North South University

Department of Electrical & Computer Engineering

Report

Project Name: Smart Irrigation System Using Arduino Uno (Improved)

Submitted to:

Faculty Name: Syed Mahmud Husain (SMH2)

Course Code: CSE331

Course Title: Microprocessor Interfacing & Embedded System

Submitted by:

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Objective:

i. Automating water irrigation
ii. Detecting soil moisture level
iii. Turning on the motor pump, when the moisture level goes down.
iv. Displaying moisture status on an LCD display.

Components:

i. Capacitor, ii. DHT11, iii. Inductor, iv. LMO16L, v. Logicstate, vi. Motor, vii. NPN, viii. POT-HG, ix. Rain Sensor, x. Simulino Uno, xi. Soil Moisture sensor, xii.L239D.

Code:

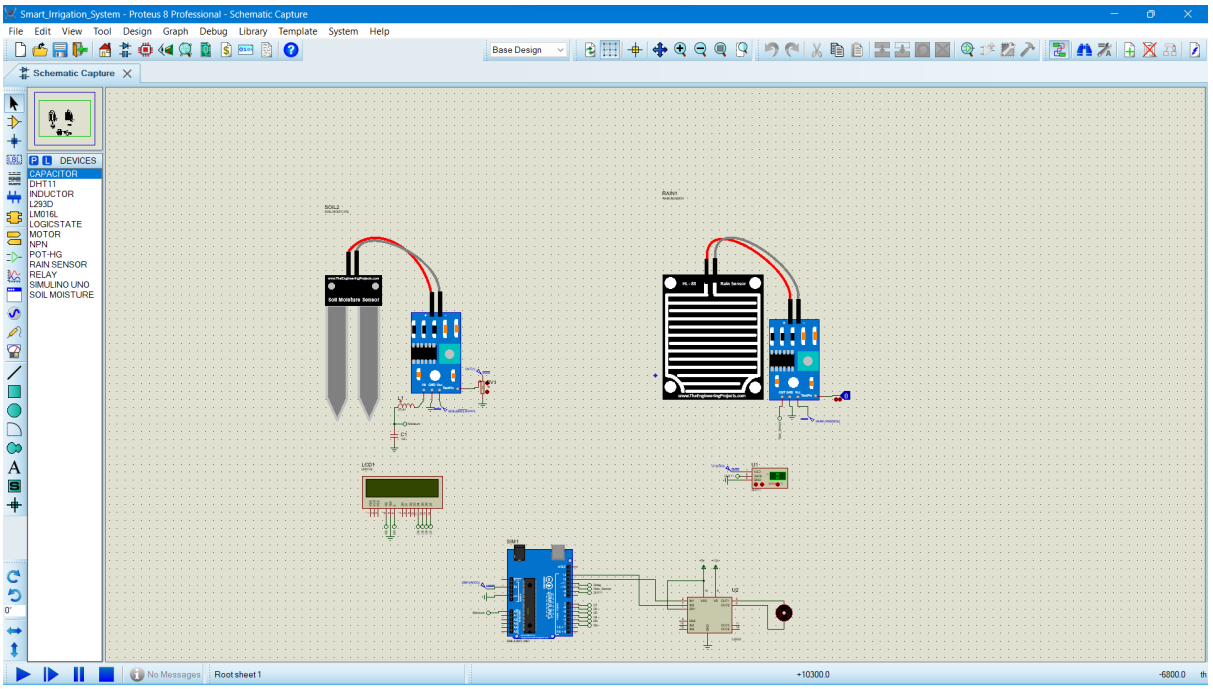
```
#include <LiquidCrystal.h>
#include "DHT.h"

LiquidCrystal lcd(2, 3, 4, 5, 6,7);
const int relay_Pin = 8;
const int DHT11_Sesnor = 9;
const int moisture_sensor = A0;
const int rain_Sesnor = 10;

const int pin1=12;    //new motor
const int pin2=13;

#define DHTTYPE DHT11
int  moisture_sensor_value;
int rain_Sesnor_value;
float humudity_value,temprature_value;
DHT dht(DHT11_Sesnor, DHTTYPE);

void setup() {
  Serial.begin(9600);
  pinMode(relay_Pin, OUTPUT);
  pinMode(pin1, OUTPUT);    //new motor
  pinMode(pin2, OUTPUT);
  pinMode(rain_Sesnor, INPUT);
  lcd.begin(16, 2);
  lcd.print("Smart Irrigation ");
  lcd.setCursor(0,2);
  lcd.print(" SYSTEM");
  digitalWrite(relay_Pin, LOW);
  digitalWrite(pin1, LOW);    //new motor
  digitalWrite(pin2, LOW);
```

```
  dht.begin();
   delay(500);

}
void loop()
{
  //readDTH11_Sesnor();
  moisture_level_detected();
  water_motor_start();

}


void readDTH11_Sesnor()
{

  // Reading temperature or humidity takes about 250 milliseconds!
  // Sensor readings may also be up to 2 seconds 'old' (its a very slow sensor)
  humudity_value = dht.readHumidity();
  // Read temperature as Celsius (the default)
  temprature_value = dht.readTemperature();

  // Check if any reads failed and exit early (to try again).
  if (isnan(humudity_value) || isnan(temprature_value)) {
    Serial.println(("Failed to read from DHT sensor!"));
    return;
  }

  Serial.print((" Humidity: "));
  Serial.print(humudity_value);
  Serial.print(("%"));
  lcd.clear();
  lcd.print("Humidity %: ");
  lcd.setCursor(0,2);
  lcd.print(humudity_value);
  Serial.print("\n");
  delay(500);
  Serial.print(("Temperature: "));
  Serial.print(temprature_value);
  Serial.print(("C "));
  lcd.clear();
  lcd.print("Temperature degCel");
  lcd.setCursor(0,2);
  lcd.print(temprature_value);
```

