

SMART WATER MANAGEMENT

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Introduction:

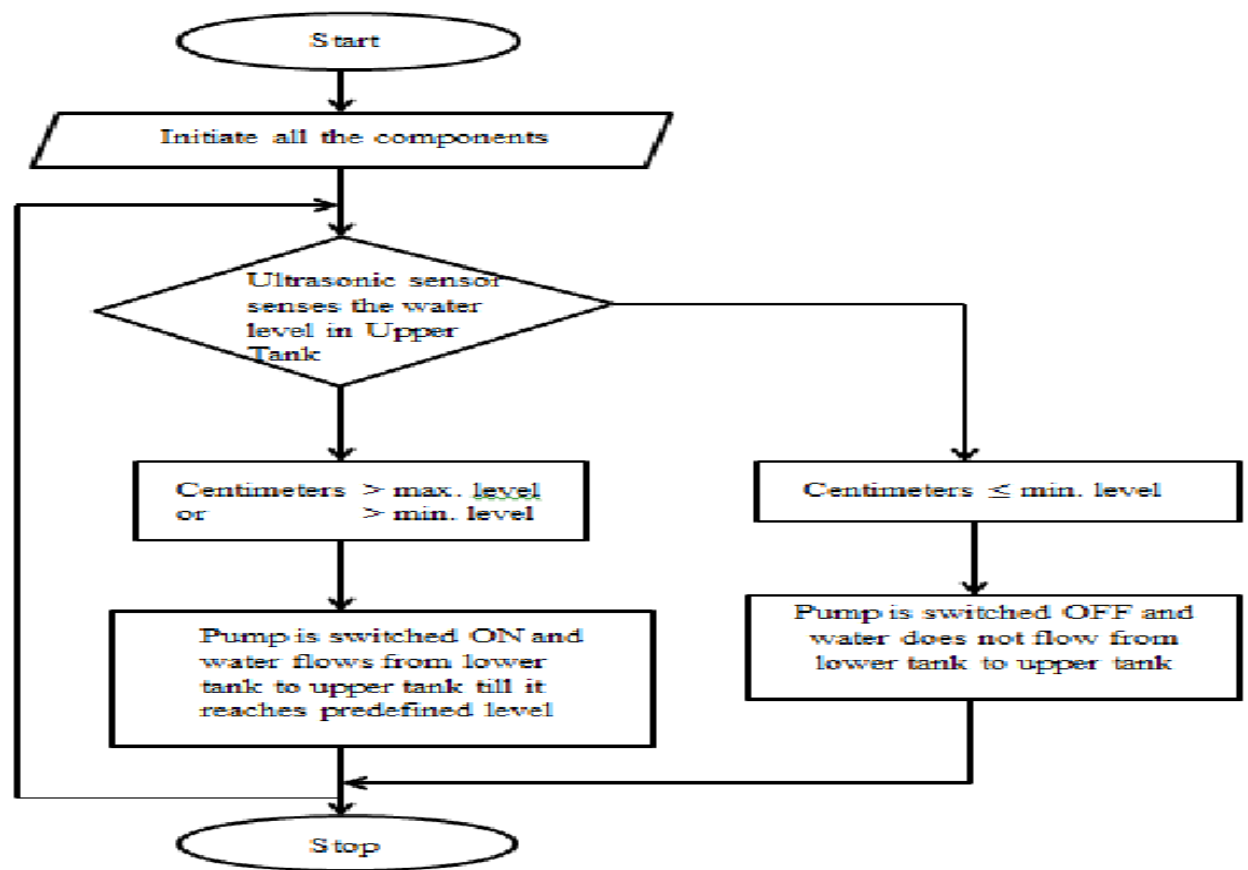
Smart Water Management is the activity of planning, developing, distributing and managing the use of water resources using an array of IOT technologies which are designed to increase transparency, and make more reasonable and sustainable usage of these water resources. The main goal of smart water is to ensure that the resource is being managed effectively by using data to help inform decisions.

Components of Water Level Monitoring:

