

Project 12:

IoT Smart Agriculture & Automatic Irrigation System with WeMos

1. Introduction

In this project, we will learn about the IoT Based **Smart Agriculture & Automatic Irrigation System with Nodemcu ESP8266**. Agriculture plays a vital role in the development of agricultural countries. Some issues concerning agriculture have been always hindering the development of the country. Consequently, the only solution to this problem is **smart agriculture** by modernizing the current traditional methods of agriculture.

Hence the method is making agriculture smart using **automation and IoT technologies**. Internet of Things (IoT) enables various applications of **crop growth monitoring** and selection, **automatic irrigation** decision support, etc.

COMPONENTS: -

- 1. WEMOS**
- 2. DHT11**
- 3. SOIL MOISTURE**

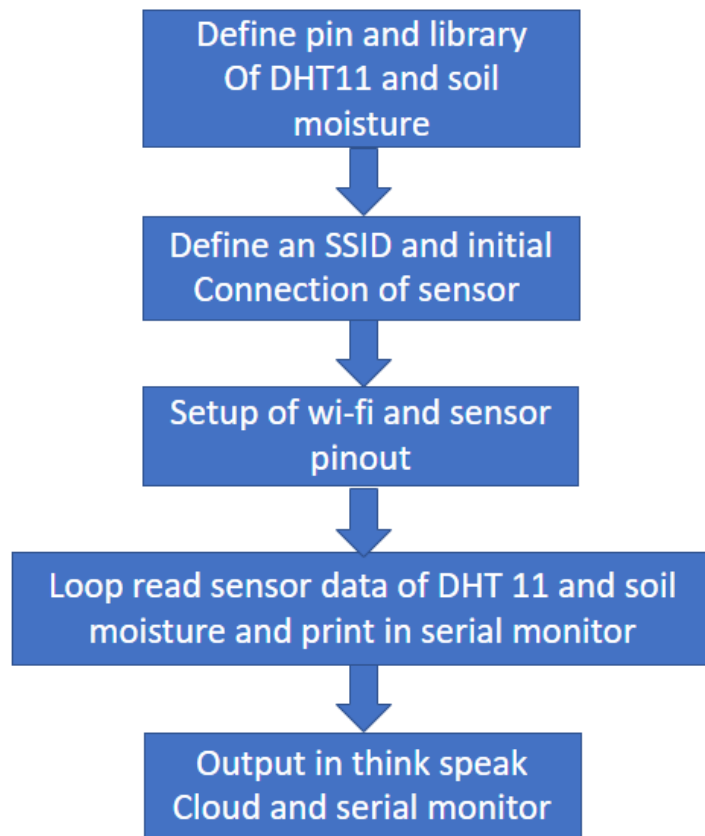
APPLICATION: -

The proposed system makes use of microcontroller ATMEGA328P on Arduino uno platform and IOT which enables farmers to remotely monitor the status of water level in the soil by knowing the sensor values thereby, making the farmers work much easier as they can concentrate on other farm activities.

OBJECTIVES: -

The project describes how irrigation can be handled smartly using IOT. This project aims at saving time and avoiding problems like constant vigilance. It also helps in conserving water by automatically providing water to the plants/field depending on the water requirements.

