Innovation of Smart Water System

GROUP 1

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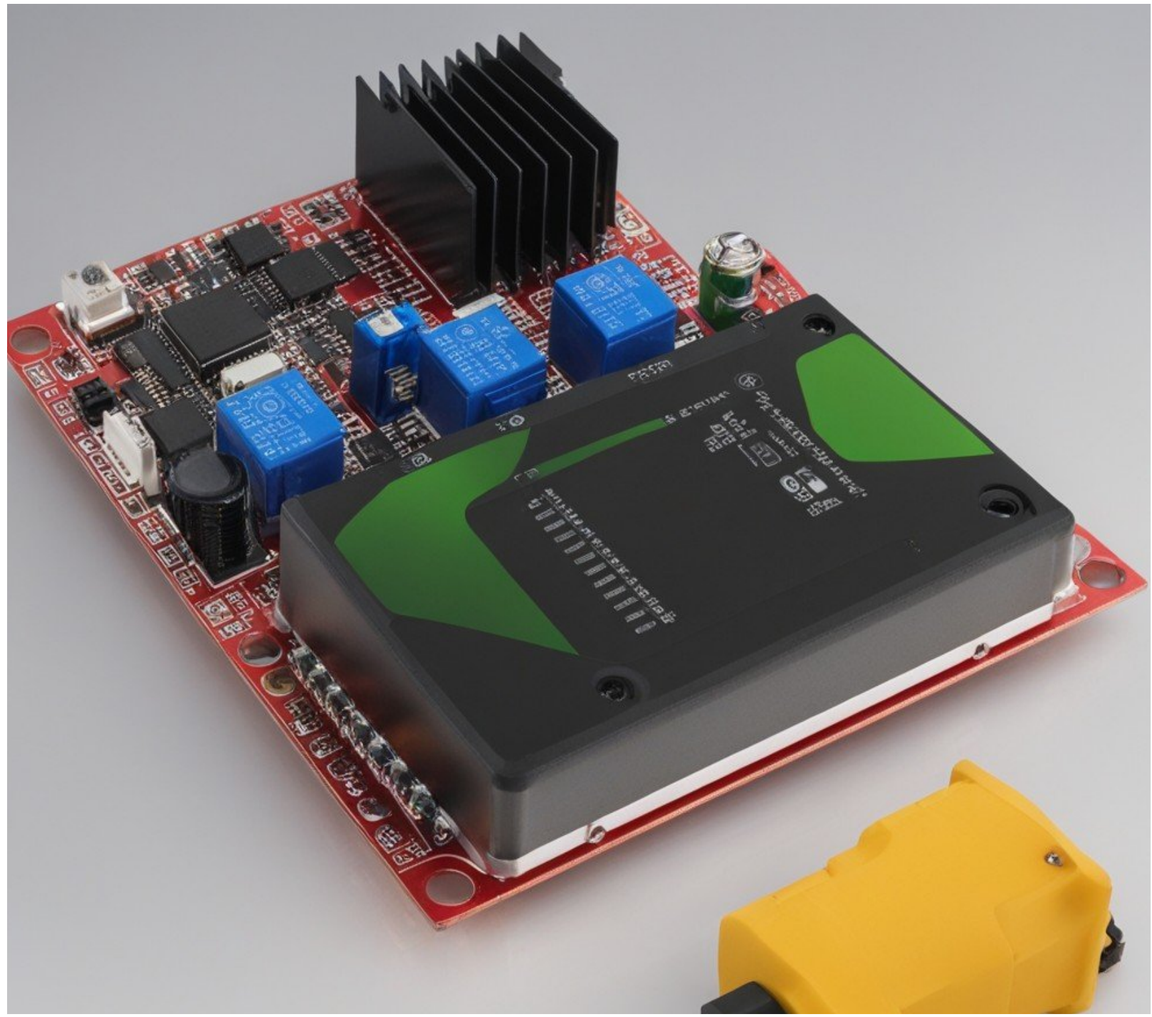
WORKING

