



LAI SOLUTION

IOT WATER LEVEL CONTROL SYSTEM

PRESENTATIONS 2025



www.wlcs.com



THE FOUNDERS



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PROBLEM:

In drought-prone regions like Sicily, many rely on rooftop water tanks to manage supply shortages. However, without a monitoring system, residents often don't know when their water is running low, leading to unexpected shortages.

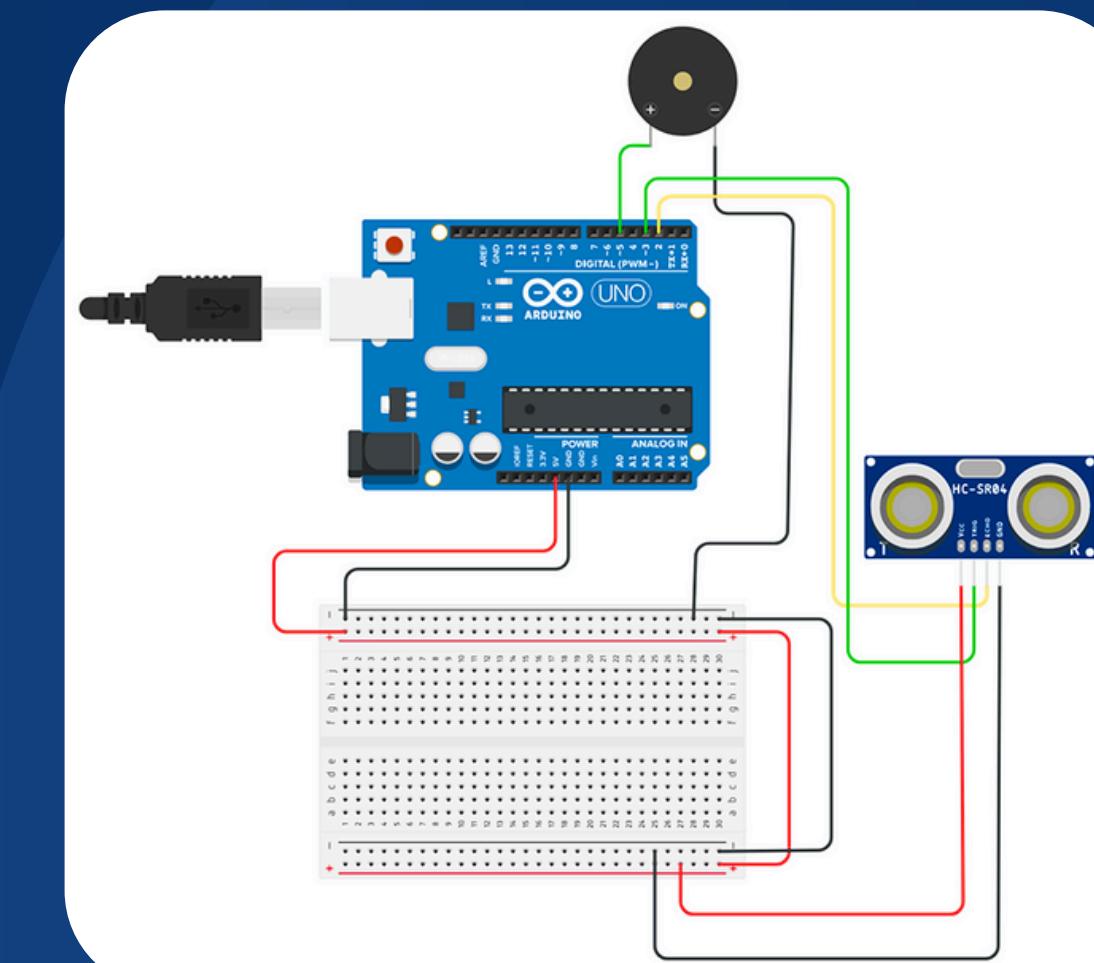
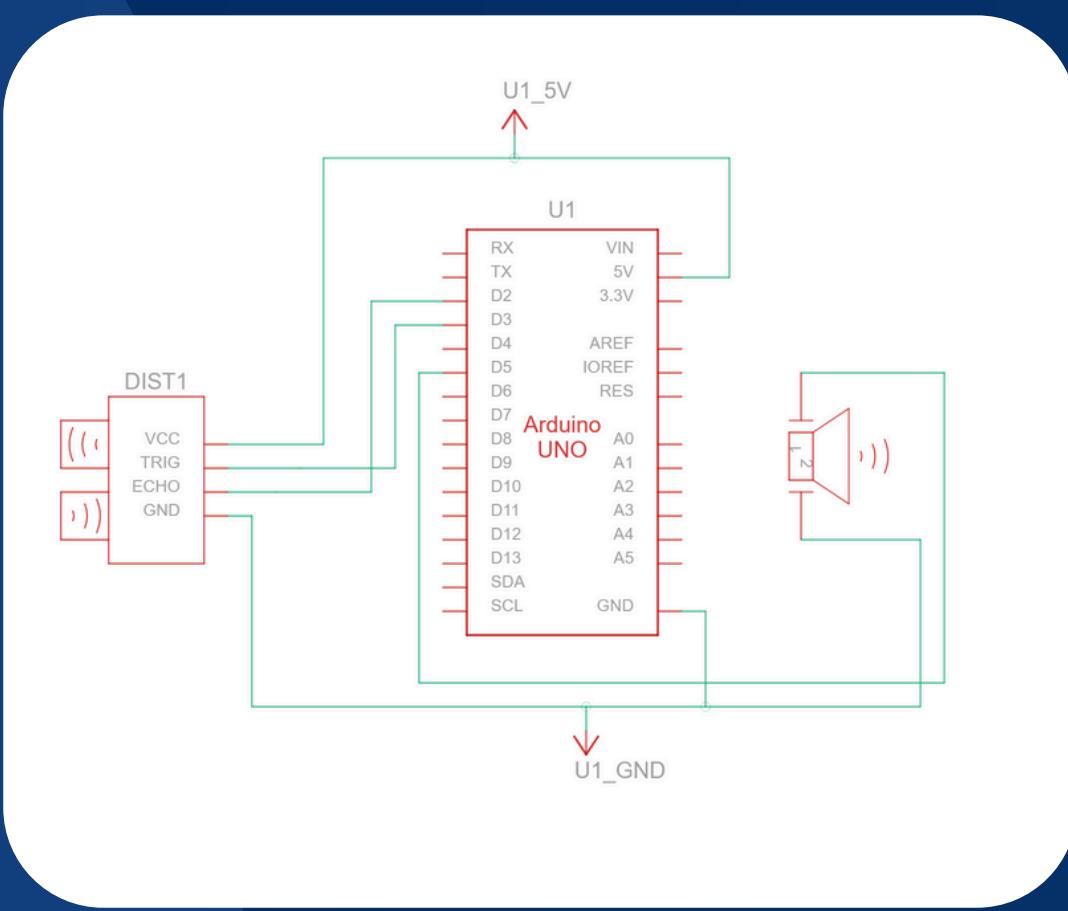
Older cars often lack a water level monitoring system for the engine's cooling system, making it difficult for drivers to know when the water tank is running low. This becomes a problem, especially when there's a water leak, as the tank can empty without warning, leading to engine overheating and potential damage.

