IPRC MUSANZE
Integrated Polytechnic Regional College
RWANDA POLYTECHNIC
P.O.Box 226 Musanze-Rwanda
Tel: +250 785 189 494
Email: info@iprcmusanze.rp.ac.rw
www.iprcmusanze.rp.ac.rw

WATER LEVEL INDICATOR BASED ON ULTRASONIC SENSOR

NAMES: REBECCA UWIRINGIYIMANA

REG Nº 21RP09076

DEPARTMENT: ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAM: ELECTRICAL AUTOMATION TECHNOLOGY

Watch video to the following link:

https://youtu.be/YvdWQG9cDnM

ABSTRACT

Water level indicator project in a system which shows the value of water in the tank, if there is low or full water. And to avoid any water wastage. This system it's uses Arduino as open-source electronic hardware and software. And ultrasonic sensor to measure the distance or level of the water in the tank and LCD Display will display the measure and percentages of level measured by the sensor then, Arduino can switch the LED to indicates by using light.

Keyword: Arduino, Ultrasonic sensor, LCD Display and LED

1. INTRODUCTION

In this Arduino based automatic water level indicator and controller project we are going to measure the water level by using ultrasonic sensors. Basic principal of ultrasonic distance measurement is based on ECHO. When sound waves are transmitted in environment then they return back to the origin as ECHO after striking on any obstacle.

So, we have to only calculate its travelling time of both sounds means outgoing time and returning time to origin after striking on any obstacle. And after some calculation we can get a result that is the distance. This concept is used in our water controller project where the water motor pump is automatically turned on when water level in the tank becomes low.

2. PROBLEM STATEMENT

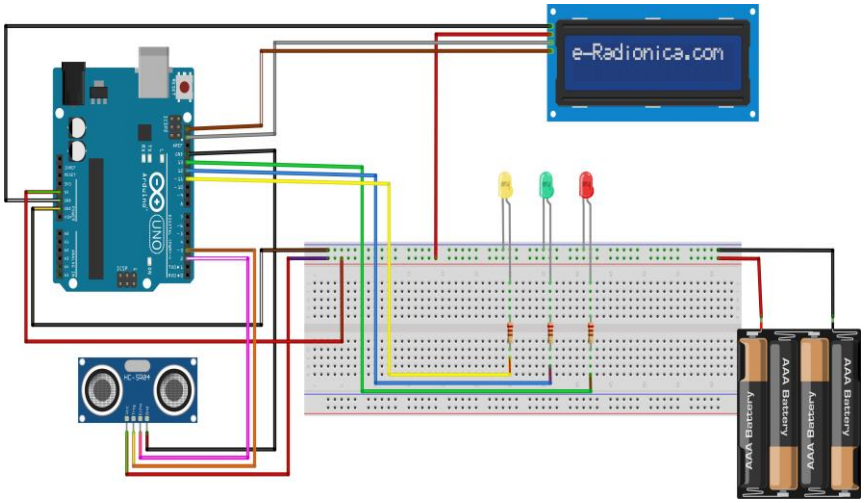
Need of this project is to avoid wastage of water. Because sometimes people forget to off the motor when tank is full, because of that water get wasted. To avoid this problem this project came into picture. By using this water level indicator system, we can monitor water level and consumption of water.

3. METHODOLOGY

COMPONENTS REQUIRED

- Arduino UNO
- ultrasonic sensor (Hc-sr04)
- LCD display with I2C
- Resistor 220 ohm (3)
- LED (3)
- Breadboard
- Jumper wires

CIRCUIT DIAGRAM



PIN CONNECTION

1. connect the LEDs on the breadboard and make sure that the cathode pin is connected to the ground
2. Connect led 1 to arduino digital pin 13
3. Connect led 2 to arduino digital pin 12
4. Connect led 3 to arduino digital pin 11