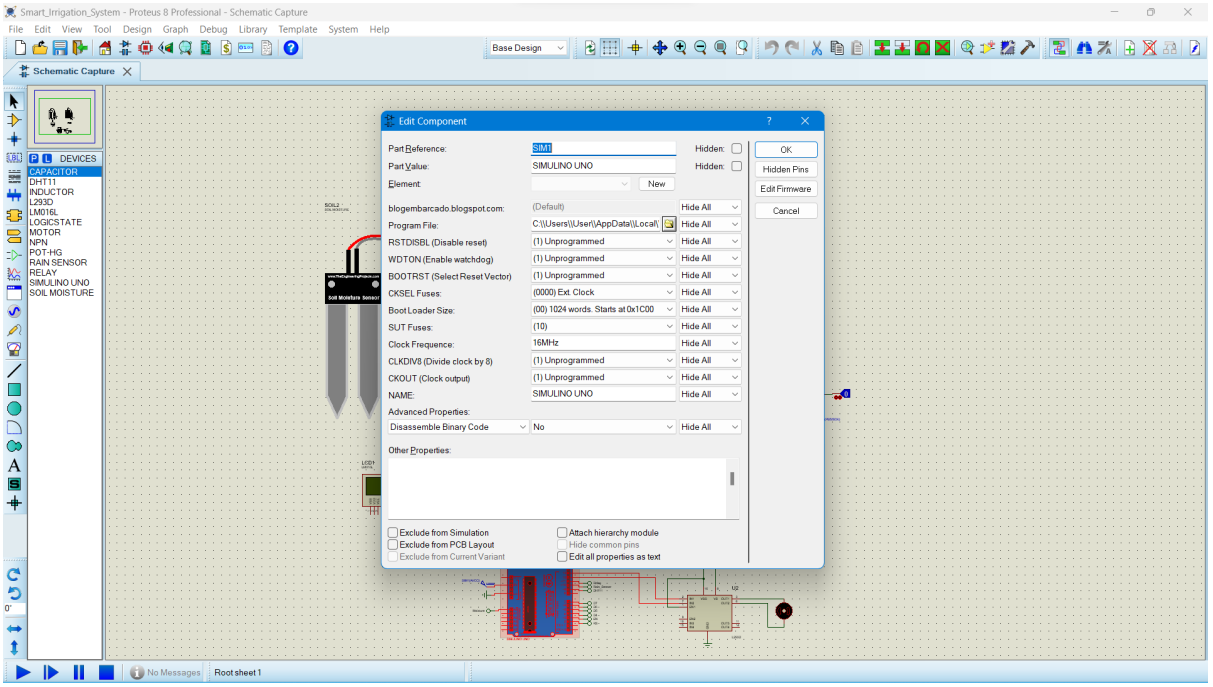
```
  Serial.print("\n");
  delay(500);
}

void moisture_level_detected()
{

  moisture_sensor_value = analogRead(moisture_sensor);
  Serial.println("Moisture Level : ");
  Serial.println(moisture_sensor_value);
  lcd.clear();
  lcd.print("Moisture Level :");
  lcd.setCursor(0,2);
  lcd.print(moisture_sensor_value);
  delay(500);
}

void water_motor_start()
{

 rain_Sesnor_value = digitalRead(rain_Sesnor);
 delay(500);
 if(rain_Sesnor_value == false)
 {
   if(moisture_sensor_value > 700 )
   {
     digitalWrite(relay_Pin, HIGH);
     analogWrite(pin1, 255); //High Speed
     digitalWrite(pin2, LOW);
     lcd.clear();
     lcd.print("Low water level");
     lcd.setCursor(0,2);
     lcd.print("Motor ON - High");
     delay(500);
   } else if(moisture_sensor_value > 300 && moisture_sensor_value < 700)
   {
     digitalWrite(relay_Pin, HIGH);
     analogWrite(pin1, 100); //Low Speed
     digitalWrite(pin2, LOW);
     lcd.clear();
     lcd.print("Low water level");
     lcd.setCursor(0,2);
     lcd.print("Motor ON - Low");
     delay(500);
```

```
    }
    else
    {
      digitalWrite(relay_Pin, LOW);
      analogWrite(pin1, LOW); //Low Speed
      digitalWrite(pin2, LOW);
      lcd.clear();
      lcd.print("Water Level Ok");
      lcd.setCursor(0,2);
      lcd.print("Motor OFF");
      delay(500);
    }
  }
  else
  {
      digitalWrite(relay_Pin, LOW);
      analogWrite(pin1, LOW); //Low Speed
      digitalWrite(pin2, LOW);
      lcd.clear();
      lcd.print("Rain Detected");
      lcd.setCursor(0,2);
      lcd.print("Motor OFF");
   delay(500);
  }
}
```

