Graphic Era
Deemed to be University

IOT Project report

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Subject: - Fundamental of IOT

Submitted to: -

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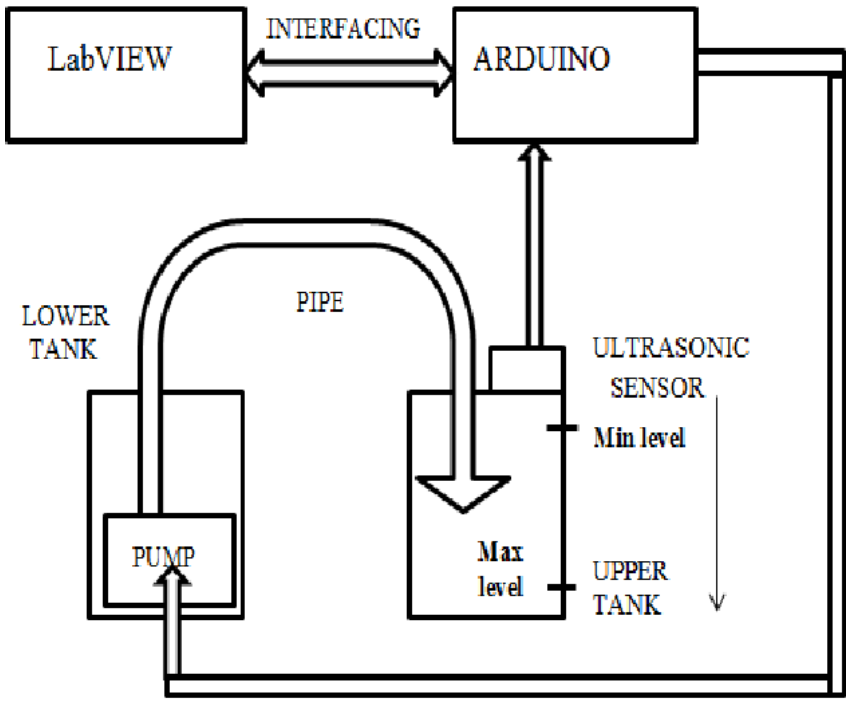


Figure 1. A Block Diagram of Automatic water level controller

AUTOMATIC WATER LEVEL MONITORING SYSTEM

Aim: - To Monitor and control the water level of water tanks.

Purpose: - In this project we can determine the water level in the tank using an ULTRASONIC SENSOR and indicate the level using LED lights and automatically starting the Pump if the water level is below 30%.

Theory: -

Ultrasonic Sensor HC-SR04 is a sensor using which we can measure distance between the sensor and the surface which can reflect the ultrasonic rays. It emits an ultrasound at 40 000 Hz (40kHz) which travels through the air and if there is an object or obstacle on its path It will bounce back to the module. Considering the travel time and the speed of the sound We can calculate the distance.

The configuration pin of HC-SR04 is VCC (1), TRIG (2), ECHO (3), and GND (4). The supply voltage of VCC is +5V and we can attach TRIG and ECHO pin to any Digital I/O in our Arduino Board.

Working of this project is very simple. We have used Ultrasonic sensor module which sends the sound waves in the water tank and detects reflection of sound waves that is ECHO. First of all, we need to trigger the ultrasonic sensor module to transmit signal by using Arduino and then wait to receive ECHO. Arduino reads the time between triggering and received ECHO. We know that speed of sound is around 340 m/s. so we can calculate distance by using given formula:

Distance= (travel time/2) * speed of sound

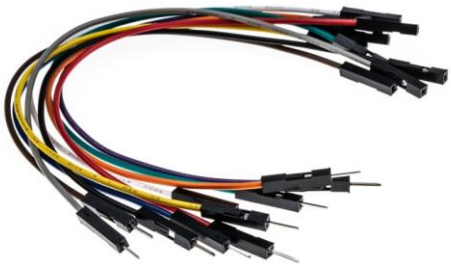
Where speed of sound is approximately 340m per second.

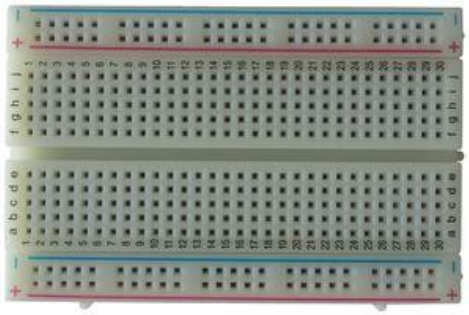
By using this method, we get distance from sensor to water surface. After it we need to calculate water level.

