

Industrial IoT Minor

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Experiment - 6

AIM: Write a program on ESP32/Raspberry Pi to retrieve temperature and humidity data from DHT11/DHT22 to thingspeak cloud.

OBJECTIVE: To write a code on ESP32 to retrieve temperature and humidity data from DHT11/DHT22 to thingspeak cloud.

THEORY: DHT11/22: The DHT11 detects water vapor by measuring the electrical resistance between two electrodes. The humidity sensing component is a moisture holding substrate with electrodes applied to the surface. When water vapor is absorbed by the substrate, ions are released by the substrate which increases the conductivity between the electrodes.

Thingspeak: ThingSpeak is an open-source software written in Ruby which allows users to communicate with internet enabled devices. It facilitates data access, retrieval and logging of data by providing an API to both the devices and social network websites.

SIMULATION CODE:

```
#include <DHT.h>
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ThingSpeak.h>
#define DHTPIN 0
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
const char* ssid = ".....";
const char* password = "....";
WiFiClient client;
unsigned long myChannelNumber = 1682481; // your channel number
const char * myWriteAPIKey = "7YXRHX583B7L73ZU"; // your API key
uint8_t temperature, humidity;
void setup()
{
  Serial.begin(115200);
  dht.begin();
  delay(10);
  // Connect to WiFi network
  Serial.println();
  Serial.println();
  Serial.print("Connecting to ");
  Serial.println(ssid);
```

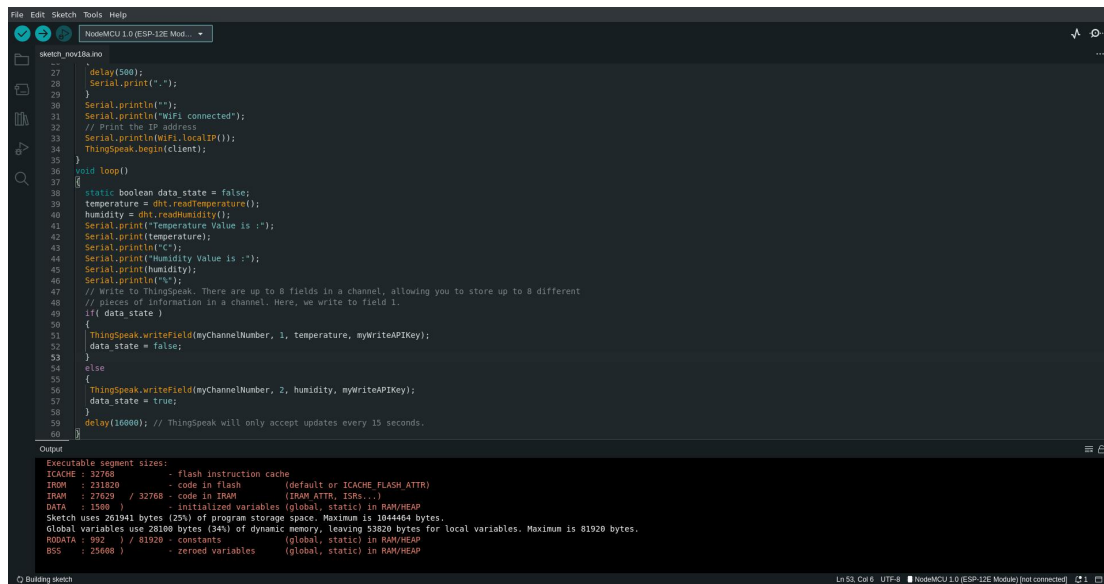
```

WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED)
{
  delay(500);
  Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected");
// Print the IP address
Serial.println(WiFi.localIP());
ThingSpeak.begin(client);
}

void loop()
{
  static boolean data_state = false;
  temperature = dht.readTemperature();
  humidity = dht.readHumidity();
  Serial.print("Temperature Value is :");
  Serial.print(temperature);
  Serial.println("C");
  Serial.print("Humidity Value is :");
  Serial.print(humidity);
  Serial.println("%");
  // Write to ThingSpeak. There are up to 8 fields in a channel, allowing you to store up
  // to 8 different
  // pieces of information in a channel. Here, we write to field 1.
  if( data_state )
  {
    ThingSpeak.writeField(myChannelNumber, 1, temperature, myWriteAPIKey);
    data_state = false;
  }
  else
  {
    ThingSpeak.writeField(myChannelNumber, 2, humidity, myWriteAPIKey);
    data_state = true;
  }
  delay(16000); // ThingSpeak will only accept updates every 15 seconds.
}

```

SIMULATION RESULT:



```
File Edit Sketch Tools Help
NodeMCU 1.0 (ESP-12E Mod...)

sketch_new12a.ino
27 delay(500);
28 Serial.print(".");
29 }
30 Serial.println("");
31 Serial.println("WiFi connected");
32 // Print the IP address
33 Serial.println(WiFi.localIP());
34 ThingSpeak.begin(client);
35 }
36 void loop()
37 {
38     static boolean data_state = false;
39     temperature = dht.readTemperature();
40     humidity = dht.readHumidity();
41     Serial.print("Temperature Value is :");
42     Serial.print(temperature);
43     Serial.println(" ");
44     Serial.print("Humidity Value is :");
45     Serial.print(humidity);
46     Serial.println(" ");
47     // Write to Thingspeak. There are up to 8 fields in a channel, allowing you to store up to 8 different
48     // pieces of information in a channel. Here, we write to field 1.
49     if (data_state)
50     {
51         ThingSpeak.writeField(myChannelNumber, 1, temperature, myWriteAPIKey);
52         data_state = false;
53     }
54     else
55     {
56         ThingSpeak.writeField(myChannelNumber, 2, humidity, myWriteAPIKey);
57         data_state = true;
58     }
59     delay(16000); // Thingspeak will only accept updates every 15 seconds.
60 }
```

Output

Executable segment sizes:

Segment	Size	Usage
ICACHE	32768	- flash instruction cache (default or ICACHE_FLASH_ATTR)
IRAM	27620 / 32768	- code in flash (IRAM_ATTR, ISRs...)
DATA	1500	- initialized variables (global, static) in RAM/HEAP
Sketch	261941 bytes	(25%) of program storage space. Maximum is 1044464 bytes.
Global variables	28100 bytes	(34%) of dynamic memory, leaving 53820 bytes for local variables. Maximum is 81920 bytes.
RODATA	992	- constants (global, static) in RAM/HEAP
BSS	25088	- zeroed variables (global, static) in RAM/HEAP

Ln 63, Col 6 UTF-8 NodeMCU 1.0 (ESP-12E Module) [not connected]

CONCLUSION: After performing this experiment we were able to retrieve temperature and humidity data from DTH11/DTH22 to thingspeak cloud.