IOT PROJECT REPORT

Iot Based Water irrigation system

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ABSTRACT

The Smart Irrigation System is an IoT based device which is capable of automating the irrigation process by analyzing the moisture of soil and the climate condition (like raining). In this project, we will command the arduino/328p microcontroller through a webpage to control the motor (i.e., to start and stop the motor) and the rest of whole irrigation process will be automatically controlled by arduino itself. It will not only automatically irrigate the water based on the moisture level in the soil but also send the Data to ThingSpeak Server to keep track of the land condition. The System will consist a water pump which will be used to sprinkle water on the land depending upon the land environmental condition such as Moisture, Temperature and Humidity. Before starting, it is important to note that the different crops require different Soil Moisture, Temperature and Humidity Condition.

INTRODUCTION

So in this tutorial we are using such a crop which will require a soil moisture of about 50-55%. So when the soil loses its moisture to less than 50% then Motor pump will turn on automatically to sprinkle the water and it will continue to sprinkle the water until the moisture goes upto 55% and after that the pump will be turned off. The sensor data will be sent to ThingSpeak Server in defined interval of time so that it can be monitored from anywhere in the world.

Once the Motor pump has started- following automated condition will work

1. User can switch OFF the motor if he desires by a click on the web page.

2. The motor pump will automatically get switched OFF once the soil moisture sensor has reached the required threshold value

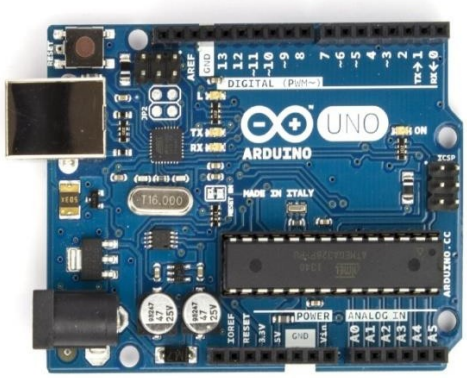
3. If weather condition is such that it started raining, then the micro-controller will shut down the motor pump till raining. And after that it checks whether the soil moisture sensor has reached the threshold value or not. If it crosses the threshold value then motor pump will remain shut down otherwise it will start again automatically. This helps in saving water resource and electricity.

4.Also in case, when power supply gets cut-off and motor gets switched off. It will restart again automatically when there will be availability power supply, user will have not to worry about restarting the motor pump manually.

REQUIREMENTS

➢ **Arduino Uno**

It is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button.



➢ **Soil moisture sensor module**

This **Soil Moisture Sensor Module** can be used to detect the **moisture** of **soil** or judge if there is water around the **sensor**, let the plants in your garden reach out for human help. Insert this **module** into the **soil** and then adjust the on-board potentiometer to adjust the sensitivity.

