Microcontroller based Industrial Applications

Automated Slug detection system for Water- tanks

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Problem Statement:

Develop a Microcontroller Based prototype which alert the user to clean the water tank as the sludge level is more

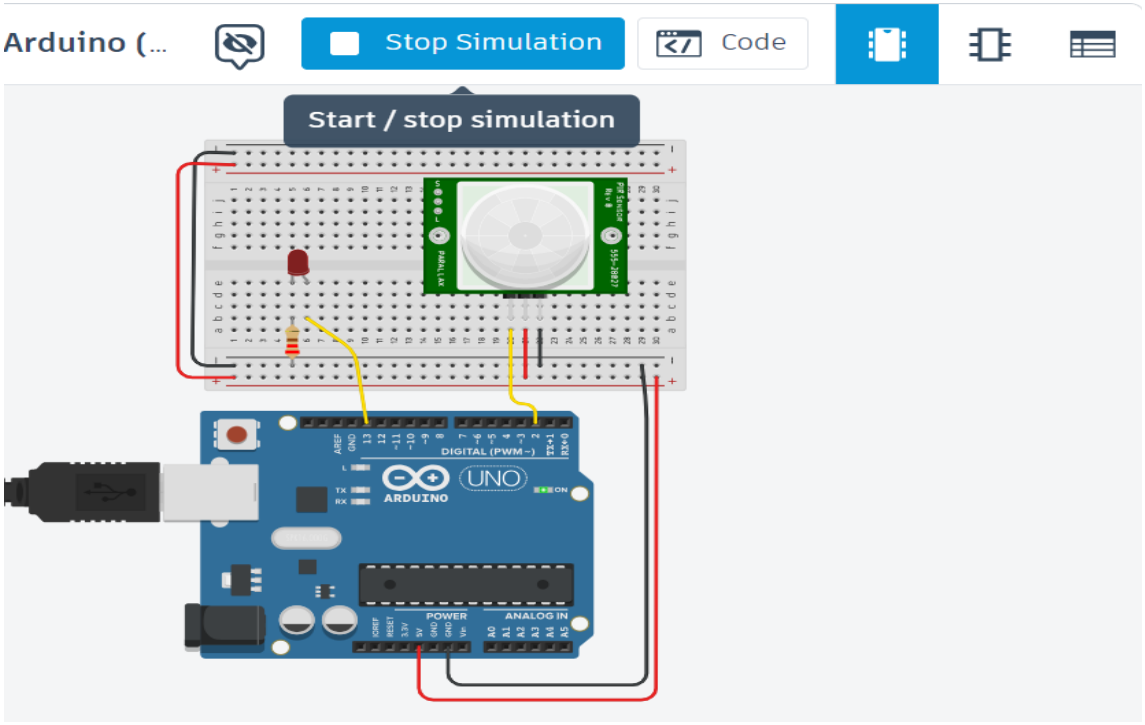
Scope of the Solution:

We can detect the slug formation in water using the device and prevent them from remaining in the water are contaminating the water body

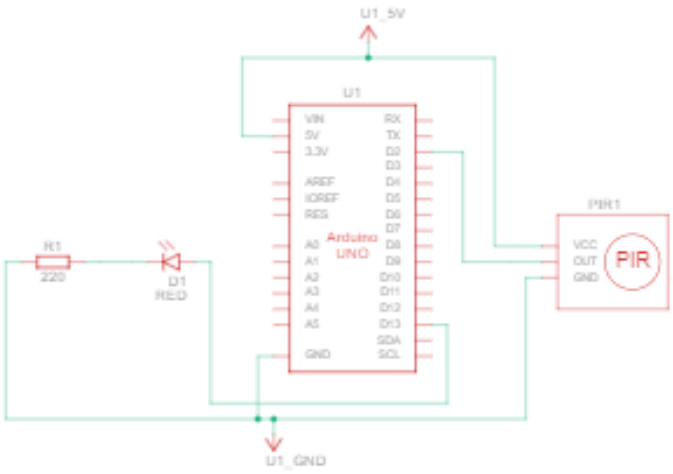
Required components to develop solutions:

1. Arduino Uno
2. Photoelectronic sensor
3. LCD display
4. Switch
5. Arduino IDE
6. Bread board
7. Connecting wires
8. Led light-

Simulated circuit (tinkercad):



Schematic diagram:



Video of the demonstration:

Link of the video is attached below:

demo video

Arduino code:

```
#include <EEPROM.h>

#include <Wire.h>
#include <LiquidCrystal_I2C.h>


LiquidCrystal_I2C lcd(0x27, 16, 2);


long duration, inches;
int set_val,percentage;
bool state,pump;


void setup() {

  lcd.begin();
  lcd.print("WATER LEVEL:");
  lcd.setCursor(0, 1);
  lcd.print("PUMP:OFF MANUAL");

  pinMode(2, OUTPUT);
  pinMode(3, INPUT);
  pinMode(10, INPUT_PULLUP);
  pinMode(11, INPUT_PULLUP);
  pinMode(13, OUTPUT);

   set_val=EEPROM.read(0);
```

```
    if(set_val>20)set_val=20 ;
}
void loop() {
    digitalWrite(2, HIGH);
    delayMicroseconds(10);
    digitalWrite(2, LOW);
    duration = pulseIn(3, HIGH);
    inches = microsecondsToInches(duration);

    percentage=(set_val-inches)*110/set_val;

    lcd.setCursor(12, 0);
    if(percentage<0)percentage=0;
    lcd.print(percentage);
    lcd.print("%   ");

    if(percentage<30&digitalRead(11))pump=1;
    if(percentage>85)pump=0;
    digitalWrite(13,!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 ");
    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 / 29 / 2;
}

```