SOLUTION:

IoT-WLCS offers automated and accurate monitoring, complete with alerts to prevent overflows or water shortages, ensuring efficient and reliable water management even in resource-constrained scenarios.



ARCHITECTURE OF THE SYSTEM



Product name: IoT-WLCS

List of components:

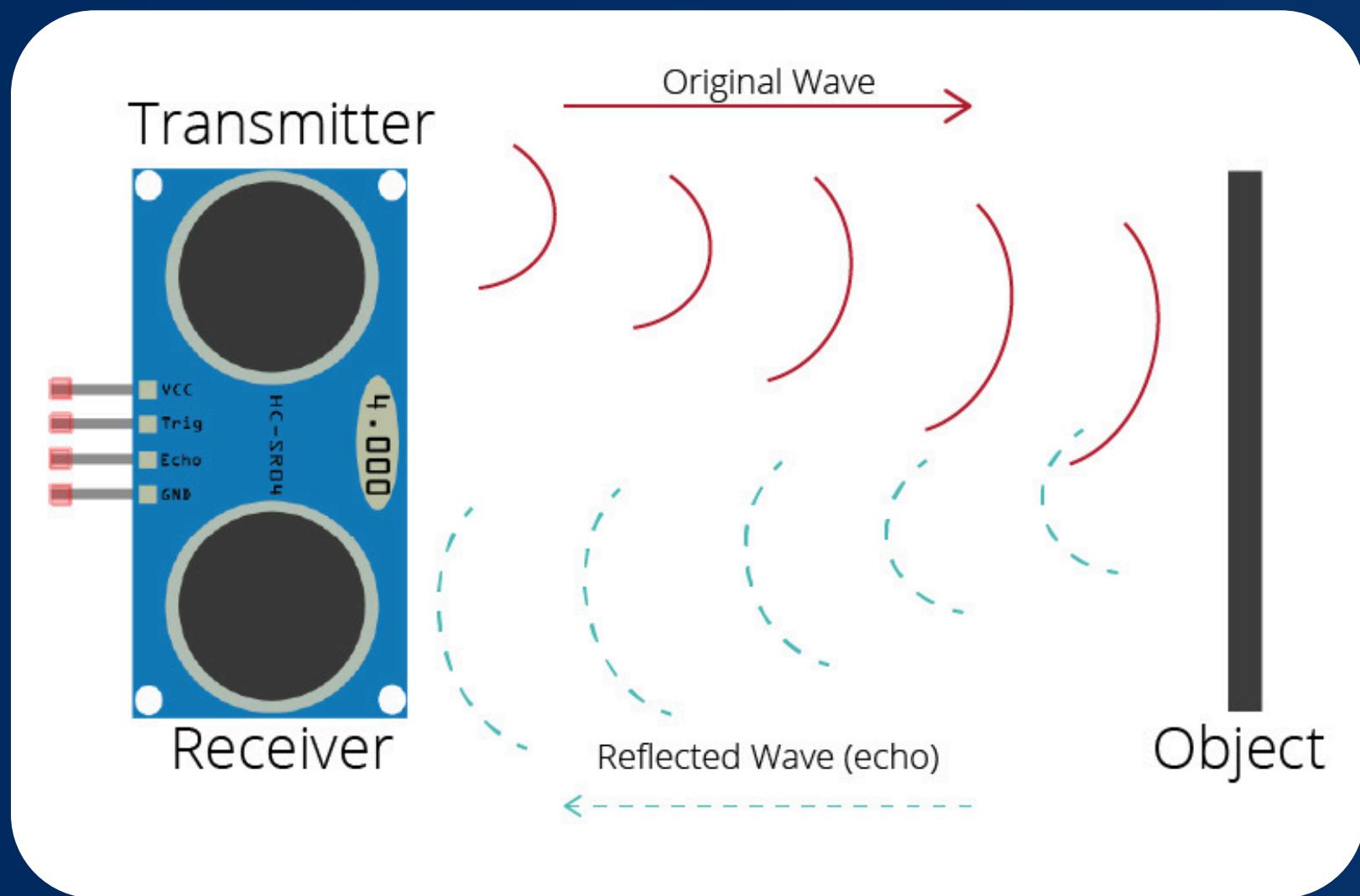
- 1x Arduino YUN
- 1x HC-SR04 Ultrasonic Sonar Sensor
- 1x Piezo Buzzer

List of the Feature:

- Ultrasonic Sensor: Uses HC-SR04 to measure water level in a container.
- Threshold Detection: Triggers actions when the water level falls below predefined thresholds.
- Piezo Buzzer: Activates for an audible alarm when water level is beyond thresholds.
- Remote Monitoring: Sends water level data to the Buzzit platform for real-time alerts via Wi-Fi (using ESP8266/ESP32 module).

ULTRASONIC PRECISION:

HOW THE HC-SR04 POWERS SMART WATER MONITORING

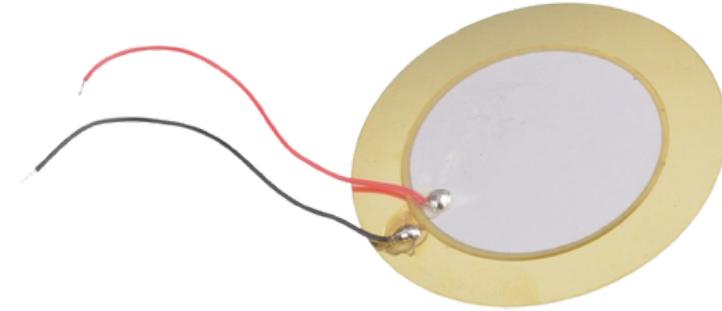


The sensor consists of a transmitter and a receiver. When triggered, the transmitter emits a sound wave, which reflects off an object (e.g., a water surface). The receiver detects the returning wave, and the sensor calculates the distance based on the time delay.

In our case, to use the HC-SR04 for water level monitoring, we place the sensor above the water surface and align it perpendicular to the surface for accurate readings.

By periodically measuring the distance between the sensor and the water, you can determine the water level. Setting minimum and maximum thresholds allows you to monitor water levels effectively and trigger alerts or actions when the level is too high or low.

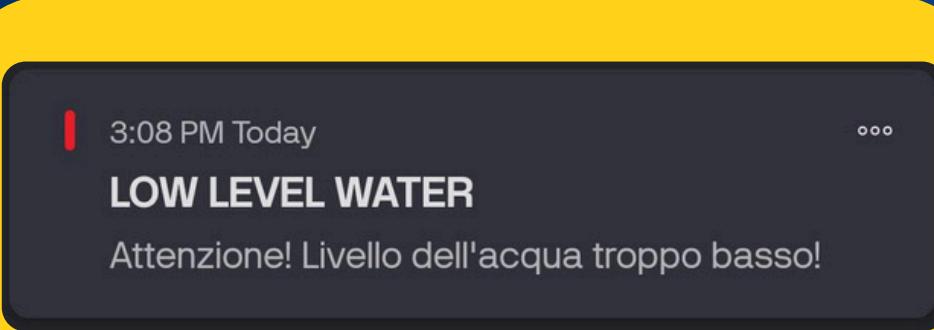
VISUAL AND AUDIBLE WARNINGS



Piezo

A piezo buzzer is a simple, efficient device that converts electrical signals into sound, commonly used in alarms, alerts, and notifications in IoT systems:

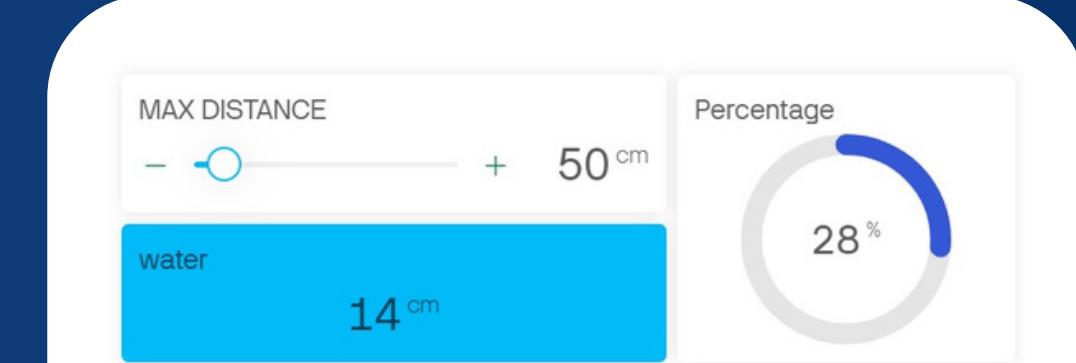
- Sound Generation: Produces sound by vibrating when an electrical signal is applied.
- Frequency Control: The tone can be varied by adjusting the signal frequency.
- Low Power: Consumes minimal energy.



Push Notification

Blynk push notifications provide real-time alerts for remote IoT device monitoring:

- Real-time alerts: Instantly informs users when critical events occur.
- Remote monitoring: Enables users to stay updated on their IoT devices from any location.



Dashboard

In the Blink dashboard for the water level control system:

- Slider: Allows adjustment of the total height of the water tank.
- Text Display: Shows the remaining water level in centimeters.
- Gauge: Visualizes the remaining water level as a percentage.



IOT WATER LEVEL MONITORING CODE BREAKDOWN:

CODE:

This code integrates an ultrasonic sensor with the Blynk app to monitor water levels and trigger alerts.

Key Points:

- Blynk Setup: Defines template ID, name, and authentication token.
- Pin Configuration: Sets pins for the ultrasonic sensor and buzzer.
- **BLYNK_WRITE(V1)**: Updates **MAX_DISTANCE** with the slider value from the app and prints it to the serial monitor.

```
#define BLYNK_TEMPLATE_ID "TMPL4Uq3hnltm"
#define BLYNK_TEMPLATE_NAME "Water Level Control" // Nome del template
#define BLYNK_AUTH_TOKEN "H_DKyxEzylM_lIEkPT_YAI679YjQKA94" // Auth Token del progetto

#define BLYNK_PRINT Serial // Per il debug via monitor seriale

#include <Bridge.h>
#include <BlynkSimpleYun.h>

// Pin del sensore ultrasonico
int TRIG_PIN = 3;    // Trigger pin
int ECHO_PIN = 2;    // Echo pin
int PIEZO_PIN = 5;   // Pin per il buzzer

int MAX_DISTANCE = 200; // Valore predefinito di MAX_DISTANCE

// Funzione per ricevere il valore dallo slider su Blynk
BLYNK_WRITE(V1) {
    MAX_DISTANCE = param.asInt(); // Aggiorna MAX_DISTANCE
    Serial.print("[Blynk] Nuovo valore di MAX_DISTANCE: ");
    Serial.println(MAX_DISTANCE);
}
```

IOT WATER LEVEL MONITORING CODE BREAKDOWN:

CODE:

The setup() function initializes key components for the water level control system:

- Serial communication: Starts at 9600 baud for debugging (Serial.begin(9600));.
- Blynk connection: Initializes Blynk using the authentication token (Blynk.begin(BLYNK_AUTH_TOKEN));.
- Pin configuration:
 - Sets the ultrasonic sensor trigger pin as output (pinMode(TRIG_PIN, OUTPUT));.
 - Sets the echo pin as input (pinMode(ECHO_PIN, INPUT));.
- Configures the piezo buzzer pin as output (pinMode(PIEZO_PIN, OUTPUT));.

```
void setup() {
    // serial printer per il debug e inizializzazione blynk
    Serial.begin(9600);
    Serial.println("Inizializzazione del sistema...");

    Blynk.begin(BLYNK_AUTH_TOKEN);

    // Configura i pin
    pinMode(TRIG_PIN, OUTPUT);
    pinMode(ECHO_PIN, INPUT);
    pinMode(PIEZO_PIN, OUTPUT);

    Serial.println("Sistema pronto! Connessione a Blynk avviata...");
}
```

IOT WATER LEVEL MONITORING CODE BREAKDOWN:

CODE:

The loop() function continuously monitors the water level and maintains the Blynk connection:

- Blynk connection: Keeps the system connected to Blynk for remote monitoring (Blynk.run());).
- Ultrasonic pulse: Sends a trigger pulse to the ultrasonic sensor to start measurement (digitalWrite(TRIG_PIN, LOW/HIGH)).
- Echo duration: Reads the time for the echo signal to return (pulseIn(ECHO_PIN, HIGH));).
- Distance calculation: Converts the echo duration into a distance measurement in centimeters (distance = (duration / 2) / 29.1;).
- Debugging: Prints the signal duration and calculated distance to the serial monitor.
- Water level percentage: Calculates the water level as a percentage based on the measured distance (percentage).

```
void loop() {
    Blynk.run(); // Mantiene la connessione a Blynk

    // Emetti un impulso sul pin Trigger
    digitalWrite(TRIG_PIN, LOW);
    delayMicroseconds(2);
    digitalWrite(TRIG_PIN, HIGH);
    delayMicroseconds(10);
    digitalWrite(TRIG_PIN, LOW);

    long duration = pulseIn(ECHO_PIN, HIGH); // durata eco
    long distance = (duration / 2) / 29.1; // conversione in cm

    // Debugging: durata segnale e distanza calcolata
    Serial.print("Durata del segnale: ");
    Serial.print(duration);
    Serial.print(" microsecondi, Distanza calcolata: ");
    Serial.print(distance);
    Serial.println(" cm");

    //percentuale del livello dell'acqua
    float percentage = ((float)(MAX_DISTANCE - distance) / MAX_DISTANCE) * 100;
```

IOT WATER LEVEL MONITORING CODE BREAKDOWN:

CODE:

The loop() function checks the water level and sends data to Blynk:

- Water level check: If the water level is less than 10% of the tank capacity, it triggers an alert.
- Blynk data update:
 - Sends the water level in centimeters to virtual pin V0 (Blynk.virtualWrite(V0, MAX_DISTANCE - distance)).
 - Sends the water level percentage to virtual pin V2 (Blynk.virtualWrite(V2, percentage)).
- Low water alert:
 - Activates the buzzer when the water level is too low (tone(PIEZO_PIN, 1000, 1000));.
 - Logs an event to Blynk to notify about the low water level (Blynk.logEvent("low_water", "Attenzione! Livello dell'acqua troppo basso!"));.
- Normal water level:
 - Deactivates the buzzer if the water level is adequate (noTone(PIEZO_PIN));.
 - Prints the remaining water level in centimeters to the serial monitor.

```
if (MAX_DISTANCE - distance <= 0.10 * MAX_DISTANCE) {  
    // Scrive livello dell'acqua sul Virtual Pin V0  
    Blynk.virtualWrite(V0, MAX_DISTANCE - distance);  
  
    //la percentuale dell'acqua sul Virtual Pin V2  
    Blynk.virtualWrite(V2, percentage);  
  
    Serial.println("ATTENZIONE: Livello dell'acqua troppo basso!");  
    tone(PIEZO_PIN, 1000, 1000); // Suona il buzzer (frequenza 1000 Hz, durata 1 secondo)  
  
    // creazione di un evento per segnalare il livello basso  
    Blynk.logEvent("low_water", "Attenzione! Livello dell'acqua troppo basso!");  
}  
else {  
    noTone(PIEZO_PIN); //buzzer spento se il livello è normale  
    Serial.print("Livello dell'acqua OK. Acqua rimanente: ");  
    Serial.print(MAX_DISTANCE - distance);  
    Serial.println(" cm");  
  
    Blynk.virtualWrite(V0, MAX_DISTANCE - distance);  
    Blynk.virtualWrite(V2, percentage);  
}  
  
//valore attuale di MAX_DISTANCE  
Serial.print("Valore corrente di MAX_DISTANCE: ");  
Serial.println(MAX_DISTANCE);  
  
delay(500); // Aspetta mezzo secondo prima della prossima lettura  
}
```

SIMILAR PRODUCT:



Mutuer Sensore Livello Acqua, Misuratore Livello Serbatoio Dell'acqua Ultrasuoni Multifunzionale, Indicatore Elettronico Livello Dell'acqua Serbatoio Dell'acqua Sensore Misuratore, con Display Led 3,3in

60,99 €

Sped. gratuita

Tot. 60,99 €

Disponibilità ●

Sensore Livello Acqua, Misuratore Livello Serbatoio Dell'acqua Ultrasuoni Multifunzionale, Indicatore Elettronico Livello Dell'acqua Serbatoio Dell'acqua Sensore Misuratore, con Display Led 3,3in 【Sensore Livello Acqua】 : Sensore livello acqua ultrasuoni

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★★★★★ (396) ⓘ



EPTTECH TLC2206-ZB ZigBee APP promemoria liquido impermeabile IP67 Accuratezza del livello dell'acqua liquido del serbatoio dell'olio Monitoraggio del sensore Controller indicatore di allarme

64,90 €

Sped. gratuita

Tot. 64,90 €

Disponibilità ●

EPTTECH TLC2206-ZB ZigBee APP promemoria liquido impermeabile IP67 Accuratezza del livello dell'acqua liquido del serbatoio dell'olio Monitoraggio del sensore Controller indicatore di allarme Lunghezza di misurazione: da 10 cm a 2,5 m (da 4 a 98 pollici)

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★★★★★ (396) ⓘ



AIDNTBEO Trasmettitore sensore di livello dell'acqua, kit sensore di livello dell'acqua del serbatoio e sensore di temperatura, indicatore di livello di riempimento del serbatoio della cisterna con sensore,

84,19 €

Sped. gratuita

Tot. 84,19 €

Disponibilità ●

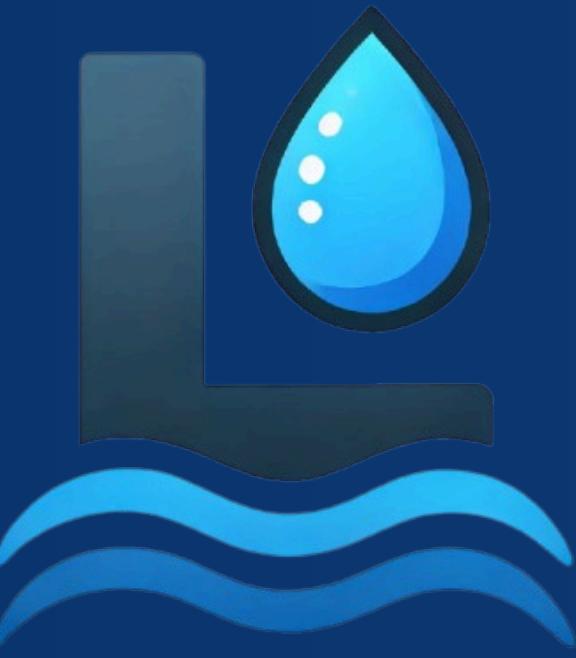
Trasmettitore sensore di livello dell'acqua, kit sensore di livello dell'acqua del serbatoio e sensore di temperatura, indicatore di livello di riempimento del serbatoio della cisterna con sensore, 【Indicatore di temperatura indicatore di livello di