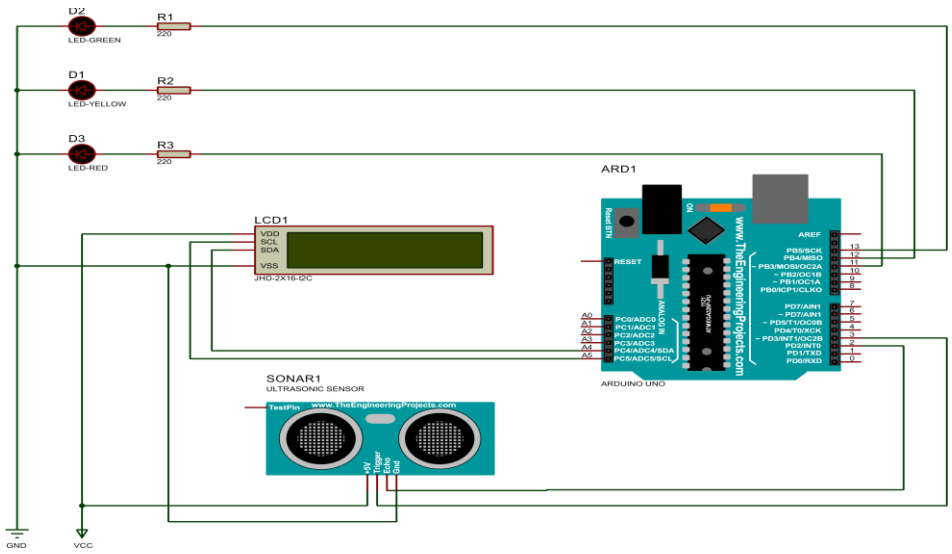
Don't forget to add a current limit resistor to the led Anode pin. Its value is 220 resistors

5. Connect Hc-sr04 Vcc pin to arduino 5v pin
6. Connect Hc-sr04 GND pin to arduino digital GND pin
7. Connect Hc-sr04 Trig pin to arduino digital pin 3
8. Connect Hc-sr04 Echo pin to arduino digital pin 2

9. Connect LCD I2C Vcc pin to arduino 5v pin
10. Connect LCD I2C GND pin to arduino digital GND pin
11. Connect LCD I2C SDA pin to arduino analog pin A4
12. Connect LCD I2C Echo pin to arduino analog pin A5

Now circuit is complete.

SIMULATION IN PROTEUS



ARDUINO CODE

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd (0x27, 16, 2);
const int trigpin= 2;
const int echopin= 3;
long duration = 0;
int distance = 0;
int i;
int percentage = 0;
int TankDepth = 25;
const int MAX_DISTANCE = 20;
void setup()
{
  Wire.begin();
  pinMode(trigpin,OUTPUT);
  pinMode(echopin,INPUT);
  Serial.begin(9600);
  lcd.begin();
  lcd.backlight();
  Serial.println("\nI2C Scanner");
}
  void loop()
{ digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  distance = duration*0.034/2;
  Serial.println(distance);
  lcd.setCursor(0,0);
  percentage = (100*distance/TankDepth);
  percentage = 100 - percentage;
  lcd.setCursor(0,1);
  lcd.print("percentage:  ");
  lcd.print(percentage);
  lcd.print("% ");
  delay(500);
if (percentage>=0 && percentage<=50)
 { lcd.clear();
   lcd.setCursor(0,0);
   lcd.print("level is low");
   digitalWrite(13, HIGH);
   digitalWrite(12, LOW);
   digitalWrite(11, LOW); }
if (percentage>=50 && percentage<=80)
{ lcd.clear();
   lcd.setCursor(0,0);
   lcd.print("level is good");
   digitalWrite(12, HIGH);
   digitalWrite(11, LOW); }
if (percentage>=80)
 {lcd.clear();
   lcd.setCursor(0,0);
   lcd.print("tank is full");
   digitalWrite(13, HIGH);
   digitalWrite(12, HIGH);
   digitalWrite(11, HIGH);
   digitalWrite(10, HIGH);
  }
else
  {digitalWrite(11, LOW);
  digitalWrite(10, LOW);
  }
else
  {digitalWrite(12, LOW);}
}
```