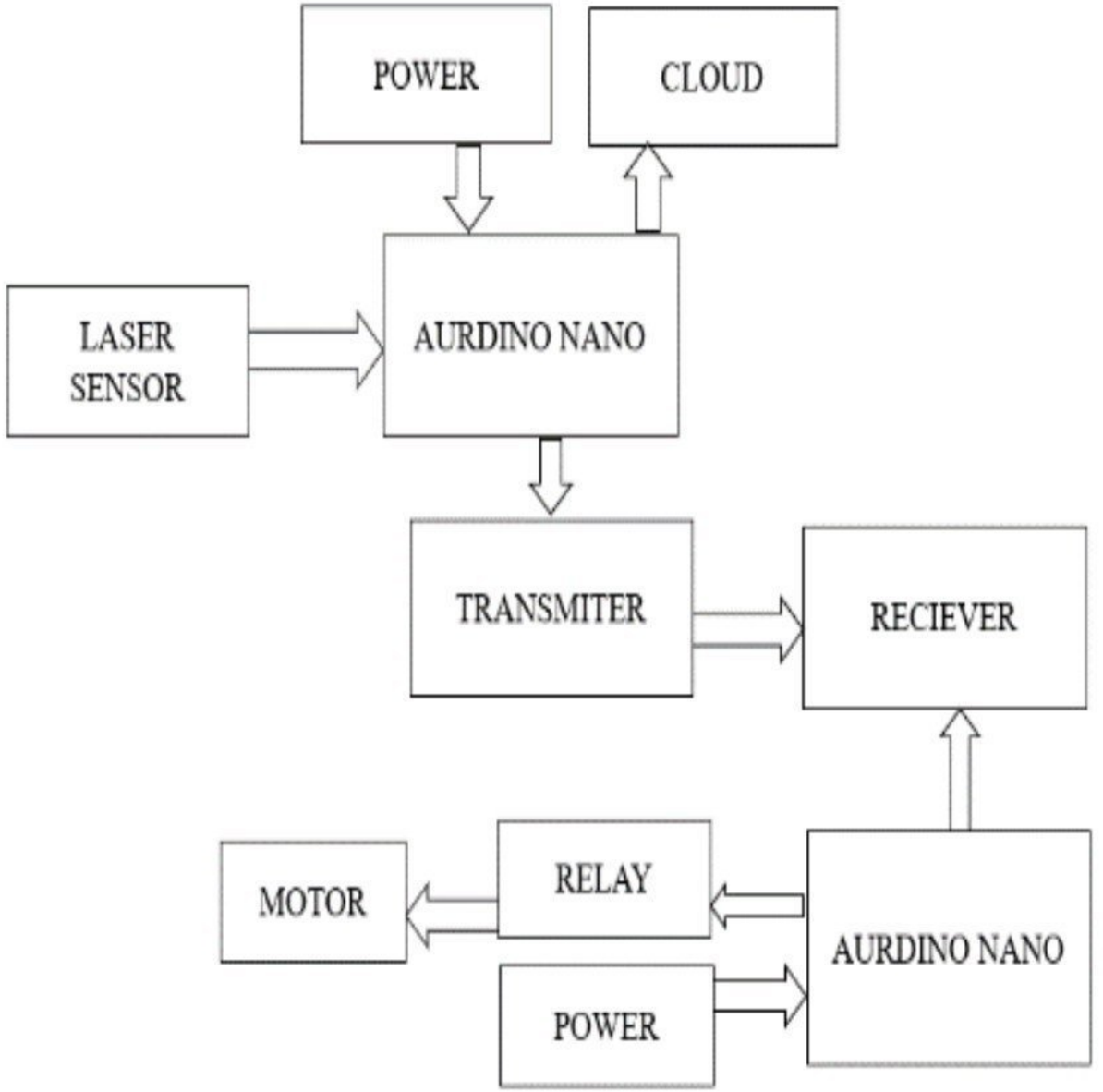
Many researches are working in the field of IOT and its application. One such application is Smart Water Management. The researchers are creating a system which can indicate level of water in tanks, usage of water in water,quality monitoring suchas turbidity sensor, PH sensor, salt sensor in the water tanks to know contamination, alkaline nature and salts in the water which causes diseases to living beings. Another work presented an IOT system which is capable of detecting and displaying level of water in the storage tanks and used for managing and planning use of water. Divyapriya et.al in continuously keeps track of the level of the water in water system like overhead water tanks. Proposed the client can send the message to the framework realize the water level subtleties of the tank. This is intended to control the dimensions of water with help of ultrasonic sensor and GSM innovation. Kumar et.al in IOT based water management system for a campus proposed real time monitoring system for campus recommended that work utilized an off /on the track ultrasonic sensor HC-SR04 which is mounted at the highest point of the tank. It sends the ultrasound beats at 40khz towards the water surface and measures the reflected waves backs to the sensor.

