

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**
- 4. Relay**
- 5. Water pump**

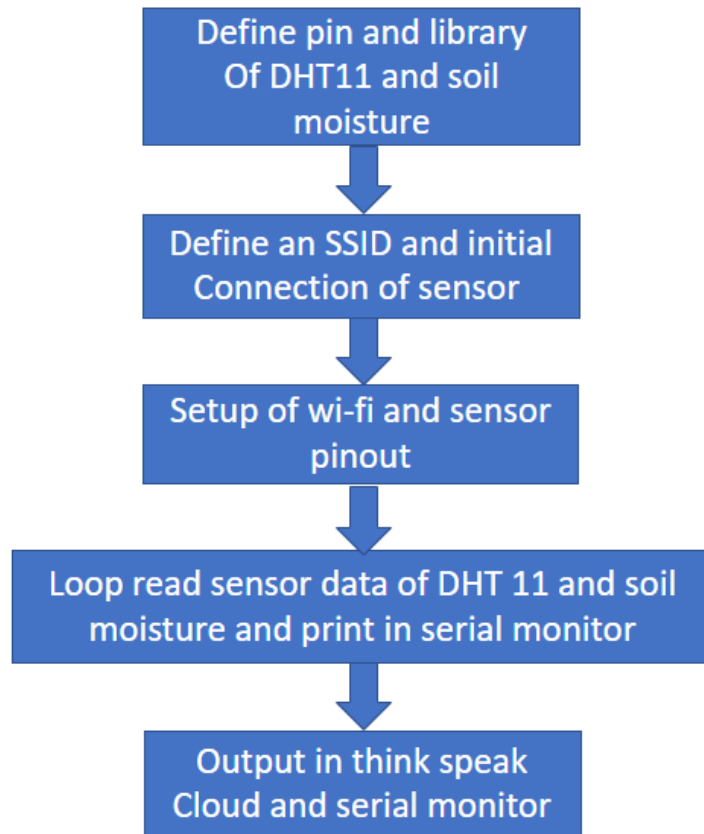
APPLICATION: -

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 <DHT.h>
#include <ESP8266WiFi.h>
String apiKey = "X5AQ3EGIKMBYW31H"; // Enter your Write API key here
const char* server = "api.thingspeak.com";
const char *ssid = "CircuitLoop"; // Enter your WiFi Name
const char *pass = "circuitdigest101"; // Enter your WiFi Password
#define DHTPIN D3 // GPIO Pin where the dht11 is connected
DHT dht(DHTPIN, DHT11);
WiFiClient client;

const int moisturePin = A0; // moisture sensor pin
const int motorPin = D0;
unsigned long interval = 10000;
unsigned long previousMillis = 0;
unsigned long interval1 = 1000;
unsigned long previousMillis1 = 0;
float moisturePercentage; //moisture reading
float h; // humidity reading
float t; //temperature reading
```

```

void setup()
{
  Serial.begin(115200);
  delay(10);
  pinMode(motorPin, OUTPUT);
  digitalWrite(motorPin, LOW); // keep motor off initially
  dht.begin();
  Serial.println("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");          // print ... till not connected
  }
  Serial.println("");
  Serial.println("WiFi connected");
}

void loop()
{
  unsigned long currentMillis = millis(); // grab current time

  h = dht.readHumidity(); // read humidity
  t = dht.readTemperature(); // read temperature

  if (isnan(h) || isnan(t))
  {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  moisturePercentage = ( 100.00 - ( (analogRead(moisturePin) / 1023.00) * 100.00 ) );

  if ((unsigned long)(currentMillis - previousMillis1) >= interval1) {
    Serial.print("Soil Moisture is ");
    Serial.print(moisturePercentage);
    Serial.println("%");
    previousMillis1 = millis();
  }

  if (moisturePercentage < 50) {
    digitalWrite(motorPin, HIGH); // tun on motor
  }
  if (moisturePercentage > 50 && moisturePercentage < 55) {
    digitalWrite(motorPin, HIGH); //turn on motor pump
  }
  if (moisturePercentage > 56) {
    digitalWrite(motorPin, LOW); // turn off mottor
  }

  if ((unsigned long)(currentMillis - previousMillis) >= interval) {

    sendThingspeak(); //send data to thing speak
    previousMillis = millis();
    client.stop();
  }

}

void sendThingspeak() {
  if (client.connect(server, 80))
  {
    String postStr = apiKey; // add api key in the postStr string
    postStr += "&field1=";
    postStr += String(moisturePercentage); // add mositure readin
  }
}

```

```

postStr += "&field2=";
postStr += String(t);           // add tempr readin
postStr += "&field3=";
postStr += String(h);           // add humidity readin
postStr += "\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()); //send lenght of the string
client.print("\n\n");
client.print(postStr);           // send complete string
Serial.print("Moisture Percentage: ");
Serial.print(moisturePercentage);
Serial.print("%. Temperature: ");
Serial.print(t);
Serial.print(" C, Humidity: ");
Serial.print(h);
Serial.println("%%. Sent to Thingspeak.");
}
}

```

HARDWARE CONNECTION: -

1. Connect Pin DHT11 To D3.
2. Connect Relay signal pin to D0.
3. Connect pin GND to GND
4. Connect pin 5v to 5v
5. Connect Sensor A0 pin to A0.

CIRCUIT DIAGRAM:-