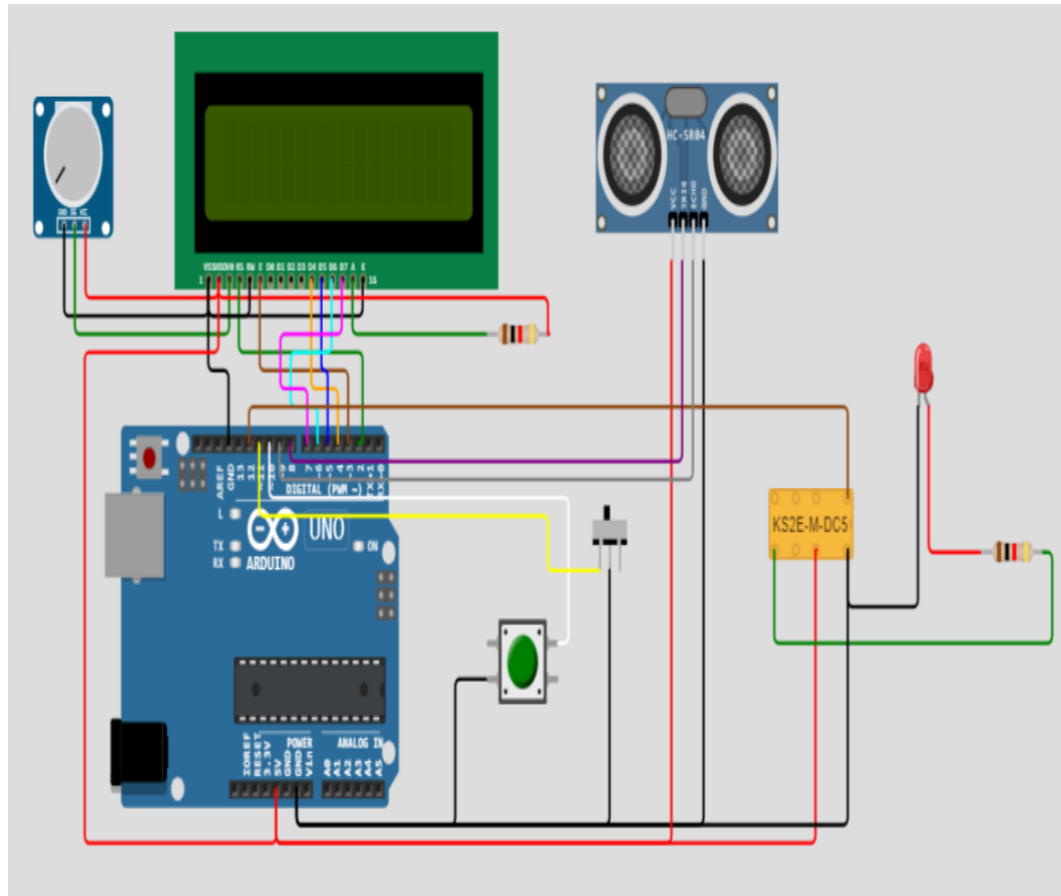
Some components are used to make the sensor work, to read the sensor data and displaying the process what doing now. The components are,

1. Arduino UNO
2. Potentiometer
3. Icd 1602
4. hc-sr04 Ultrasonic Distance sensor
5. pushbutton
6. slide-switch
7. ks2e-m-dc5 Relay

Flowchart:



Connection of Arduino Board :



