Experiment - Sending Temperature and Humidity sensing data to a web server using ESP8266

Name: Ayush Pandit
Roll No.: 19EE10067
Department: Electrical Engineering

Experiment 6:

1. Aim of the Experiment:
To send temperature and humidity data (sensed by DHT22) to the ThingSpeak web server using ESP8266.

2. Requirements:
1. DHT22 temperature sensor
2. ESP8266
3. OTG cable
4. Arduino IDE
5. ThingSpeak web server

3. Procedure:
We connect the DHT22 to the ESP8266 board with the output pin to D5, +ve terminal to 3V, and -ve pin to ground.
We download all the necessary libraries and boards in Arduino IDE.
Then we upload the following code to the ESP8266 board using Arduino IDE:
Arduino IDE code:

```
#include <DHT.h>
#include "ThingSpeak.h"
#include <ESP8266WiFi.h>

const char * apiKey = "U451HU8PF4VCUJ57";
unsigned long Channel_ID = 1685254;
const char *ssid = "moto g(6) plus 1137";
const char *pass = "laluprasad";
const char* server = "api.thingspeak.com";
```

```cpp
#define DHTPIN D5 //pin where the dht22 is connected

DHT dht(DHTPIN, DHT22);WiFiClient client;

void setup()
{
  Serial.begin(115200);
  ThingSpeak.begin(client);
  delay(10);
  dht.begin();
  Serial.println("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
 }
void loop()
{
  float h = dht.readHumidity();
  float t = dht.readTemperature();
  if (isnan(h) || isnan(t))
  {
    Serial.println("Failed to read from DHT sensor!");
    delay(1000);
    return;
  }
  Serial.print(F("Humidity: "));
  Serial.print(h);
  Serial.print(F("% Temperature: "));
  Serial.print(t);
  Serial.print(F("°C "));
  ThingSpeak.writeField(Channel_ID, 1, String(t), apiKey);
  delay(15000);
  ThingSpeak.writeField(Channel_ID, 2, String(h), apiKey);
  delay(15000);
  Serial.println("Waiting...");
}
```
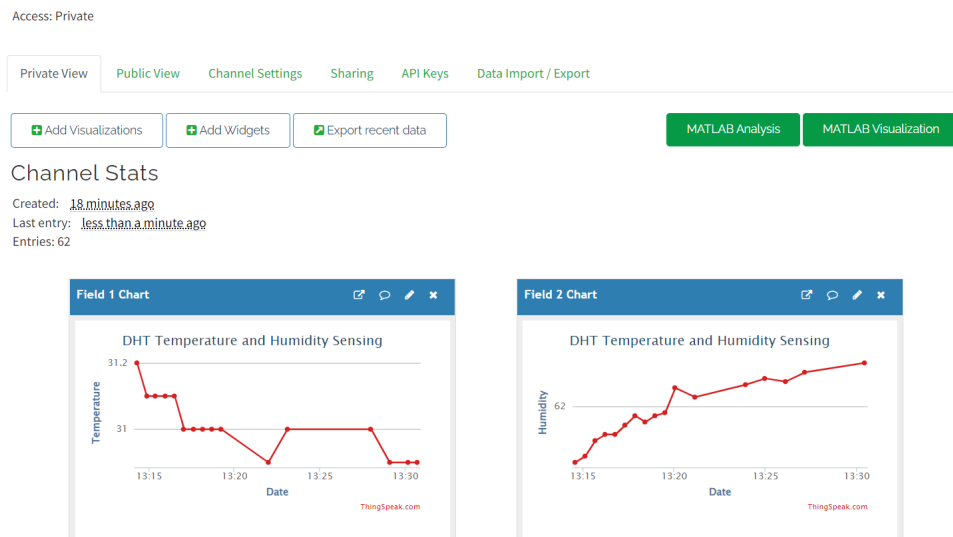
4. Results:

The serial monitor shows the readings after every 15s.

```
moto g(6) plus 1137
.................
WiFi connected
Humidity: 60.20% Temperature: 31.20°C Waiting...
Humidity: 60.40% Temperature: 31.10°C Waiting...
Humidity: 60.90% Temperature: 31.10°C Waiting...
Humidity: 61.10% Temperature: 31.10°C Waiting...
Humidity: 61.10% Temperature: 31.10°C Waiting...
Humidity: 61.40% Temperature: 31.00°C Waiting...
Humidity: 61.70% Temperature: 31.00°C Waiting...
Humidity: 61.50% Temperature: 31.00°C Waiting...
Humidity: 61.70% Temperature: 31.00°C Waiting...
Humidity: 61.80% Temperature: 31.00°C Waiting...
Humidity: 62.60% Temperature: 31.00°C Waiting...
Humidity: 62.00% Temperature: 31.00°C Waiting...
Humidity: 62.30% Temperature: 31.00°C Waiting...
Humidity: 62.80% Temperature: 31.00°C Waiting...
Humidity: 62.30% Temperature: 30.90°C Waiting...
Humidity: 62.50% Temperature: 31.00°C Waiting...
Humidity: 62.40% Temperature: 31.00°C Waiting...
Humidity: 62.70% Temperature: 31.00°C Waiting...
Humidity: 62.80% Temperature: 31.00°C Waiting...
Humidity: 62.90% Temperature: 31.00°C Waiting...
Humidity: 62.80% Temperature: 31.00°C Waiting...
Humidity: 62.80% Temperature: 31.00°C Waiting...
Humidity: 63.00% Temperature: 30.90°C Waiting...
Humidity: 63.10% Temperature: 30.90°C Waiting...
Humidity: 62.90% Temperature: 30.90°C Waiting...
Humidity: 63.00% Temperature: 31.00°C Waiting...
Humidity: 63.20% Temperature: 30.90°C Waiting...
Humidity: 63.30% Temperature: 30.90°C Waiting...
Humidity: 63.30% Temperature: 31.00°C Waiting...
Humidity: 63.40% Temperature: 30.90°C
```

In the ThingSpeak server, our specified channels will show

Private View   Public View   Channel Settings   Sharing   API Keys   Data Import / Export

➕ Add Visualizations   ➕ Add Widgets   ↗ Export recent data   MATLAB Analysis   MATLAB Visualization

Channel Stats

Created: 18 minutes ago
Last entry: less than a minute ago
Entries: 62

Field 1 Chart   ↗ ○ ✏ ✖

DHT Temperature and Humidity Sensing

Field 2 Chart   ↗ ○ ✏ ✖

DHT Temperature and Humidity Sensing

5. Discussions:

1) ThingSpeak only allows data transfer at a minimum interval of 15s. So, we need to introduce a delay of at least 15s between two consecutive readings.
2) The DHT22 connection should be made very carefully(output pin to D5, +ve terminal to 3V, and -ve pin to ground). Otherwise, it gives NaN results.
3) Sometimes, the despite connecting the OTG cable, the port isn't available. We need to update the driver to solve ths problem.