EXISTING SYSTEM

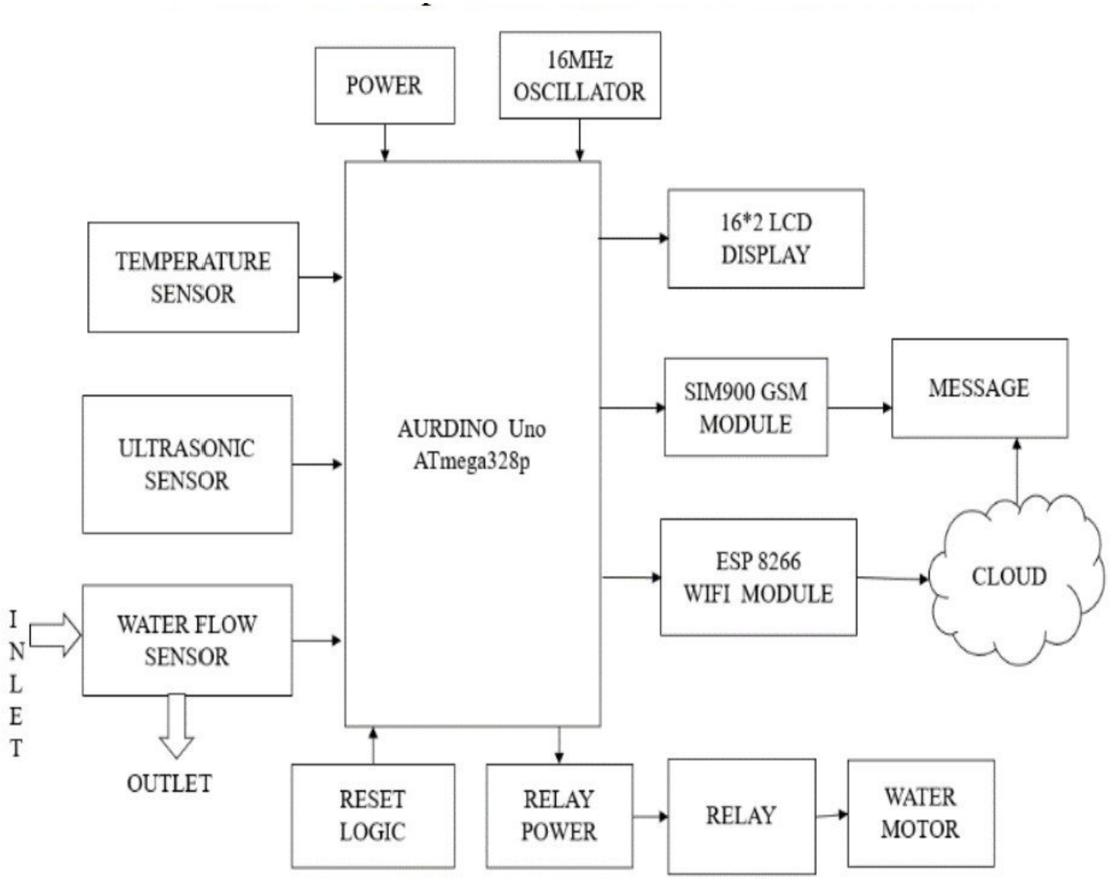
This is used for water level detection and automatic ON/OFF the motor for water tanks. By using IOT the data is upload on Ada fruit platform. Laser sensor is placed above the tank toknowthe level of the water in the tank. When water falls below the threshold value the motor is automatically ON.



