

A PROJECT REPORT ON
**“ARDUINO IOT CLOUD AND ESP8466 WITH DHT11
FOR TEMPERATURE AND HUMIDITY
MONITORING”**



Submitted by

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UNDERTAKING

I declare that the work presented in this project titled “***ARDUINO IOT CLOUD AND ESP8466 WITH DHT11 FOR TEMPERATURE AND HUMIDITY MONITORING***”, submitted to the All India council of robotics and Automation, for the award of the Internship in **INTERNET OF THINGS (IOT)**, is my original work. I have not plagiarized or submitted the same work for the award of any other Internship. In case this undertaking is found incorrect, I accept that my Project may be unconditionally withdrawn.

OCTOBER, 2021

B.E ELECTRICAL & ELECTRONICS

SHAMBHAVI

RANJITHA BR

CERTIFICATE

Certified that the work contained in the project titled “***ARDUINO IOT CLOUD AND ESP8466 WITH DHT11 FOR TEMPERATURE AND HUMIDITY MONITORING***”, by SHAMBHAVI AND RANJITHA BR has been carried out under my supervision and that this work has not been submitted elsewhere for a Internship..

All India Council of Robotics and Automation
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PREFACE

The fundamental purpose of monitoring electronics appliances in the modern world by using IOT(Internet of Things) is to make everything in the house automatically control led using technology to control the demand perform the job that we normally do manually. Nowadays, efficient control is more and more needed to optimize performance and saves unnecessary wastage of power. The basics home appliances are light, fan and refrigerators, by controlling them unnecessary wastage of power and resources by turning on lights during day time and high speed fan while no one is around can be avoided. A system has been developed to control house hold appliances any where at anytime across the globe.Node MCU,an android operating system is used to achieve therefore mentioned automation.

This project proposes an efficient implementation forIOT (Internet of Things) used for monitoring and controlling the home appliances via Internet. Home automation uses portable devices as user interface. The Node MCU server communicates with the corresponding relay hardware circuits that control the appliances running at home. With this we provide a comfortable and effective home automation system.

Chapter 1

Introduction

There are such a large number of inserted gadgets to associate with the conditions by interfacing web. The addition of these sorts of articles is accomplishing the advancement of Microcontroller-based frame works which are supplanting old convoluted electronic circuits. By utilizing IOT ,we can control any electronic hardware in homes and business. Besides, we can peruse an information from any sensor and examine it graphically from anyplace on the planet

Arduino is a microcontroller board which fills in as a little PC. Node MCU is a stage to buildup a co-operation with required programming. Arduino UNO is miniaturized scale controller unit

to get an information of Humidity and Temperature from DHT11 Sensor and offer it to an ESP8266 module(wi-fi).

Chapter 2

About IOT

The Internet Of Things refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IOT. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to device otherwise it would be dumb, enabling the to communicate real-time data without involving a human being. The Internet Of Things is making the fabric of the world around us more responsive, merging the digital and physical universes

Pretty much any physical objects can be transformed into IOT devices if it can be connected to the internet to be controlled or communicate information

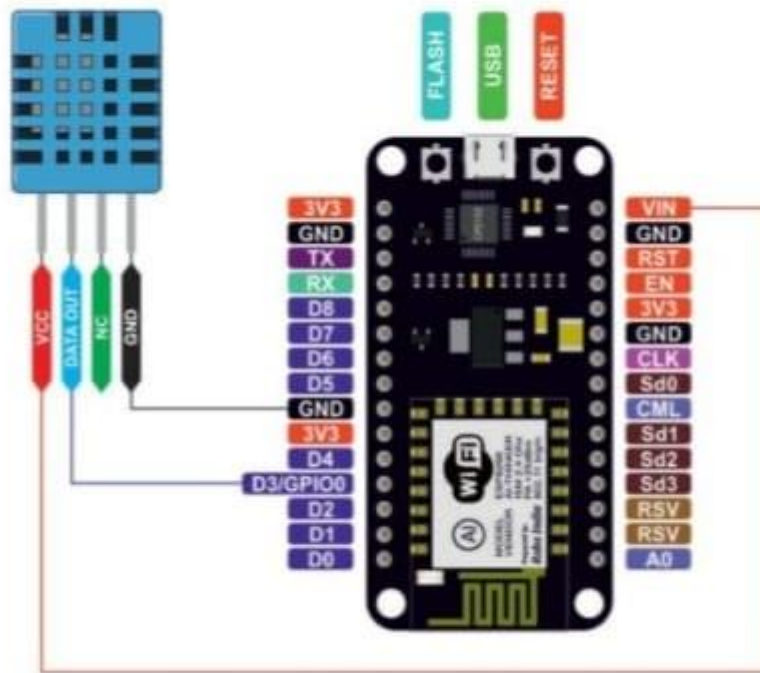
A Light bulb that can be switched on using a smartphone app is an IOT device, as is a motion sensor or a smart thermostat in your office or a connected streetlight. At an even bigger scale, smart cities projects are filling entire regions with sensors to help us understand and control the environment

