PRACTICAL - 3

AIM: Interfacing a humidity and temperature sensor (DHT11) with Arduino board.

Introduction to DHT11 Sensor - Temperature and Humidity Sensor

This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor capability. It is integrated with a high-performance 8-bit microcontroller. Its technology ensures the high reliability and excellent long-term stability. This sensor includes a resistive element and a sensor for wet NTC temperature measuring devices. It has excellent quality, fast response, anti-interference ability and high performance.

Each DHT11 sensor features extremely accurate calibration of humidity calibration chamber. The calibration coefficients stored in the OTP program memory, internal sensors detect signals in the process, we should call these calibration coefficients. The single-wire serial interface system is integrated to become quick and easy. Small size, low power, signal transmission distance up to 20 meters, enabling a variety of applications and even the most demanding ones. The product is 4-pin single row pin package. Convenient connection, special packages can be provided according to users need.

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. The change in resistance between the two electrodes is proportional to the relative humidity. Higher relative humidity decreases the resistance between the electrodes, while lower relative humidity increases the resistance between the electrodes.

- Supply Voltage: +5 V
- Temperature range :0-50 °C error of ± 2 °C
- Humidity :20-90% RH ± 5% RH error
- Interface: Digital

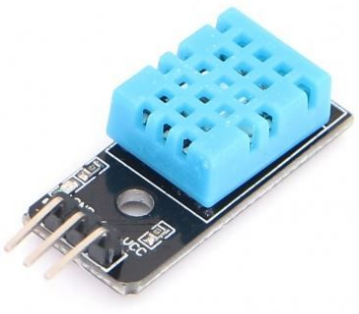

Fig 3.1 - DHT11 Sensor

Code

```
#include "DHT.h"

DHT dht(8, DHT22);

float humidity;
float temperature;

void setup() {
	Serial.begin(9600);
	dht.begin();
}

void loop() {
	humidity = dht.readHumidity();
	temperature = dht.readTemperature();

	Serial.print("Humidity : ");
	Serial.print(humidity);
	Serial.print("%, Temperature: ");
	Serial.print(temperature);
	Serial.println(" Celsius ");
	delay(2000); // Delay of 2 seconds
}
```