BLOCK DAIGRAM OF EXISITNG MODEL



PROPOSED SYSTEM

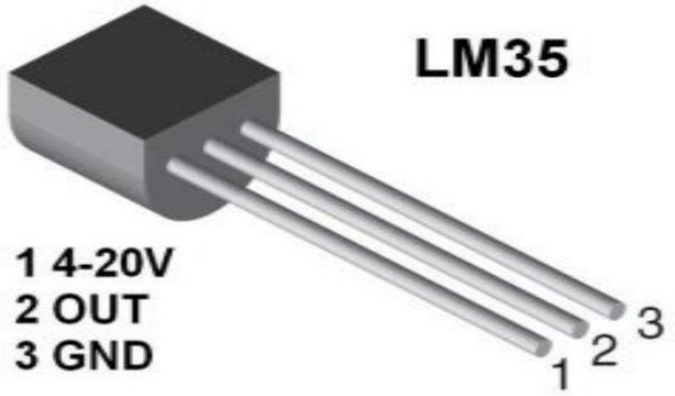


In the proposed system the following parameters can be known

- The level of water in the tank by using the ultrasonic sensor and can reduce overflow of the water.
- The usage of the water in the tank can be used to control the wastage of the water.
- To know the temperature in the water tank in real time

TEMPERATURE SENSOR

Arduino UNO has super convenient power management and built-in voltage regulation.The Arduino can be directly powered through USBor external power supply. The external power supply can be given by Connecting power source(7-12v DC) to DC power jack Connecting a battery lead to Vin and Gnd. 5V and 3.3Vare used to provide power to sensors and modules when connecting it to. The temperature sensor LM35IC has been used for sensing the temperature. It is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature. The temperature can be measured more accurately with it than using a thermistor. The sensor circuit ryis sealed and not subject to oxidation, etc. It is a three terminal sensor used to measure the surrounding temperature ranging from -55 degree centigrade to 150 degree centigrade.



WATER FLOW SENSOR

Water flow sensor consists of a copper body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls, its speed changes with different rate of flow. And the hall-effect sensor outputs the corresponding pulse signal.

ULTRASONIC SENSOR

The HC-SR04 ultrasonic module is a module that can provide noncontact measurement within the range of 2cm to 400cm with an ranging accuracy that can reach 3mm. It works on the principle of echolocation. The ultrasonic sensor as a trigger and an echo pins. The Arduino provides a high signal of 10microseconds to this pin. The sensor is trigged, it send out a 840khz to the surface of the water. On getting to the surface of the water, the wave is echoed back to the sensor and the Arduino reads the echo pin to determine the time spent between the triggering and receiving of the echo.

ADREINO UNO

The Arduino Uno is used as microcontroller in this structure , it has 14 propelled data/yield pins of which the user are using 6 pins for interfacing sensors-waterflow , Ultrasonic and temperature. Interfacing the wi-fi module ESP8266 with Arduino for giving an electronic system. Arduino is a microcontroller board subject to the Atmega328p. A 16 MHz quartz valuable stone, a USB affiliation, a power jack, a reset.