Source code :

```
#include <EEPROM.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd(2,3,4,5,6,7);
long duration, inches;
int set_val,percentage;
bool state,pump;
void setup()
{
  lcd.begin(16, 2);
  lcd.print("WATER LEVEL:");
  lcd.setCursor(0, 1);
  lcd.print("PUMP:OFF MANUAL");
  pinMode(8, OUTPUT);
  pinMode(9, INPUT);
  pinMode(10, INPUT_PULLUP);
  pinMode(11, INPUT_PULLUP);
  pinMode(12, OUTPUT);
  set_val=EEPROM.read(0);
  if(set_val>150)set_val=150;
}
void loop()
{
```

```

digitalWrite(3, LOW);
delayMicroseconds(2);
digitalWrite(8, HIGH);
delayMicroseconds(10);
digitalWrite(8, LOW);
duration = pulseIn(9, HIGH);
inches = microsecondsToInches(duration);
percentage=(set_val-inches)*100/set_val;
lcd.setCursor(12, 0);

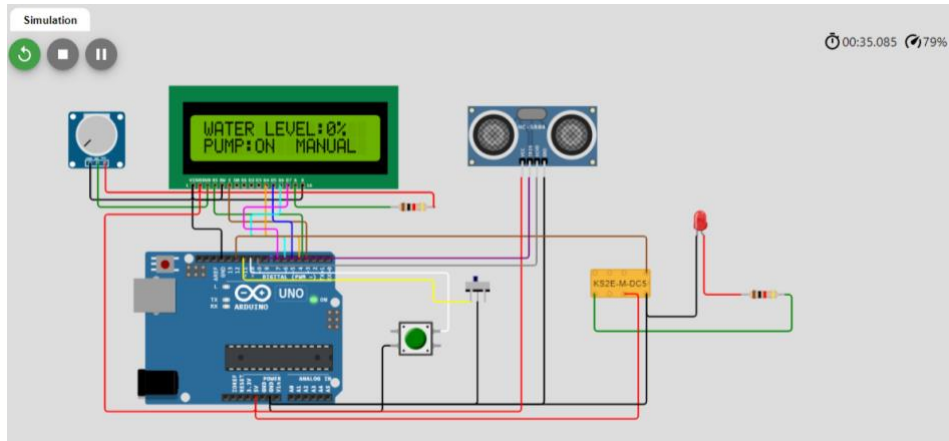
if(percentagem<0)percentage=0;
lcd.print(percentage);
lcd.print("%  ");
if(percentagem<30&digitalRead(11))pump=1;
if(percentagem>99)pump=0;
digitalWrite(12,!pump);
lcd.setCursor(5, 1);
if(pump==1)lcd.print("ON ");
else if(pump==0) lcd.print("OFF");
lcd.setCursor(9, 1);
if(!digitalRead(11))lcd.print("MANUAL");
else lcd.print("AUTO  ");

if(!digitalRead(10)&!state&digitalRead(11))
{
    state=1;
    set_val=inches;
    EEPROM.write(0, set_val);
}
if(!digitalRead(10)&!state&!digitalRead(11))
{
    state=1;
    pump=!pump;
}
if(digitalRead(10))state=0;
delay(500);
}
long microsecondsToInches(long microseconds)
{
    return microseconds / 74 / 2;
}

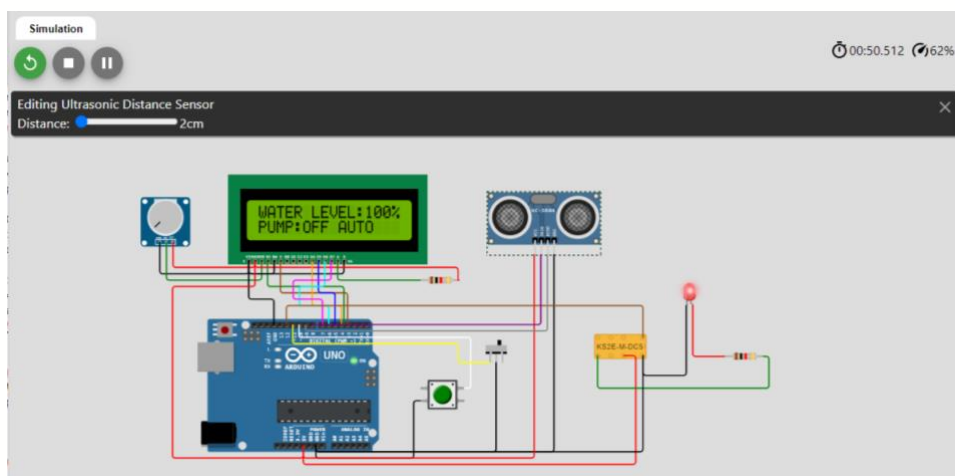
```

Output:

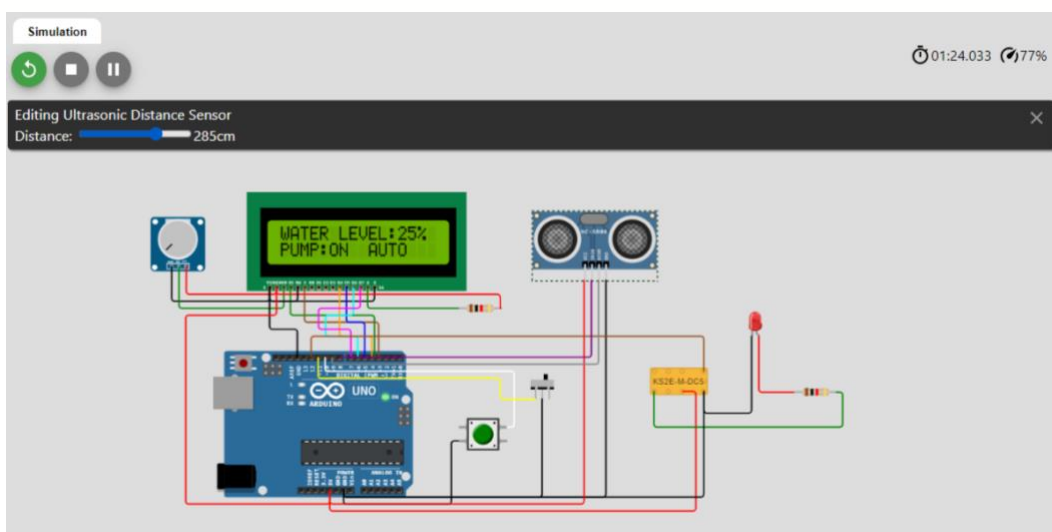
In the beginning, the LCD display automatically displays 0% which means the tank is empty.



In the ultrasonic sensor we adjust the distance. If the distance is low then the water level is high. If the distance is high then the water level is low.



If the water level is 100% (the distance is less) then automatically the pump will be turned off. If the water level is 0% (the distance is high) then automatically the pump will be turned on.



Conclusion:

In the smart water system and management there are many sectors like water level monitoring, monitoring the pH value, etc., in this phase, I have developed the water level monitoring by using Wokwi simulator by using the ultrasonic sensor.