Experiment - 6

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Semester: 6th
Subject Code: 20CSP-358
Subject Name: Internet Of Things Lab

Aim: Interfacing of Arduino with temperature sensor with real time application.

Objective:
- Learn about interfacing.
- Learn about IoT programming

Components Required:
- Arduino Uno R3 board
- DH11 Temperature
- Jumper Wires
- USB or 5V Power Supply

Arduino:
It is an open-source electronics platform. It consists ATmega328 8-bit Micro controller. It can be able to read inputs from different sensors &we can send instructions to the micro controller in the Arduino. It provides Arduino IDE to write code & connect the hardware devices like Arduino boards & sensors.

DH11 Sensor:
DHT11 Module features a temperature & humidity sensor complex with a calibrated digital signal output. The exclusive digital-signal-acquisition technique and temperature & humidity sensing technology ensure high reliability and excellent long-term stability. This sensor includes an NTC for temperature measurement and a resistive-type humidity measurement component for humidity measurement. These are connected to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability, and cost-effectiveness.

DHT11 Module Pinout

The DHT11 module has a total of 3 pins. In which two are for power and one is for communication. The pinout of a DHT11 Sensor module is as follows:

- DATA Data pin for 1-wire communication.
- GND Ground Connected to Ground pin of the Arduino.
- VCC Provides power for the module, Connect to the 5V pin of the Arduino.

Interfacing DHT11 Sensor with Arduino

Now that we have completely understood how a DHT11 Sensor works, we can connect all the required wires to Arduino and write the code to get all the data out from the sensor.

Procedure:

Step 1: Connect the VCC and GND of the module to the 5V and GND pins of the Arduino
Step 2: Then connect the DATA pin to the Arduino's digital pin 2.
Step 3: We communicate with DHT11 through this pin.
Step 4: Now write a code in your Arduino IDE.
Step 5: Now connect your Arduino board to your laptop via USB jack and in your Arduino IDE, select your board and click on upload.
Step 6: Observe the output in the Serial monitor in Arduino IDE.

CODE:

```
#include <Adafruit_Sensor.h>
#include <DHT.h>
#include <DHT_U.h>
#define DHTTYPE    DHT11     // DHT 11
#define DHTPIN 2
DHT_Unified dht(DHTPIN, DHTTYPE);
uint32_t delayMS;

void setup() {
  Serial.begin(9600);
  dht.begin();
  sensor_t sensor;
  delayMS = sensor.min_delay / 1000;
}

void loop()
```

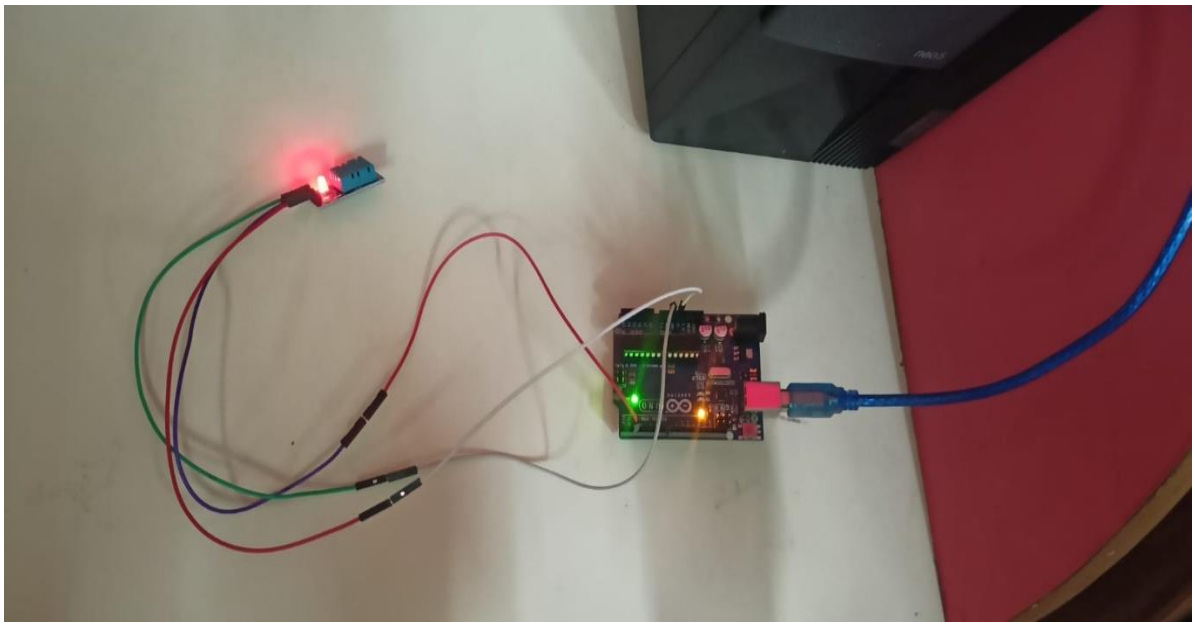
```
{
  sensors_event_t event;
  dht.temperature().getEvent(&event);
  Serial.print(F("Temperature: "));

  Serial.print(event.temperature);
  Serial.println(F("°C"));
  dht.humidity().getEvent(&event);
  Serial.print(F("Humidity: "));
  Serial.print(event.relative_humidity);
  Serial.println(F("%"));
  delay(delayMS);
}
```

sketch_apr9a.ino

```
1   #include <Adafruit_Sensor.h>
2   #include <DHT.h>
3   #include <DHT_U.h>
4   #define DHTTYPE    DHT11     // DHT 11
5   #define DHTPIN 2
6   DHT_Unified dht(DHTPIN, DHTTYPE);
7   uint32_t delayMS;
8
9   void setup() {
10    Serial.begin(9600);
11    dht.begin();
12    sensor_t sensor;
13    delayMS = sensor.min_delay / 1000;
14  }
15
16  void loop()
17  {
18    sensors_event_t event;
19    dht.temperature().getEvent(&event);
20    Serial.print(F("Temperature: "));
21
22    Serial.print(event.temperature);
23    Serial.println(F("°C"));
24    dht.humidity().getEvent(&event);
25    Serial.print(F("Humidity: "));
26    Serial.print(event.relative_humidity);
27    Serial.println(F("%"));
28    delay(delayMS);
29  }
30
```

Result:-

Circuit:



Serial Monitor: