Lab 2: Water Level Detection with Arduino

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Contents

Lab: Water Level Detection with Arduino

Introduction

In this LAB project, we explore how a Water Level Sensor can be interfaced with an Arduino UNO to detect and monitor the water level in a container. Water level sensors are widely used in automatic water tanks, flood alarms, and similar systems. The sensor used here outputs an analog voltage proportional to the water level, which can be read by the Arduino's ADC.

We will implement a visual indicator system using LEDs connected to pins 2, 3, and 4, where each LED represents a different water level:

- Green (Pin 4): Low

- Yellow (Pin 3): Medium

- Red (Pin 2): High

Components Used:

- Arduino UNO

- Water Level Sensor Module

- 3 × LEDs

    - Red LED → Pin 2 (High level indicator)

    - Yellow LED → Pin 3 (Medium level indicator)

    - Green LED → Pin 4 (Low level indicator)

- Three 220Ω Resistors

- Jumper wires

- Breadboard

- USB cable for Arduino

- Water container

Pin Connection Table:

Pin	Connected to (Arduino)
+(VCC)	Pin 7 (Digital Output)
– (GND)	GND
S (Signal)	A0 (Analog Input)
Red LED	Pin 2 (Digital Output)
Yellow LED	Pin 3 (Digital Output)
Green LED	Pin 4 (Digital Output)

Arduino Code:

```
/ Sensor pins

#define sensorPower 7

#define sensorPin A0


// Value for storing water level

int val = 0;


/* Change these values based on your calibration values */

int lowerThreshold = 200;

int upperThreshold = 400;


// Declare pins to which LEDs are connected

int redLED = 2;

int yellowLED = 3;
```

```arduino
int greenLED = 4;

void setup() {
  Serial.begin(9600);
  pinMode(sensorPower, OUTPUT);
  digitalWrite(sensorPower, LOW);

  // Set LED pins as an OUTPUT
  pinMode(redLED, OUTPUT);
  pinMode(yellowLED, OUTPUT);
  pinMode(greenLED, OUTPUT);

  // Initially turn off all LEDs
  digitalWrite(redLED, LOW);
  digitalWrite(yellowLED, LOW);
  digitalWrite(greenLED, LOW);
}

void loop() {
  int level = readSensor();

  if (level == 0) {
    Serial.println("Water Level: Empty");
    digitalWrite(redLED, LOW);
    digitalWrite(yellowLED, LOW);
```

```arduino
      digitalWrite(greenLED, LOW);
    } else if (level > 0 && level <= lowerThreshold) {
      Serial.println("Water Level: Low");
      digitalWrite(redLED, HIGH);
      digitalWrite(yellowLED, LOW);
      digitalWrite(greenLED, LOW);
    } else if (level > lowerThreshold && level <= upperThreshold) {
      Serial.println("Water Level: Medium");
      digitalWrite(redLED, LOW);
      digitalWrite(yellowLED, HIGH);
      digitalWrite(greenLED, LOW);
    } else if (level > upperThreshold) {
      Serial.println("Water Level: High");
      digitalWrite(redLED, LOW);
      digitalWrite(yellowLED, LOW);
      digitalWrite(greenLED, HIGH);
    }
  delay(1000);
}


//This is a function used to get the reading
int readSensor() {
  digitalWrite(sensorPower, HIGH);
  delay(10);
  val = analogRead(sensorPin);
```
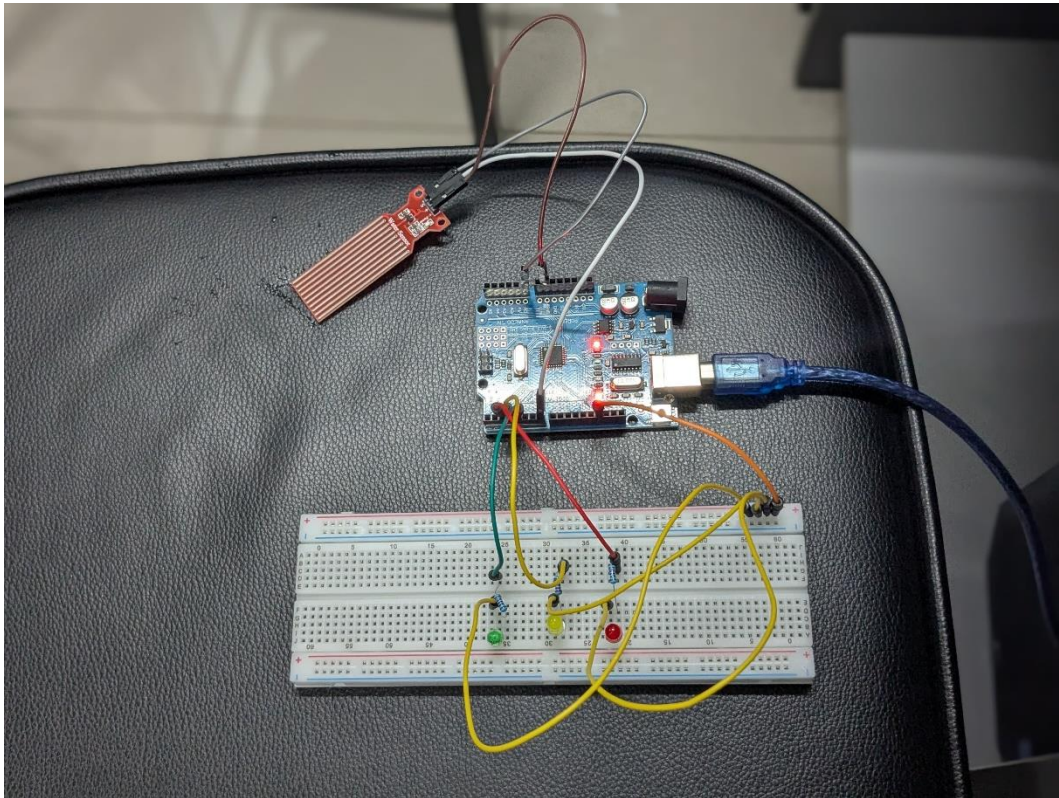
```
  digitalWrite(sensorPower, LOW);

  return val;

}
```