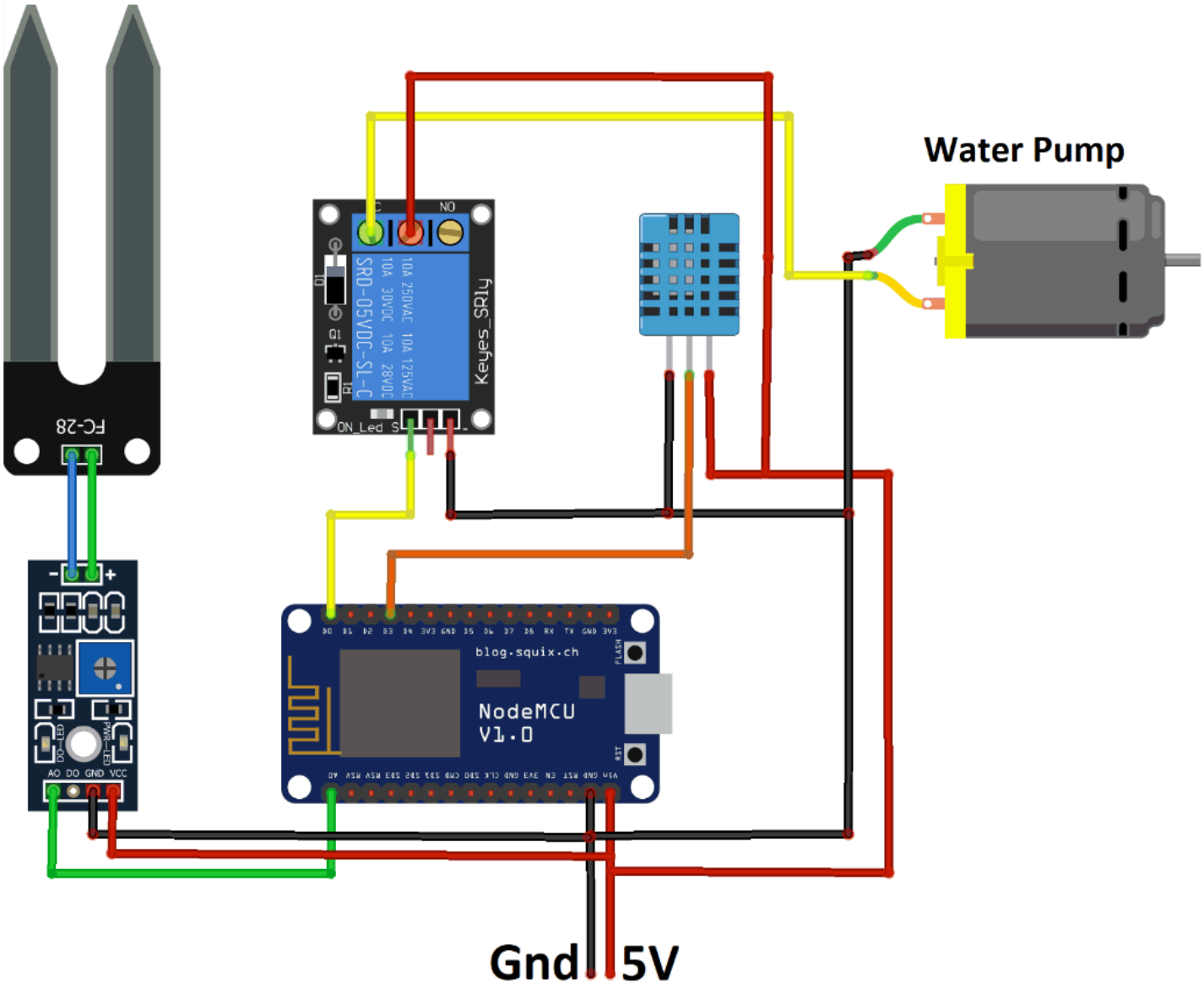
➢ **Water pump controller**

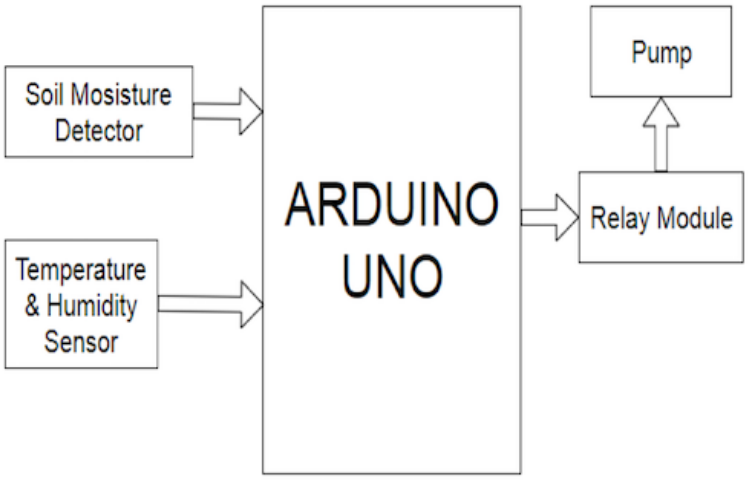
Automatic water pump controller circuit that controls the water pump motor. The motor gets automatically switched on when water in the overhead tank (OHT) falls below the lower limit. Similarly, it gets switched off when the tank is filled up.

➢ **Relay Module**

The **relay module** is a separate hardware device used for remote device switching.The **Relay module** houses two SPDT **relays** and one wide voltage range, optically isolated input. These are brought out to screw-type terminal blocks for easy field wiring.

CIRCUIT DIAGRAM





METHODOLOGY

1. The DHT11 is a basic, digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin(no analog pins needed).It is simple to use, but requires careful timing to grab data. Humidity sensors are used for measuring moisture content in the atmosphere. Then current temperature, humidity values are send to the microcontroller, those values will display in the users web page.

CODING

```
#include <EEPROM.h>
String inString="";
void sensor();
void operation();
int soil;
int rain,count=0;
byte value;
void setup() {
  pinMode(7,OUTPUT);
  pinMode(2,OUTPUT);
  pinMode(A5,INPUT);
  pinMode(A4,INPUT);
  digitalWrite(7,HIGH);
  delay(2000);
  Serial.begin(9600);
  while (!Serial) {
    ;
  }
```

```
 // Serial.println("Goodnight
moon!");


  // set the data rate for the
SoftwareSerial p

}

void loop() { // run over and
over

  delay(1000);

  digitalWrite(2,LOW);

  digitalWrite(7,LOW);

    sensor();

   value=EEPROM.read(55);

  // Serial.print("value=");

  // Serial.println(value);

   delay(3500);

  if (Serial.available()) {

 inString=Serial.readString();

    delay(2000);

    String readData = "";

    while (Serial.available() >
0 ) {
```

```
 readData = readData +
(char)Serial.read();
    }
    if
(readData.indexOf("RD") !=
-1) {
      String data;
       rain=analogRead(A4);
//reading rain sensor value
        soil=analogRead(A5);
//reading soil moisture
sensor value
      data = String(soil);
      Serial.println(data);
      delay(300);     }
  }
   if(inString=="hello" ||
value==1)
{
  inString ="";
  count=1;
  EEPROM.update(55,count);
   delay(2500);
```

```
  digitalWrite(7,HIGH);
  digitalWrite(2,HIGH);
  delay(1000);
  operation();
  }
}//ending of void loop
void sensor()        //
function  declaration for
reading sensor
{
  soil=analogRead(A5);
  delay(100);          //
reading soil moisture sensor
value

rain=analogRead(A4);       //
reading rain sensor value
  delay(100);
}
void operation(){
  while(1){
    delay(1600);
```

```
      sensor();
      delay(500);
      if(Serial.available()>0){

inString=Serial.readString();
        delay(2000);
       String readData = "";
       while (Serial.available()
> 0 ) {
          readData = readData
+ (char)Serial.read();
        }
         if
(readData.indexOf("RD") !=
-1) {
          String data;
          rain=analogRead(A4);
//reading rain sensor value
          soil=analogRead(A5);
//reading soil moisture
sensor value
          data = String(soil);
          Serial.println(data);
```

```
        delay(300);


        }
     }
    delay(2500);
    if(inString=="stop"){
        digitalWrite(7,LOW);
        digitalWrite(2,LOW);
        delay(600);
        count=0;

EEPROM.update(55,count);
        delay(2500);
        break;
       }
    if(soil<400){
        digitalWrite(2,LOW);


        count=0;

EEPROM.update(55,count);
```

```
          delay(2500);
           break;   // check
code of this line
       }   //if condition ends
here
   if(rain<250){
        delay(6500);
         if(rain<250){
           digitalWrite(2,LOW);

           delay(2500);
            sensor();
            if(rain>250 &&
soil>400){

digitalWrite(2,HIGH);

              delay(2500);
            }
            else{

digitalWrite(2,LOW);
```

```
            delay(500);
          }
         }
      }
    if(rain>250 && soil>400)
{
      digitalWrite(2,HIGH);
    }
    }  //while ends here
```

IMPLEMENTATION

This is an IOT based Water irrigation system. The proposed agricultural system is designed to solve to find an optimal solution to the water crisis. The design implements IoT technology using a webpage, a main controlling unit (MCU), sensors to measure various parameters and a water pump, which will be used to supply water to the farm.

CONCLUSION

- The application of agriculture networking technology is need of the modern agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production. With more advancement in the field of IoT expected in the coming years, these systems can be more efficient, much faster and less costlier. In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IoMT can be implemented so that agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

GITHUB

https://github.com/karan06126/Iot-Water-irrigation-system/upload/master

REFERENCES

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