Chapter 3

Project Circuit Diagram

NodeMCU ESP8266-12e works on 3.3 volts and dht11 can also work on 3 V. So I am going to power the dht11 with nodemcu output power pins. For data input to nodemcu I am using D3 or GPIO-0 of nodemcu.

Project circuit diagram is given below



Coming to the code portion, First I include the necessary libraries for nodemcu and dht11 working. ESP8266wifi header file deals with nodemcu. After libraries I defined the macros for dht sensor and the pin to which it will be connected with nodemcu. After it enter the SSID and Password of wifi network to which you want to connect your nodemcu.

```
Const char* ssid="Your SSID";
```

```
Const char* password=" Your WiFi Password";
```

Chapter 4

❖ Components Required

➤ Hardware Components

1. Node MCU ESP8266
2. DHT11 Humidity And Temperature Sensor
3. Jumper Wires (optional)
4. Micro USB Cable

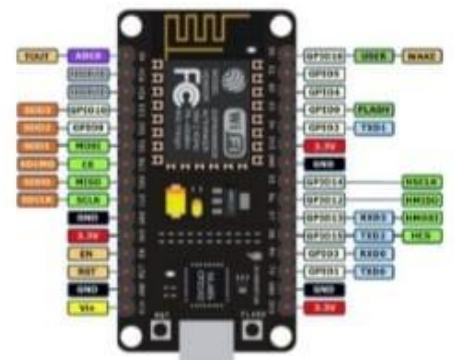
1) Arduino UNO

Chapter 5

Components Description

1.Node MCU ESP8266

The **NodeMCU ESP8266** development board comes with the ESP-12E module containing the ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. NodeMCU has 128 KB RAM and 4MB of flash memory to store data and programs. Its high processing power inbuilt WiFi / Bluetooth and Deep Sleep Operating features make it ideal for IOT Projects.



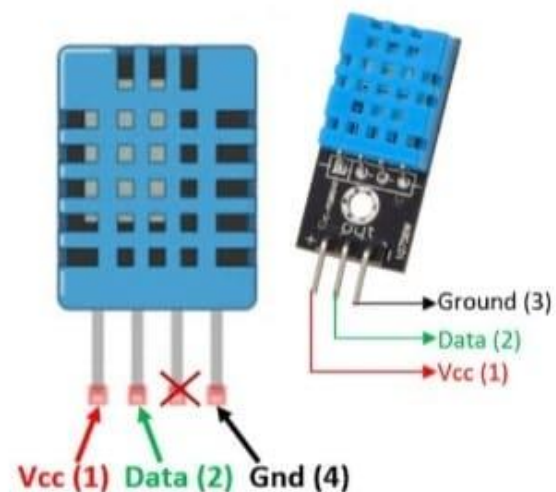
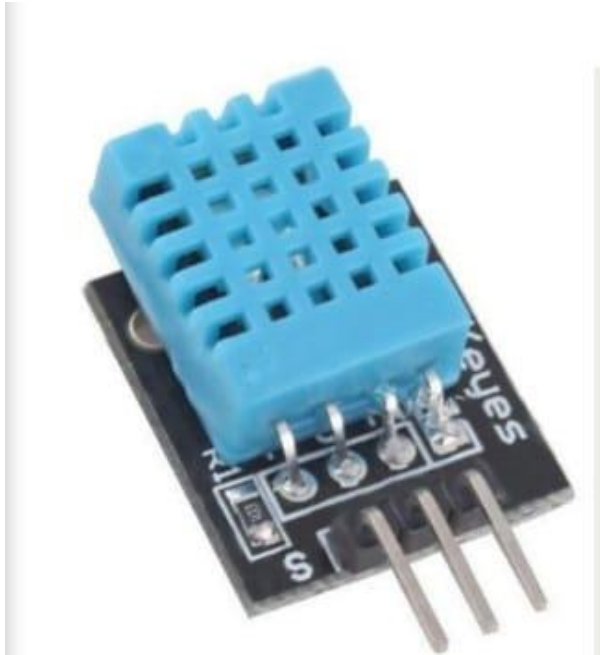
NodeMCU ESP8266 Specifications & Features

- Microcontroller : Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage : 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins(DIO): 16
- Analog Input Pins (ADC):1
- UARTs:1
- SPIs :1
- I2Cs :1

- Flash Memory :4 MB
- SRAM:64 KB
- Clock speed :80 MHz
- USB-TTL based on CPO2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small sized module to fit smartly inside your IOT Projects

2.DHT11 Humidity And Temperature Sensor

The **DHT11** is commonly used **Temperature and Humidity** Sensor that comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as a serial data.