FLOW CHART:-



PROGRAMMING: -

```
#include <ESP8266WiFi.h>
```

```
#include <SPI.h>
```

```
#include <Wire.h>
```

```
#include <Adafruit_GFX.h>
```

```
#include <Adafruit_SSD1306.h>
```

```
#include <DHT.h> // Including library for dht
```

```
#define SCREEN_WIDTH 128 // OLED display width, in pixels
```

```
#define SCREEN_HEIGHT 64 // OLED display height, in pixels
#define OLED_RESET -1 // Reset pin # (or -1 if sharing Arduino reset pin)
```

```
#define DHTPIN D4 //pin where the dht11 is connected
DHT dht(DHTPIN, DHT11);
```

```
String apiKey = "C25ICK6FHOR7PST4"; // Enter your Write API key from ThingSpeak
```

```
const char *ssid = "MySmartHome"; // replace with your wifi ssid and wpa2 key
```

```
const char *pass = "nRF52840";
```

```
const char* server = "api.thingspeak.com";
```

```
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, OLED_RESET);
```

```
const int AirValue = 790; //you need to replace this value with Value_1
```

```
const int WaterValue = 390; //you need to replace this value with Value_2
```

```
const int SensorPin = A0;
```

```
int soilMoistureValue = 0;
```

```
int soilmoisturepercent=0;
```

```
int relaypin = D5;
```

```
WiFiClient client;
```

```
void setup() {  
  Serial.begin(115200); // open serial port, set the baud rate to 9600  
  bps  
  display.begin(SSD1306_SWITCHCAPVCC, 0x3C); //initialize with the  
  I2C addr 0x3C (128x64)  
  display.clearDisplay();  
  pinMode(relaypin, OUTPUT);  
  
  dht.begin();  
  
  WiFi.begin(ssid, pass);  
  
  while (WiFi.status() != WL_CONNECTED)  
  {  
    delay(500);  
    Serial.print(".");  
  }  
  Serial.println("");  
  Serial.println("WiFi connected");  
  delay(4000);  
}  
  
void loop()
```

```
{  
  float h = dht.readHumidity();  
  float t = dht.readTemperature();  
  
  Serial.print("Humidity: ");  
  Serial.println(h);  
  Serial.print("Temperature: ");  
  Serial.println(t);  
  
  soilMoistureValue = analogRead(SensorPin); //put Sensor insert  
  into soil  
  Serial.println(soilMoistureValue);  
  
  soilmoisturepercent = map(soilMoistureValue, AirValue,  
  WaterValue, 0, 100);  
  
  if(soilmoisturepercent > 100)  
  {  
    Serial.println("100 %");  
  
    display.setCursor(0,0); //oled display  
    display.setTextSize(2);  
    display.setTextColor(WHITE);  
    display.print("Soil RH:");  
    display.setTextSize(1);
```

```
display.print("100");
display.println(" %");
display.setCursor(0,20); //oled display
display.setTextSize(2);
display.print("Air RH:");
display.setTextSize(1);
display.print(h);
display.println(" %");
display.setCursor(0,40); //oled display
display.setTextSize(2);
display.print("Temp:");
display.setTextSize(1);
display.print(t);
display.println(" C");
display.display();

delay(250);
display.clearDisplay();
}
```

```
else if(soilmoisturepercent <0)
{
  Serial.println("0 %");
}
```

```
display.setCursor(0,0); //oled display
display.setTextSize(2);
display.setTextColor(WHITE);
display.print("Soil RH:");
display.setTextSize(1);
display.print("0");
display.println(" %");
display.setCursor(0,20); //oled display
display.setTextSize(2);
display.print("Air RH:");
display.setTextSize(1);
display.print(h);
display.println(" %");
display.setCursor(0,40); //oled display
display.setTextSize(2);
display.print("Temp:");
display.setTextSize(1);
display.print(t);
display.println(" C");
display.display();

delay(250);
display.clearDisplay();
}
```



```
else if(soilmoisturepercent >=0 && soilmoisturepercent <= 100)
{
    Serial.print(soilmoisturepercent);
    Serial.println("%");

    display.setCursor(0,0); //oled display
    display.setTextSize(2);
    display.setTextColor(WHITE);
    display.print("Soil RH:");
    display.setTextSize(1);
    display.print(soilmoisturepercent);
    display.println(" %");
    display.setCursor(0,20); //oled display
    display.setTextSize(2);
    display.print("Air RH:");
    display.setTextSize(1);
    display.print(h);
    display.println(" %");
    display.setCursor(0,40); //oled display
    display.setTextSize(2);
    display.print("Temp:");
    display.setTextSize(1);
    display.print(t);
    display.println(" C");
```

```
display.display();
```

```
delay(250);
```

```
display.clearDisplay();
```

```
}
```

```
if(soilmoisturepercent >=0 && soilmoisturepercent <= 30)
```

```
{
```

```
    digitalWrite(relaypin, HIGH);
```

```
    Serial.println("Motor is ON");
```

```
}
```

```
else if (soilmoisturepercent >30 && soilmoisturepercent <= 100)
```

```
{
```

```
    digitalWrite(relaypin, LOW);
```

```
    Serial.println("Motor is OFF");
```

```
}
```

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

```
{
```

```
    String postStr = apiKey;
```

```
    postStr += "&field1=";
```

```
    postStr += String(soilmoisturepercent);
```

```
    postStr += "&field2=";
```

```
    postStr += String(h);
```

```
    postStr += "&field3=";
```

```

    postStr += String(t);
    postStr += "&field4=";
    postStr += String(relaypin);
    postStr += "\r\n\r\n\r\n\r\n\r\n";

    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);

}
    client.stop();

}

```

HARDWARE CONNECTION: -

1. Connect Pin DHT11 TO SOIL MOISTURE TO WEMOS
2. Connect pin D0 to D4
3. Connect pin GND to GND
4. Connect pin 5v to 5v

5. Connect pin D0 to D6

CIRCUIT DIAGRAM:-