Hardware requirements:

The materials that we need to make this project:
1. Arduino UNO R3 CH340

2. Ultrasonic Sensor HC-SR04

3. Jumper Wires
a). Male to Male
b). Male to Female

4. Breadboard



5. USB cable

6. Relay

7. Water Pump

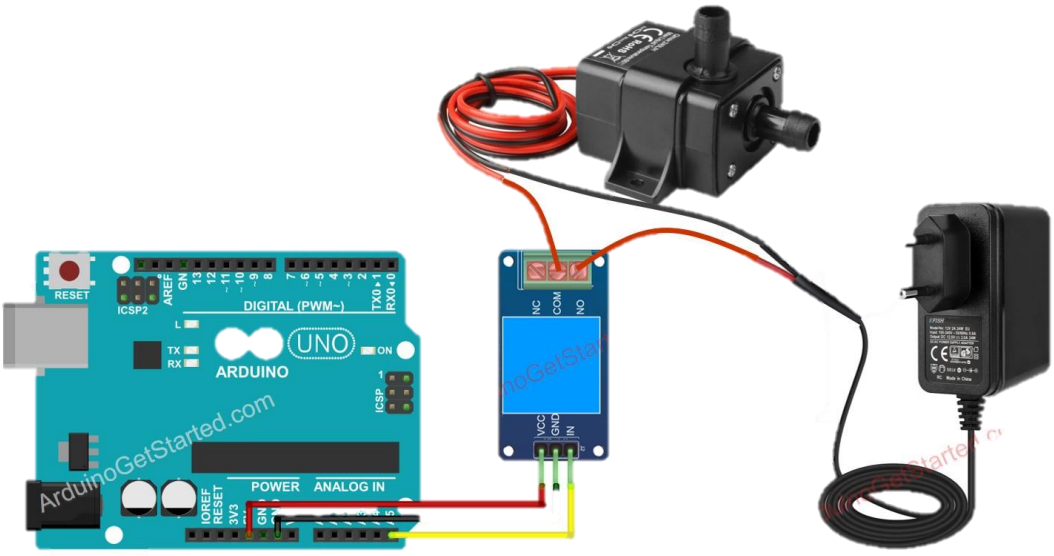
8. LED lights

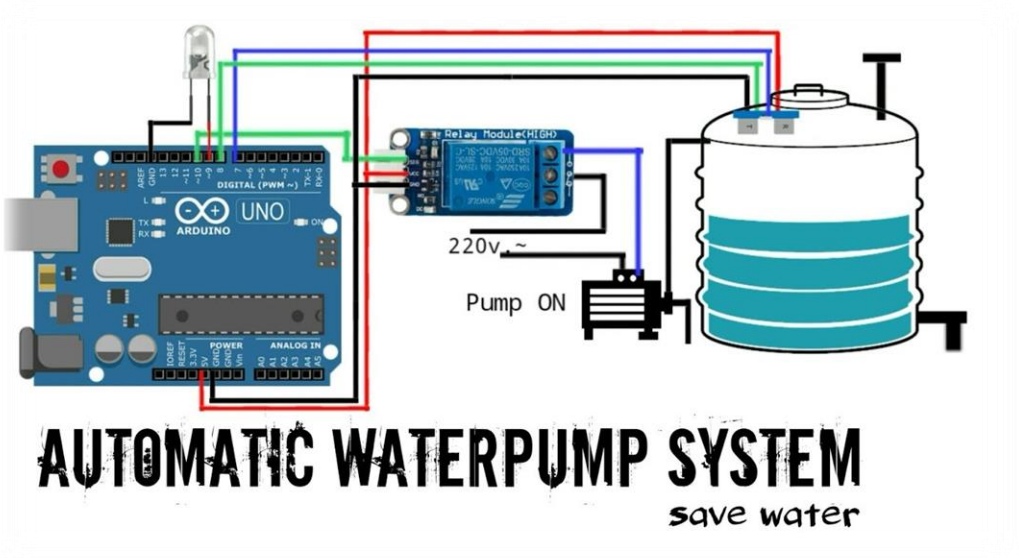
Software Requirements:

1. Arduino IDE

PIN DIAGRAM

Connection of water pump using relay: -





CODE: -

```
// Arduino programming


#define trigpin 7
#define echopin 5
#define Relay_pin 6
int led1 = A0; //RED
int led3 = A4;//GREEN
int depth = 9; // in cm

void setup()
{
  Serial.begin(9600);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  pinMode(led1, OUTPUT);

  pinMode(led3, OUTPUT);
  pinMode(Relay_pin, OUTPUT);



  digitalWrite(led1,LOW);
  digitalWrite(led3, LOW);

  delay(1000);
}
```

```
void loop()
{
  int percen, duration, distance;
  digitalWrite(trigpin, HIGH);

  delayMicroseconds(1000);
  digitalWrite(trigpin, LOW);



  duration = pulseIn(echopin, HIGH);
  distance = ( duration / 2) / 29.1;

  if (  distance > 7   )
  {
    digitalWrite(led1, HIGH);
    //digitalWrite(led2, LOW);
    digitalWrite(led3, LOW);
    digitalWrite(Relay_pin, HIGH);
  }
  else if ( distance >2 && distance <= 4  )
  {
    digitalWrite(led1, LOW);
   // digitalWrite(led2, LOW);
    digitalWrite(led3, HIGH);
    digitalWrite(Relay_pin, HIGH);

  }
```

```
 else{
   digitalWrite(led1, LOW);
   digitalWrite(led3, HIGH);
   digitalWrite(Relay_pin, LOW);
 }
 }
```

OUTPUT:

Different water levels were seen using LED lights (RED, GREEN).

Red for low water level.

Green for full tank.

It was also observed that the pump in the lower tank automatically started when the water level was below 30 % and was stopped automatically when the water level become greater than 80%.

APPLICATION:

- Home based water tank monitoring system
- Automatic irrigation system.
- Flood monitoring
- Sea level monitoring