DHT11 Specifications:

- Operating Voltage:3.5 V to 5.5 V
- Operating Current : 0.3mA(measuring) 60uA(standby)
- Output : Serial data

- Temperature Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit

3. Jumper Wires:

A Jump wire also known as jumper wire, jumper cable, DuPont wire or cable is an electrical wire, or group of them in a cable with a connector or pin at each end. Which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipments or components, without soldering.

Individual jump wires are fitted by inserting the “end connectors” into the slots provided in a bread board, the header connector of a circuit board or a piece of test equipment.



4. Micro USB Cable:

The term USB stands for “Universal Serial Bus”. USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more. Devices manufactured to the current USB revision 3.0 specification are backward compatible with version 1.1



Chapter 6

Programming

```
#include "DHT.h"           // including the library of DHT11 temperature and humidity module
#define DHTTYPE DHT11      // DHT 11

#define dht_dpin 0

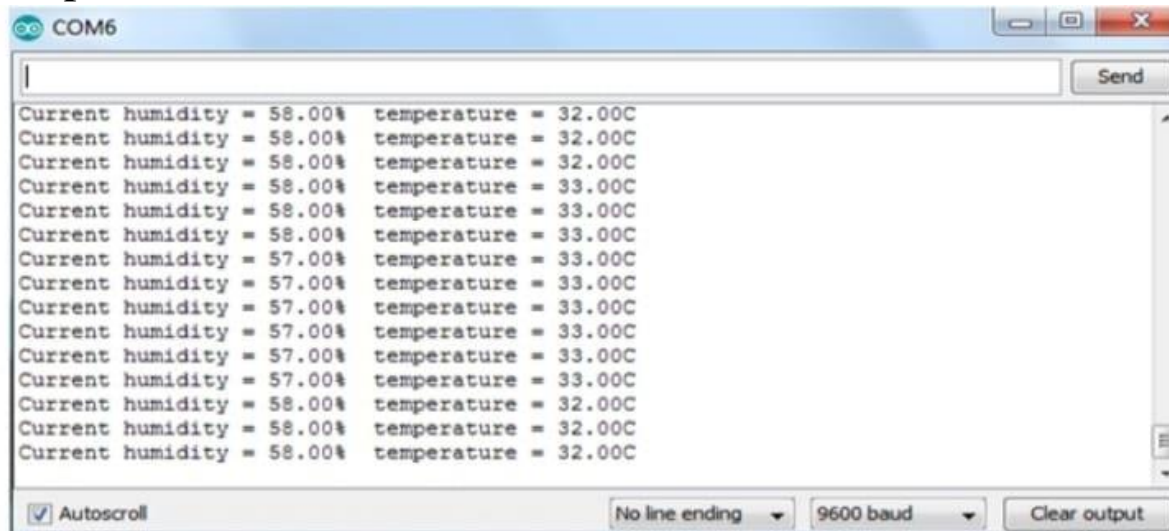
DHT dht(dht_dpin, DHTTYPE);

void setup(void)
{
    dht.begin();
    Serial.begin(9600);
    Serial.println("Humidity and temperature\n\n");
    delay(700);
}

void loop() {
    float h = dht.readHumidity();
    float t = dht.readTemperature();
    Serial.print("Current humidity = ");
    Serial.print(h);
    Serial.print("% ");
    Serial.print("temperature = ");
    Serial.print(t);
    Serial.println("C ");
    delay(800);
}
```

Chapter 7

Output



Chapter 8

Advantages:

- Low cost
- Integrated support for WiFi network
- Reduced size of the board
- Low energy consumption
- 3-5V power and Input
- 2.5 mA maximum current used during conversion
- Good for 90-80% Humidity readings with 5% Accuracy
- Good for 0-50 degree celcius temperature

Chapter 9

Applications:

- Prototyping of IOT devices
- Low power battery operated applications
- Network projects
- Projects requiring multiple input interfaces with WiFi with Bluetooth functions
- Weather stations
- HVAC (Heating , Ventilation & Air conditioning) systems

- Medical equipment for measuring Humidity
- Home automation systems
- Automotive & other weather control applications.

Chapter 10

Refrence

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