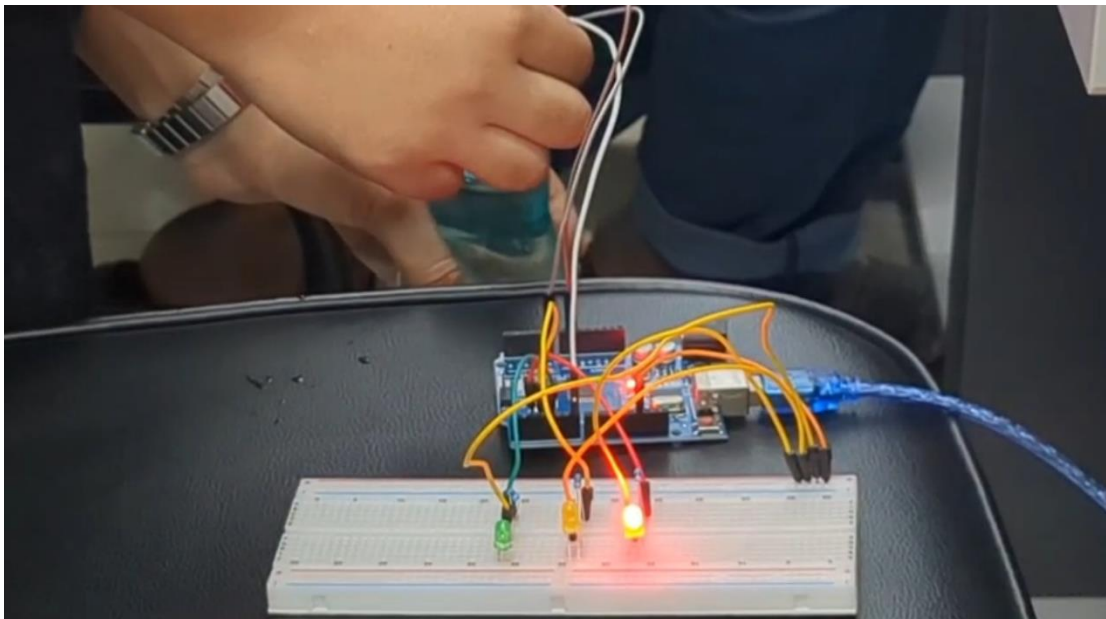## Water level with Senor Reading:

Water Level	Sensor Reading
Empty	0
Low	1 – 200
Medium	201 – 400
High	401+

Images:
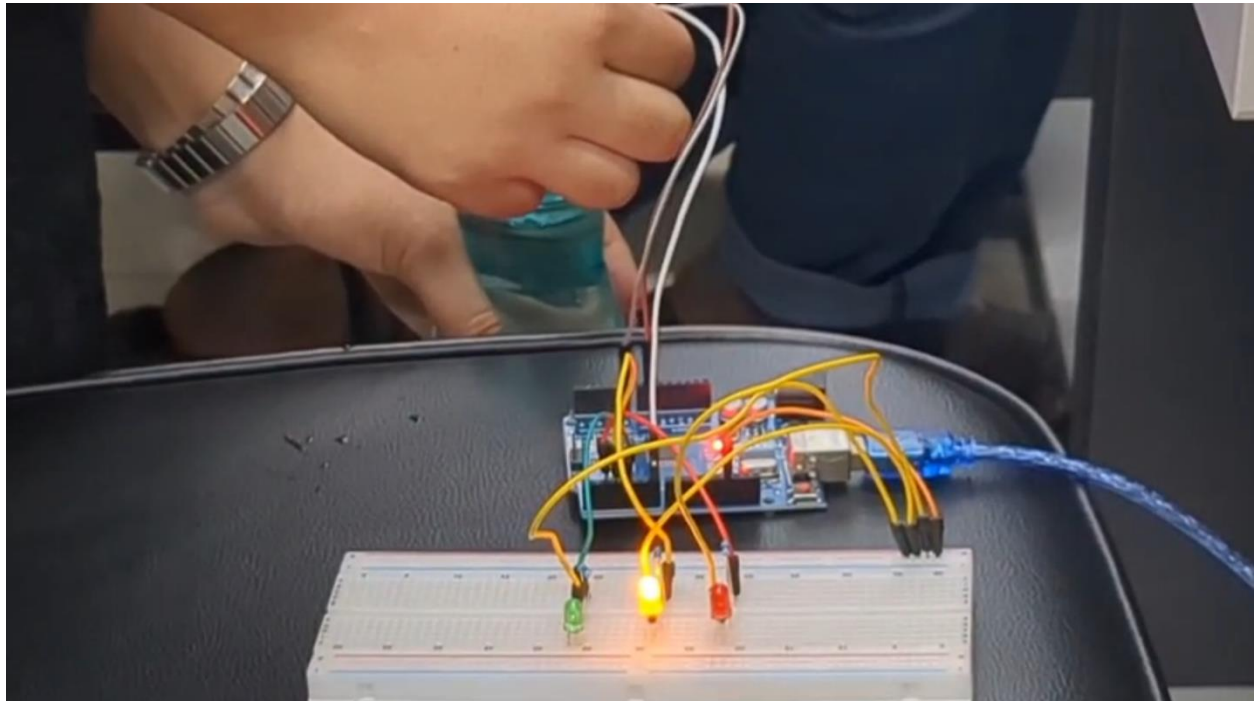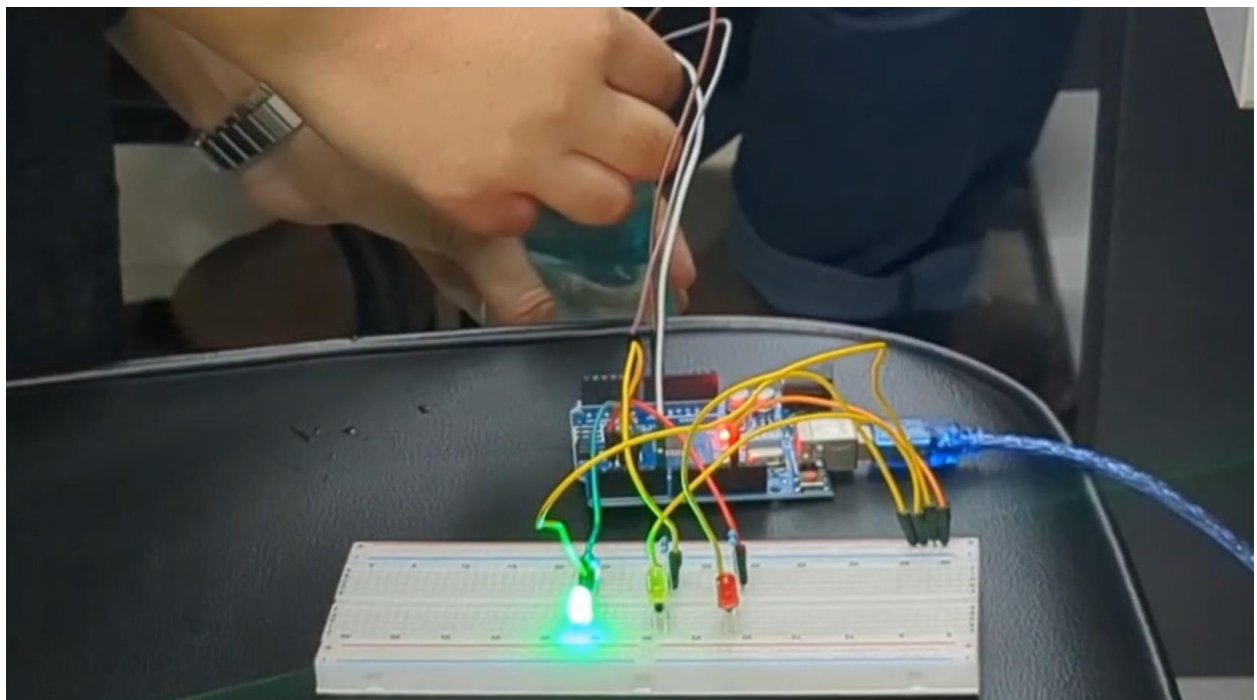
Initial Setup

For High water level: Red light will be on

For Medium water level: yellow light will be on

For Low water level: Green light will be on

Conclusion

This lab demonstrated how to interface a water level sensor with Arduino and use LEDs to indicate water levels (low, medium, high). The system worked effectively, showing real-time status through LED signals and serial output. It's a practical solution for basic water monitoring systems.

GitHub Repository:
[https://github.com/shihab372/CSE406_IoT/upload/main/Lab1]