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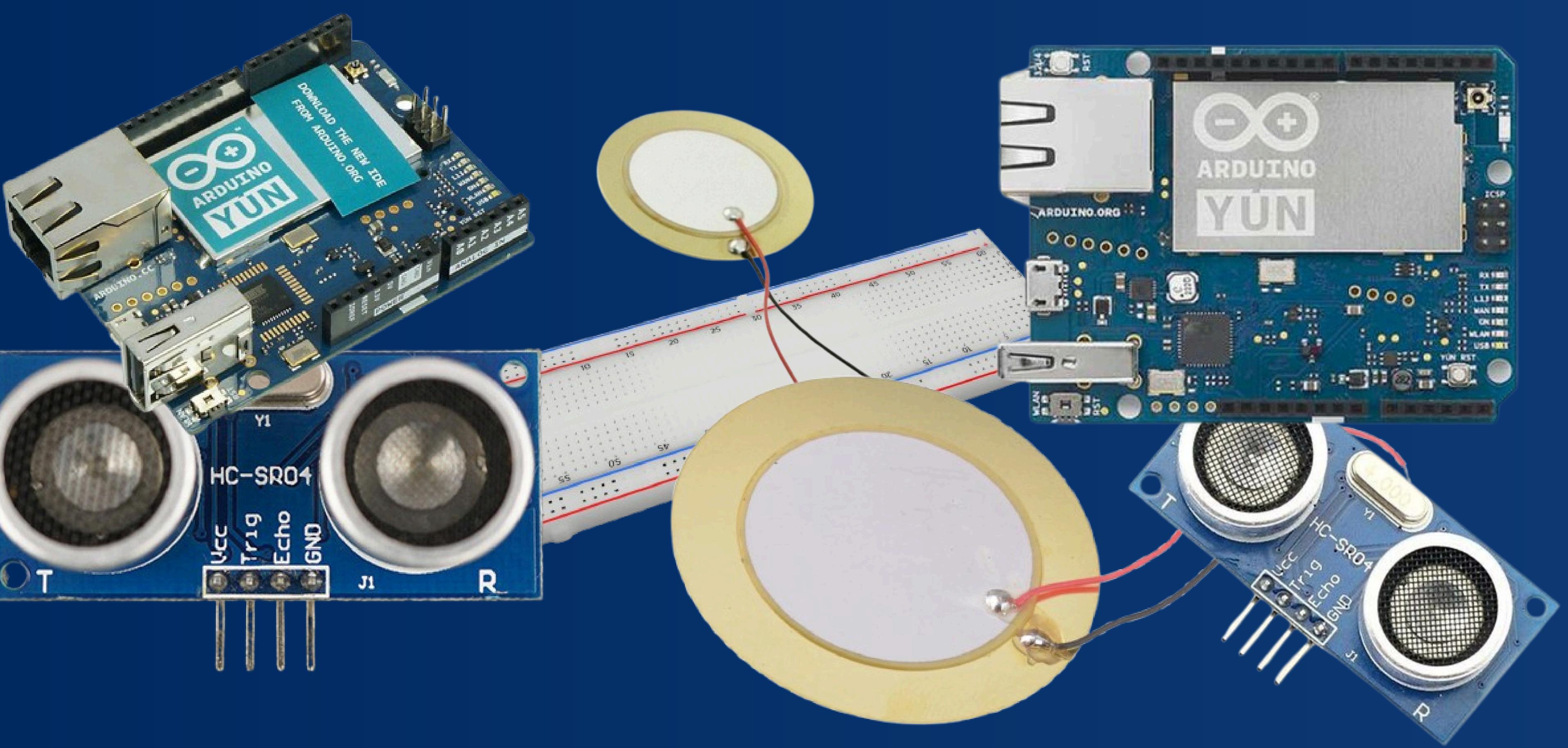


★★★★★ (396) ⓘ

**THANK YOU FOR
YOUR ATTENTION**



LAI SOLUTION



VENDESI PEZZI ARDUINO