, can only be turned on/off, and is often chosen for signaling. The operating voltage is usually 3.3V or 5V, compatible with Arduino. The power consumption is low, 10-50 mA. In passive buzzers, the sound frequency is from 100 Hz to 10 kHz, in active ones it is fixed, for example, 2-3 kHz. The connection is 2 or 3 pins: VCC, GND, signal pin (for passive ones). Small size, easy to fit on breadboards or project boards.



Project scheme

VCC pin of HC-SR04 sensor to Arduino's 5V pin, GND pin to Arduino's GND pin Connects to the Trig pin. to pin 9 of the Arduino, the Echo pin and is connected to pin 10. Buzzer's anode (+) pin to pin 8 of the Arduino, the cathode (-) pin To GND connected. LED's anode (+) pin 220-330 Ohm resistor through to pin 7 of the Arduino, the cathode (-) pin To GND connects.

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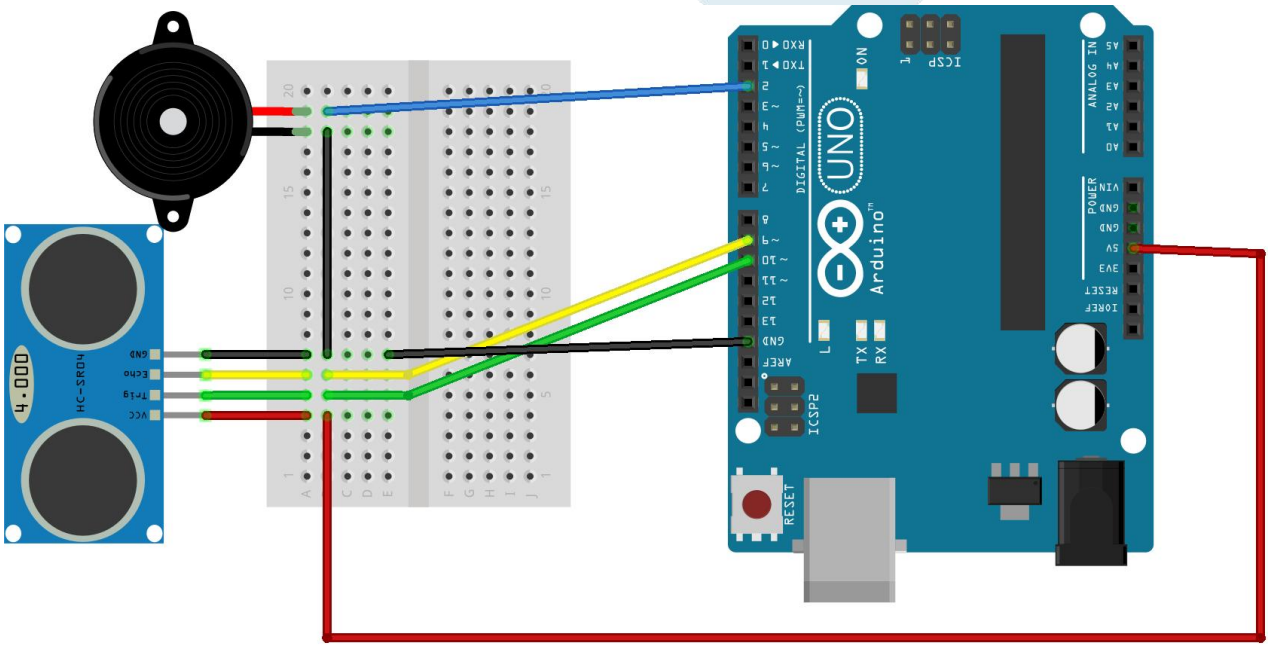

Software Maintenance

From Arduino IDE is used. The following code the system management for The code is from the HC-SR04 sensor. distance measures and the object is closer than 50 cm If, the buzzer and LED will be activated.

```
#define TRIG_PIN 9
#define ECHO_PIN 10
#define BUZZER_PIN 8
#define LED_PIN 7

void setup() {
  pinMode (TRIG_PIN, OUTPUT);
  pinMode (ECHO_PIN, INPUT);
  pinMode (BUZZER_PIN, OUTPUT);
  pinMode (LED_PIN, OUTPUT);
Serial.begin(9600);
}

void loop() {
long duration;
int distance;

  digitalWrite (TRIG_PIN, LOW);
  delayMicroseconds (2);
  digitalWrite (TRIG_PIN, HIGH);
  delayMicroseconds (10);
  digitalWrite (TRIG_PIN, LOW);

duration = pulseIn (ECHO_PIN, HIGH);
distance = duration * 0.034 / 2;
```

```
  Serial.print (" Distance : ");
  Serial.print (distance);
  Serial.println ("cm");

if (distance < 50) {
   digitalWrite (BUZZER_PIN, HIGH);
   digitalWrite (LED_PIN, HIGH);
} else {
   digitalWrite (BUZZER_PIN, LOW);
   digitalWrite (LED_PIN, LOW);
}

delay(100);
}
```

Components using breadboard connects. Connections to the scheme appropriate caution with done In the Arduino IDE new mirror opened, above code is entered and connected to the Arduino USB cable via Arduino to computer Connects to the system. to work HC-SR04 distance when lowered The buzzer sounds when the object approaches 50 cm. emits and the LED lights up. If the distance exceeds 50 cm, the buzzer and LED turn off. The distance is monitored in real time via the serial monitor. The system is tested: the object is brought closer or further away from the sensor, and the buzzer and LED are checked for operation.

Conclusion. Creating an alarm system using Arduino Uno and HC-SR04 ultrasonic sensor is a simple but effective solution. The system provides security by giving an audible and visual signal when an object approaches. This project is a great opportunity to learn electronics and programming, and can be made more functional with various extensions.

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