Coding

```
include <Arduino.h>
#include <Wire.h>
#include <EEPROM.h>
#include <WiFi.h>
#include <OneWire.h>
#include <DallasTemperature.h>
#include <Adafruit_ADS1015.h>
#include <DFRobot_ESP_EC.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>

#define SCREEN_WIDTH 128 // OLED display width, in pixels
#define SCREEN_HEIGHT 64 // OLED display height, in pixels

// Declaration for an SSD1306 display connected to I2C (SDA, SCL pins)
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);

#define ONE_WIRE_BUS 14 // this is the gpio pin 13 on esp32.
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);

DFRobot_ESP_EC ec;
Adafruit_ADS1115 ads;

float voltage, ecValue, temperature = 25;

String apiKey = "**************"; // Enter your Write API key from ThingSpeak
const char *ssid = "**************"; // replace with your wifi ssid and wpa2 key
const char *pass = "**************";
const char* server = "api.thingspeak.com";

WiFiClient client;
void setup()
{
  Serial.begin(115200);
  EEPROM.begin(32);//needed EEPROM.begin to store calibration k in eeprom
  ec.begin();
  sensors.begin();
  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) { // Address 0x3D for 128x64
    Serial.println(F("SSD1306 allocation failed"));
    for (;;);
  }
  delay(2000);
  display.clearDisplay();

  Serial.println("Connecting to ");
  Serial.println(ssid);
}
}
```

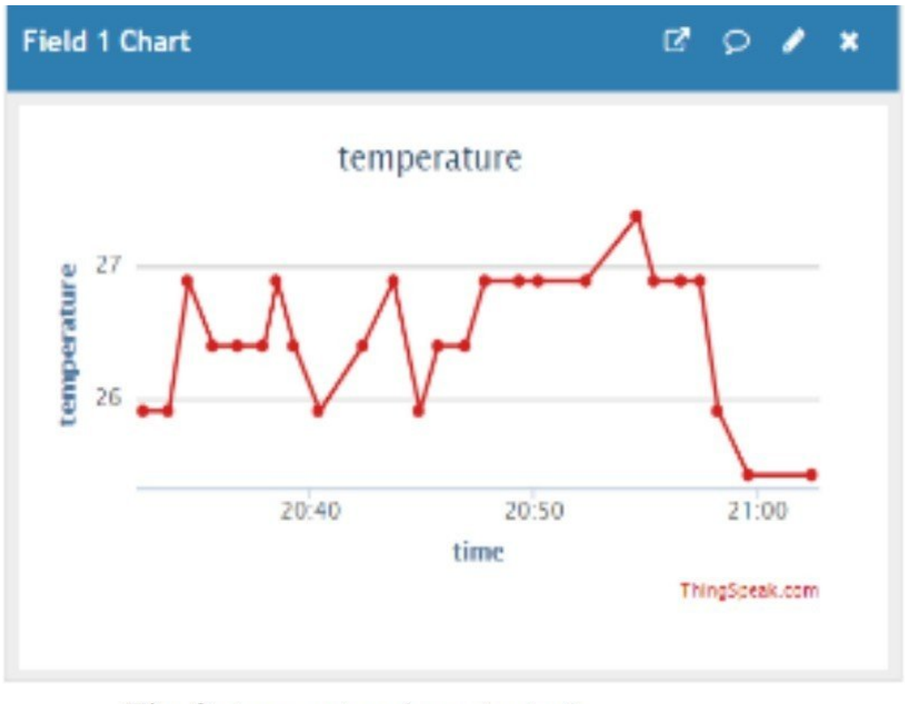
```
void loop()
{
  voltage = analogRead(A0); // A0 is the gpio 36
  sensors.requestTemperatures();
  temperature = sensors.getTempCByIndex(0); // read your temperature sensor to execute temperature compensation
  ecValue = ec.readEC(voltage, temperature); // convert voltage to EC with temperature compensation

  Serial.print("Temperature:");
  Serial.print(temperature, 2);
  Serial.println("°C");

  Serial.print("EC:");
  Serial.println(ecValue, 2);

  display.setTextSize(2);
  display.setTextColor(WHITE);

  display.setCursor(0, 10);
  display.print("T:");
  display.print(temperature, 2);
  display.drawCircle(85, 10, 2, WHITE); // put degree symbol ( ° )
  display.setCursor(90, 10);
  display.print("C");

  display.setCursor(0, 40);
  display.print("EC:");
  display.print(ecValue, 2);
  display.display();
  delay(1500);
  display.clearDisplay();

  ec.calibration(voltage, temperature); // calibration process by Serail CMD

  if (client.connect(server, 80)) // "184.106.153.149" or api.thingspeak.com
  {

    String postStr = apiKey;
    postStr += "&field1=";
    postStr += String(temperature, 2);
    postStr += "&field2=";
    postStr += String(ecValue, 2);
    postStr += "\r\n\r\n";
    delay(500);

    client.print("POST /update HTTP/1.1\n");
    client.print("Host: api.thingspeak.com\n");
    client.print("Connection: close\n");
    client.print("X-THINGSPEAKAPIKEY: " + apiKey + "\n");
    client.print("Content-Type: application/x-www-form-urlencoded\n");
    client.print("Content-Length: ");
    client.print(postStr.length());
    client.print("\n\n");
    client.print(postStr);
    delay(500);
  }
  client.stop();
}
```

