

## **Project 15:**

### **Web Server Based Weather Monitor using DHT 11 & Rain Sensor**

#### **1. Introduction**

The rain sensor module is Vary easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity.

The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer.

Raindrop sensor is basically a board on which nickel is coated in the form of lines. It works on the principal of resistance. When there is no rain drop on board. Resistance is high so we gets high voltage according to  $V=IR$ . When rain drop present it reduces the resistance because water is conductor of electricity and presence of water connects nickel lines in parallel so reduced resistance and reduced voltage drop across it.

It consists of two parts one is a black board with nickel layers on it and other is an integrated chip provided with some output pins. Board has 2 output pin and chip has 6 pin.

The analog output is used in detection of drops in the amount of rainfall. Connected to 3,3V power supply, the LED will turn Off when induction board has no rain drop, and output is Low. When dropping a little amount water, output is High, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level. When no rain digital output is 1 and analog output gives 1023 max value. When rain is present digital output is 0 and analogue output is much less than 1023.

**Hygrometer (DHT11)**- A hygrometer measures relative humidity. Relative humidity is the quantity or percentage of water vapor (water in gas form) in the air. Humidity influences environmental factors and calculations like precipitation, fog, dew point and heat index. In addition, maintaining proper humidity indoors has implications for your health and home.

**COMPONENTS: -**

- 1. WEMOS**
- 2. DHT11**
- 3. RAIN SENSOR**

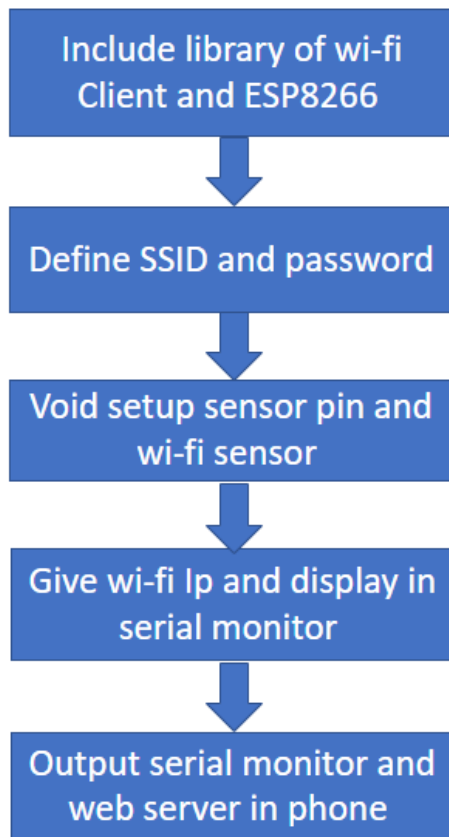
## APPLICATION: -

- This sensor is used as a water preservation device and this is connected to the [irrigation system](#) to shut down the system in the event of rainfall.
- This sensor is used to guard the internal parts of [an automobile](#) against the rainfall as well as to support the regular windscreen wiper's mode.
- This sensor is used in specialized satellite communications aerals for activating a rain blower over the opening of the aerial feed, to get rid of water droplets from the mylar wrap to keep pressurized as well as dry air within the waveguides.

## OBJECTIVES: -

Rain Alarm Project is a simple but very useful project that detects Rain (Rain Water) and automatically triggers an alarm or buzzer. ... Rain water detector will detect the rain and make an alert; rain water detector is used in the irrigation field, home automation, communication, automobiles etc.

## FLOW CHART:-



## PROGRAMMING: -

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

```
#include <WiFiClient.h>
```

```
#include <ESP8266WebServer.h>
```

```
#include "index.h" //Our HTML webpage contents with javascripts
```

```
#include "DHTesp.h" //DHT11 Library for ESP
```

```
#define LED 2 //On board LED
```

```
#define DHTpin 14 //D5 of NodeMCU is GPIO14
```

DHTesp dht;

// Replace with your SSID and Password here

const char\* ssid = "XXXXX";

const char\* password = "XXXXXXXXX";

ESP8266WebServer server(80); //Server on port 80

void handleRoot() {

String s = MAIN\_page; //Read HTML contents

server.send(200, "text/html", s); //Send web page

}

float humidity, temperature;

void handleADC() {

int rain = analogRead(A0);

//Create JSON data

String data = "{\"Rain\": \""+String(rain)+"\", \"Temperature\": \""+String(temperature) +"\", \"Humidity\": \""+ String(humidity) + "\"}";

digitalWrite(LED,!digitalRead(LED));

server.send(200, "text/plain", data);

delay(dht.getMinimumSamplingPeriod());

```
humidity = dht.getHumidity();  
temperature = dht.getTemperature();
```

```
Serial.print("H:");  
Serial.println(humidity);  
Serial.print("T:");  
Serial.println(temperature); //dht.toFahrenheit(temperature));  
Serial.print("R:");  
Serial.println(rain);  
}
```

```
void setup()  
{  
  Serial.begin(115200);  
  Serial.println();
```

```
dht.setup(DHTpin, DHTesp::DHT11); //for DHT11 Connect DHT  
sensor to GPIO 17
```

```
WiFi.begin(ssid, password); //Connect to your WiFi router
```

```
Serial.println("");
```

```
pinMode(LED,OUTPUT);
```

```
// Wait for connection
```

```
while (WiFi.status() != WL_CONNECTED) {
```

```
  delay(500);
```

```
  Serial.print(".");
```

```
}
```

```
Serial.println("");
```

```
Serial.print("Connected to ");
```

```
Serial.println(ssid);
```

```
Serial.print("IP address: ");
```

```
Serial.println(WiFi.localIP()); //IP address assigned to your ESP
```

```
server.on("/", handleRoot); //Which routine to handle at root location.  
This is display page
```

```
server.on("/readADC", handleADC); //This page is called by java  
Script AJAX
```

```
server.begin(); //Start server
```

```
Serial.println("HTTP server started");
```

```
}
```

```

void loop()
{
server.handleClient(); //Handle client requests
}

```

## HARDWARE CONNECTION: -

1. Connect pin DHT11 to Rain water to wemos
2. Connect Rain sensor pin A0 to pin A0
3. Connect pin 5V to 5V
4. Connect pin GND to GND
4. Connect DHT11 digital pin to pin D5.

## CIRCUIT DIAGRAM: -

