



IOT Based Weather Monitoring System using Node MCU-32S

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ABSTRACT: This paper presents the calculation and display of live temperature and humidity using NodeMCU-32s. It is based on NodeMCU-32S, temperature and humidity sensing DHT11 sensor for measurement and it is distinctive as it not only reads temperature from sensor but also stores displays data on screen and other devices.

KEYWORDS: IOT, sensors, NodeMCU-32S, Blynk app

I.INTRODUCTION

An accurate calculation of temperature and humidity is a important factor in many fields and industries of science. The constant observation of temperature is crucial in lot of applications like food industry, the manufacturing factory and pharmaceutical industry. For commercial purpose of temperature sensing we have analog and digital Temperature sensors. Temperature sensors which have temperature-dependent functions can be measured using resistors, semiconductors like diodes, thermocouples and thermistors. The main objective of the project is over see the live temperature and humidity in a less cost .The observational node is NodeMCU-32S . The Sensor used is DHT11 temperature sensor. This sensor consists of temperature calculating function and main advantage of using DHT11 sensor. it is inexpensive and has less weight. Sensor is connected with the NodeMCU-32S using jumper wires. The temperature is perceived using the sensor DHT11 and is read, stored and displayed by the NodeMCU-32S kit.

II.SYSTEM MODEL AND ASSUMPTIONS

NodeMCU-32S with internet connectivity, Temperature and Humidity sensor are the main hardware of this system. It is easy to operate and is cost effective and consumes low power . The monitored data is collected at the Web server with perfect date and time.

The design of the system is done in such a way that system can work 24x7 and give exact data of temperature and humidity on real time basis. With the help of this system precision farming can be done. It provides the convenience to handle different kinds of devices such as water pumps, located remotely using a Mobile phone from anywhere using internet connectivity. By adopting these system farmers can switch on and off their pump from their home or where ever they want using their mobile phone.

Humidity Sensor (DHT11)

The DHT11 is a Temperature & Humidity Sensor it measures *relative humidity* cost highly reliable sensor. Pin-1 is Vcc, Pin-2 is data pin which collects data from outside world and gives data to the microcontroller.

- Pin configuration for DHT11 sensor is shown in figure. Its output is a temperature & Humidity sensor complex with a calibrated digital signal output.
- It fortifies high reliability and excellent long-term stability. It consist of a humidity sensing component, a NTC temperature sensor (or thermistor) and an IC on the back side of the sensor.
- Its temperature range is 00-50C and Humidity range is 20-80%.

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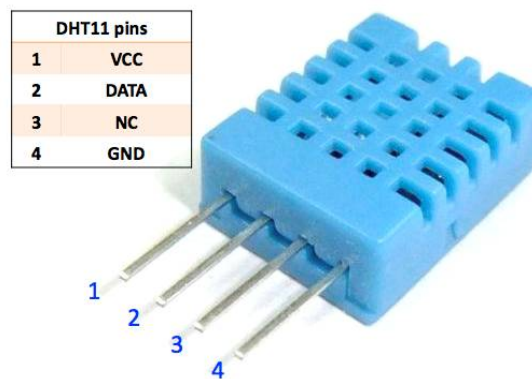


Fig1.DHT11 Sensor

NodeMCU-32S

- The NodeMCU-32S is one of the development board created by NodeMCU to evaluate the ESP-WROOM-32 module.
- It is single chip [microcontroller](#) that boasts Wifi, Bluetooth, Ethernet and Low Power support for different applications.

MCU-32S is a Lua WiFi IOT development board based on ESP-32S module. The development board has **Arduino like** Analog (i.e. A0) and Digital (D0-D8) pins on its board. It also supports serial communication protocols i.e. UART, SPI, I2C etc.



Fig2. Node MCU-32-s

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PIN DIAGRAM

NodeMCU ESP-32S

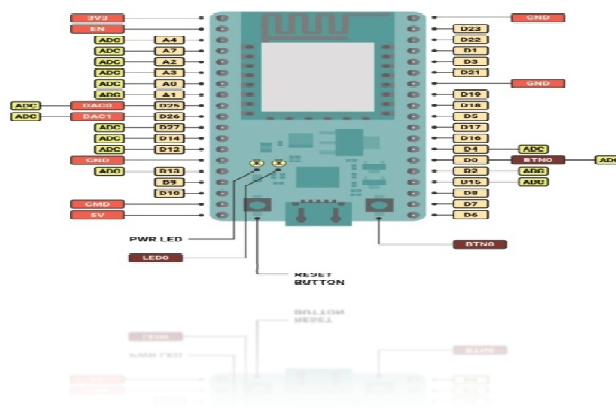


Fig3. Pin diagram

IOT

- The **Internet of things (IoT)** is the inter connected network of devices, vehicles, and home appliances that contain [electronics](#), [software](#), [actuators](#), and [connectivity](#) which allows these things to connect, interact and exchange [data](#).
- IoT involves industries through their unique flexibility and ability to be suitable in any environment. They improves the quality of data collection, automation, operations, and much more through smart devices and powerful enabling technology.
- Embedded with technology, these devices can communicate and interact over the [Internet](#), and they can be remotely monitored and controlled via different apps.



Fig4. IOT



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Weather Monitoring screen in Blynk app

Blynk is a mobile Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet.