Circuit Diagram

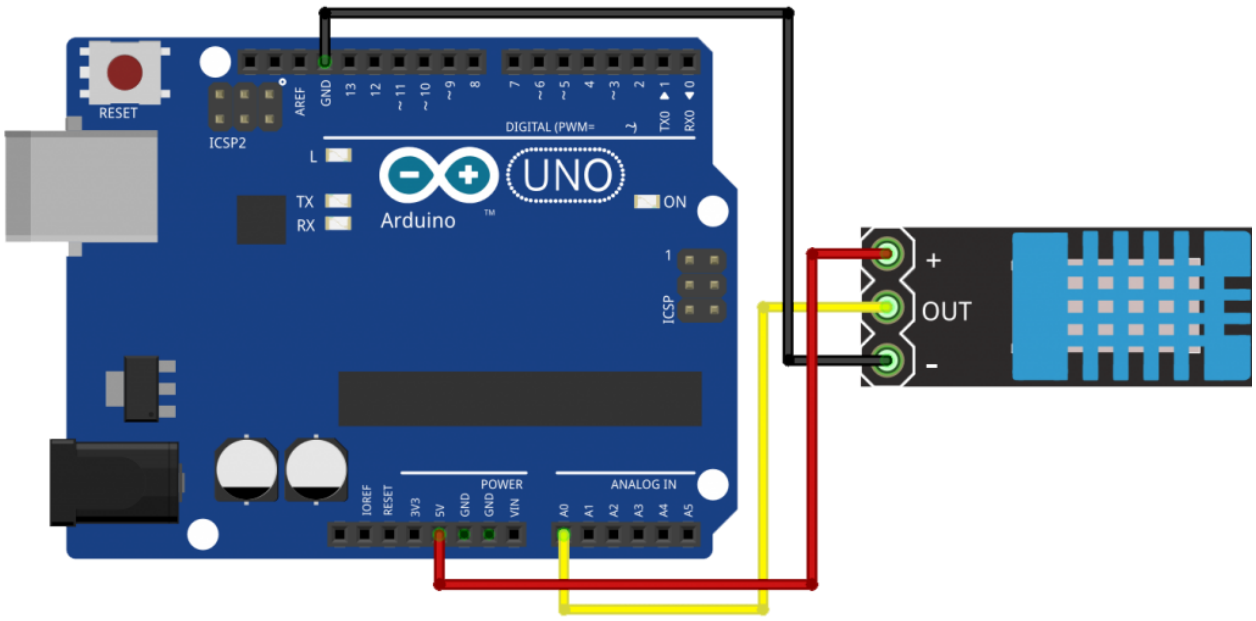

Fig 3.2 - Circuit Diagram for connecting DHT11 with Arduino

Output on Arduino with DHT11

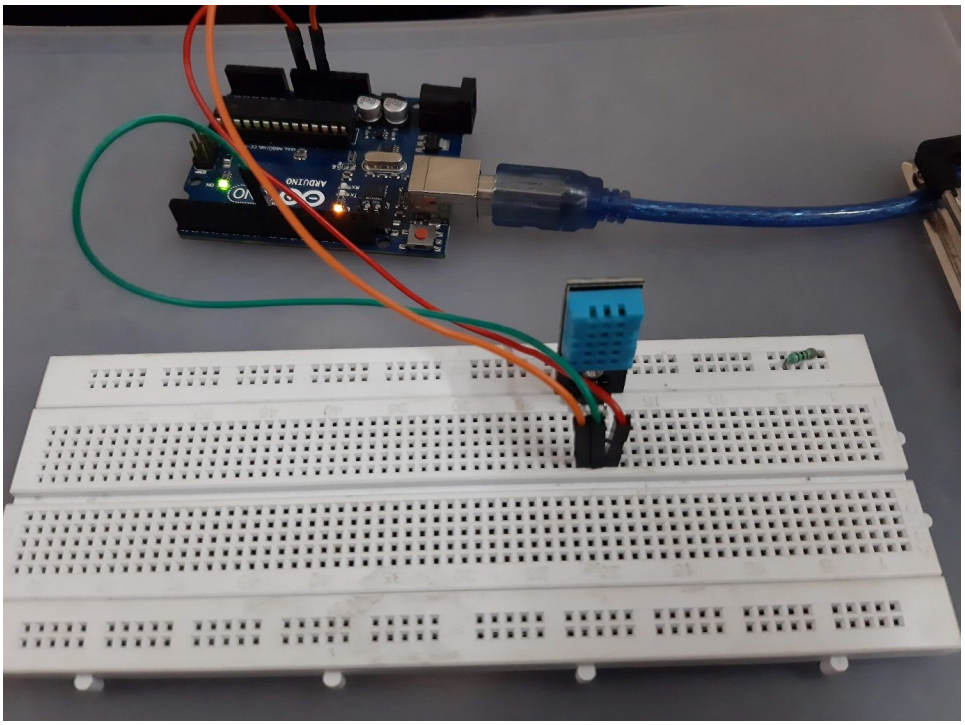

Fig 3.3 - Arduino UNO connected to DHT11 on breadboard

Serial Monitor Output

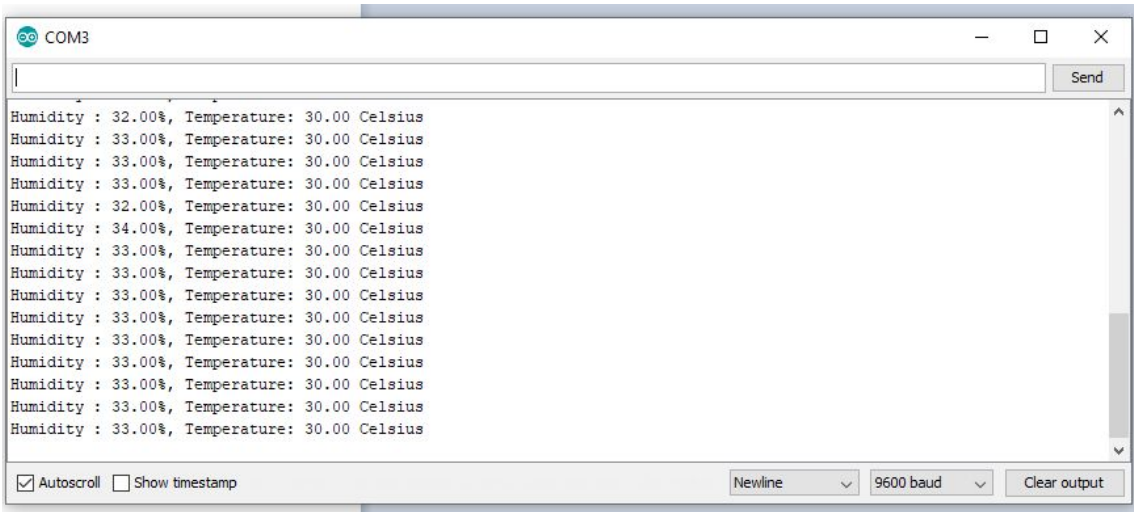

Fig 3.4 - Serial Monitor Output on Laptop