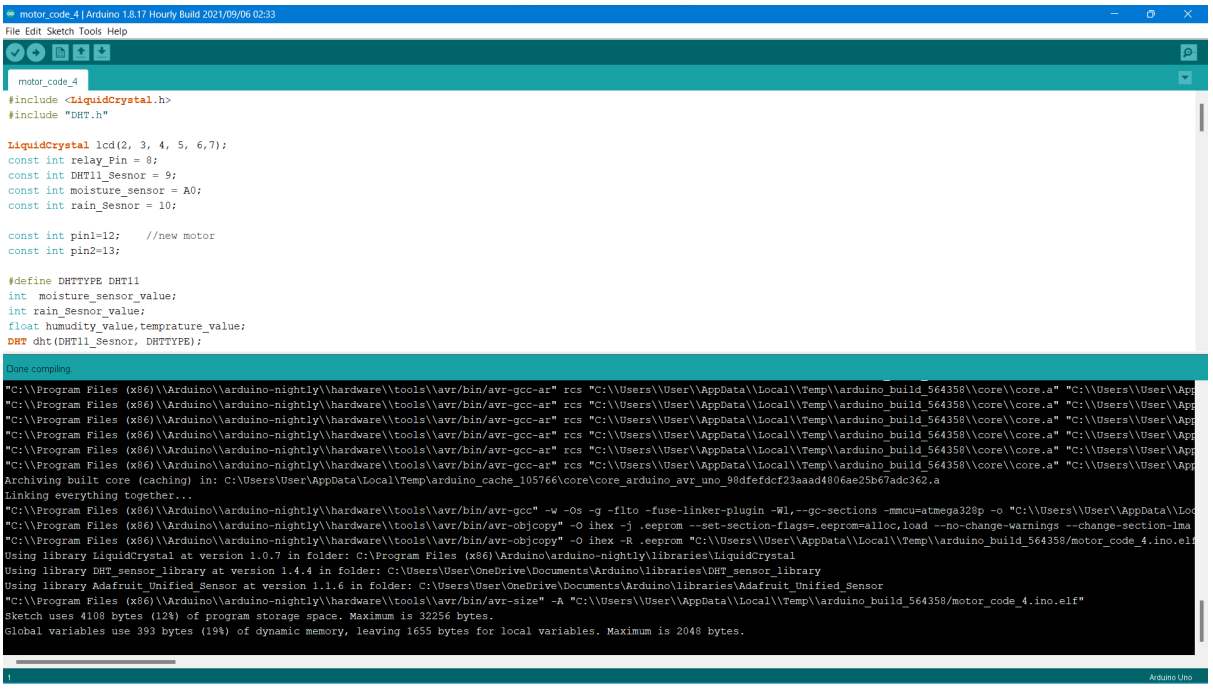
Project Diagram:



Arduino Uno Properties:



Arduino IDE:



Disscussion:

In this Smart Irrigation System project, our goal is to maintain moisture level of land automatically based on particular temperature and humidity. We used arduino to control water

pump. When soil moisture level is above 300 which means low water level in this state arduino will turn on the motor in low speed and if the level is more than 700, motor will rotate in full speed. However, Motor pump will be turned off during rain despite of soil moisture level is above 300. We used DHT to setup the temperature and humidity quantity manually. By 16x2 lcd display, We displayed the overall information of irrigation system. We built this project in proteus. We had to collect the libraries of arduino uno, soil moisture sensor, and rain detector. For simulating this, we have to do arduino code in Arduino IDE. By executing code, we get a hex file to load arduino component in Proteus.

We faced many challenges in managing libraries of arduino, soil moisture sensor, and rain detector. We also faced errors in executing code. For missing DHT library, the code didn't execute. After watching some guidelines from online, we fixed it. For building this project, we brainstormed and go throughed many tutorials from youtube and some websites.

References:

https://www.youtube.com/watch?v=Wx1Vi0EPhQU&t=907s

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