- It's a digital dashboard where you can build a graphic user interface for your project by simply dragging and dropping widgets.
- It's really simple to set everything up and you'll [start tinkering](#) in very short time.
- Blynk is independent of specific board or shield. Instead, it's supporting hardware of your choice.
- Whether your NODE MCU, Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the **Internet Of Your Things**.

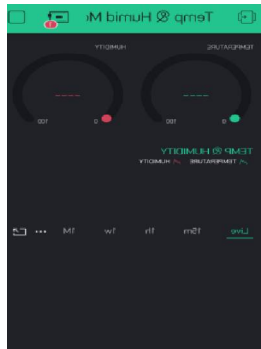


Fig.5 Blynk app

III.EFFICIENT COMMUNICATION

One aim of the IDE is to reduce the configuration necessary to piece together multiple development utilities, instead it provides the same set of capabilities as one cohesive unit. Reducing setup time can increase developer productivity, especially in cases where learning to use the IDE is faster than manually integrating and learning all of the individual tools.

the Arduino IDE(Integrated development Environment) is fully developed into functionality of full of libraries,as long as programming the Arduino UNO in Embedded C language is possible because Arduino IDE can Compile both arduino code as well as AVR standard code.

IV.SECURITY

In this paper a weather station has been developed to measure the temperature and relative humidity inside and outside the room on the present time and then share this information on a server through internet where it can be processed and monitoring for various interesting purpose .our concern is used for refrigerated cargo services. The key feature is that a refrigerated cargo holds temperature sensitive meds ,gel capsules and cosmetics.

An alarm device is also activated when a predefined temperature is crossed the reference level. In this process secure and safe because authorized password key is given on email id which can be used in hardware and overall information send on mobile app. That is the reason the system is safe and secure.

V. RESULT AND DISCUSSION

IOT-Based temperature and humidity calculating system provides an efficient and safe system for detecting agricultural parameters. The results of temperature and humidity can be seen on mobile app. By installing the software in mobile or other devices.

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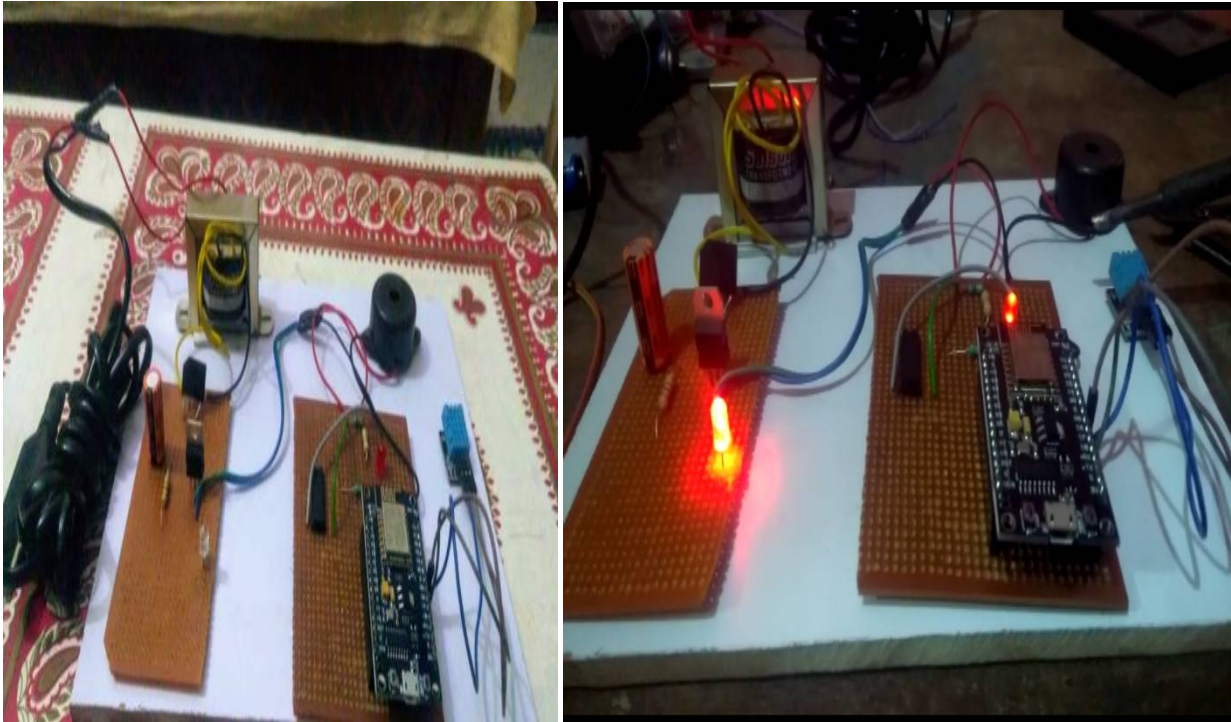


Fig6. circuit configuration



Fig7. Blynk app on process



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VI.CONCLUSION

IOT-Based temperature and humidity detecting system provide an efficient and definitive system for monitoring agricultural parameters. The corrective action can be taken. IOT-Based monitoring of field not only allows user to reduce the human work and time, but it also permits user to analyze accurate changes in the atmosphere and for taking possible action. It is cheaper in cost and consumes less power. The GDP per capita in agro sector can be increased. This IOT-based system can be extended for controlling different electronic and electrical apparatus from remote locations and the system can also extended for soil moisture and cattle monitoring.

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