CONCLUSION

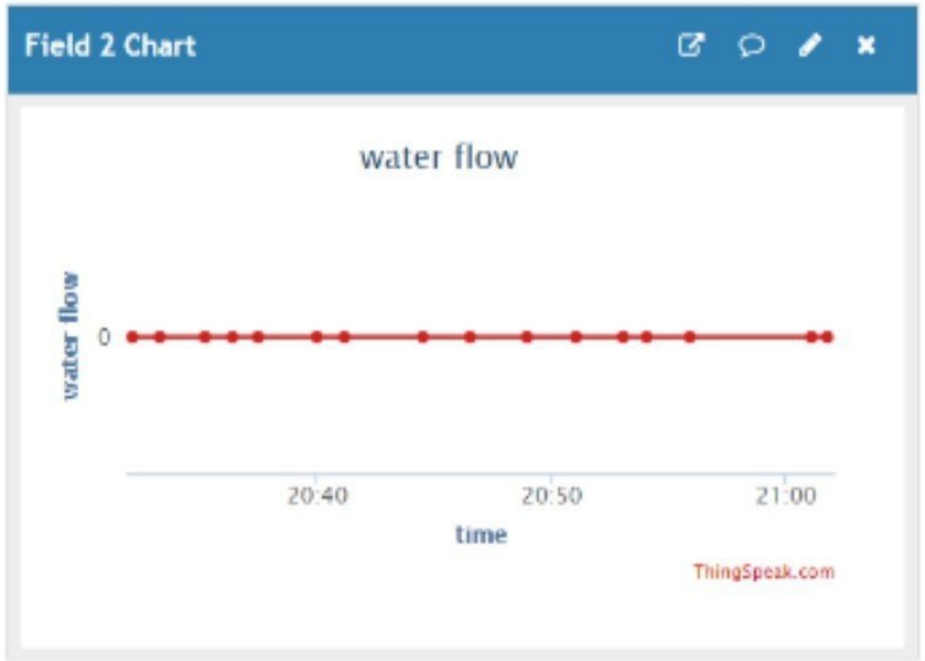
According to this system, proposed architecture becomes more autonomous with quick transmission of data by using IOT. The main advantage in IOT is, even when clients are not in the node network, data will be sent, whenever a client is connected with that node, they can able to see the data which has been sent already. Smart water management can reduce the overflow of water in tanks and provide the usage of water in liter per hour in real time. This system is cost effective. This enables the efficient use of water.Thus it reduces the wastage of water. This project can be further enhanced by using the results of this present project. The turbidity sensor is placed in the water tank to know quality of water which is helpful to know that chemicals in the water. The PH sensor is also placed in water tank to know the nature of water in tanks in which is suitable for drinking or not for living beings in real time by using IOT

RESULT

This paper gives efficient usage and level detection of water in the water tank in effective manner by using the IOT.



Temperature in water tank



Water is not in usage

THANKING YOU!