IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 4, April 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.18

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.18|

||Volume 11, Issue 4, April 2022||

|DOI:10.15662/IJAREEIE.2022.1104001 |

IOT Based Weather Monitoring System Using Node-MCU and Blynk App

Sugumaran Ganesan[1], Khawla Yaqoob Ambu-Ali [2], Muna Mubarak Al-Nabhani[2], Maroa Khalfan Ambu Saidi [2], Zwina Ali Ambusaidi [2]

Lecturer, University of Technology and Applied Sciences - Nizwa, Nizwa[1]

Bachelor Students, University of Technology and Applied Sciences- Nizwa, Nizwa [2]

ABSTRACT: Weather observation can be done in a variety of ways. They collect data and transmit it through wires to a central station. There are multiple low-cost weather systems available, including the development of a portable and low-cost Wireless Weather Station that are able to properly detecting temperature, relative humidity, light intensity, and air pressure. Others that are only obtained indirectly, such as dew point, wind chill, and so on, can be read through a base station, but such systems do not deal with wind speed and direction. The proposed system uses zero human labour or interactions to monitor the weather. The primary concept is to build a highly capable monitoring platform that focuses on offering a wide range of environmental sensing studies. The wireless weather monitoring system requires a few basic components, including a Node-MCU, DHT11 sensor, LDR sensor, and Rain sensor, which are all connected in breadboard using Jumper wires. Temperature, rain, humidity, and the amount of light are examples of physical phenomena that can be observed in the environment. There are a few software and techniques that have been developed to assist us in getting the best results in weather monitoring. The Blynk app is one of them. The Blynk app is an app editor. You can make one or many projects using it. Each project can include graphical elements such as virtual LEDs, buttons, value displays, and even a text terminal, as well as interface with one or more devices.

KEYWORDS: Blynk app, Weather station, sensors, Node-MCU

I.INTRODUCTION

Weather monitoring is a strategy that provides us with precise information on the weather in our immediate surroundings. This device essentially keeps track of several weather variables such as temperature, humidity, and rain.

The device's brain is the Node-MCU. Three sensors are employed in this project: a temperature and humidity sensor (DHT11), LDR sensor as well as rain sensors, all of which are connected to the Node MCU. The board is attached and the sensors begin to work after the code is uploaded. The Node-MCU board sends those values to the Blynk app and the LCD display.

Blynk is a new platform that lets you easily creates interfaces to manage and monitor your hardware projects from your iOS or Android smartphone. You can create a project dashboard after downloading the Blynk software and arranging buttons, sliders, graphs, and other widgets on the screen. You may use the buttons to turn pins on and off, as well as display data from sensors.

II. DESCRIPTION OF MATERIALS

A light-dependent resistor (LDR) is a form of resistor whose resistance changes depending on how much light hits its surface. These resistors are commonly employed in various circuits that need the detection of light. When the LDR is in the dark, it can be used to turn on a light, and when it's in the light it can switch off a light. A typical light-dependent resistor has a resistance of 1MOhm in the dark and a resistance of few Kilo-Ohms in the light. Also, Light-dependent resistors are inexpensive and have a straightforward design. As light sensors, these resistors are often utilized. These resistors are commonly employed in burglar alarm circuits, alarm clocks, light intensity meters, and other applications where the absence and presence of light must be detected. LDR resistors are used in a wide range of electrical and electronic tasks. For a better grasp of this idea, we'll go through some real-world projects that employ LDR resistors.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.18|

||Volume 11, Issue 4, April 2022||

|DOI:10.15662/IJAREEIE.2022.1104001 |

In addition, the DHT11 is a commonly used temperature and humidity sensor with a dedicated NTC for temperature measurement and an 8-bit CPU that outputs temperature and humidity measurements in serial data and we can use it in many applications such as, Temperature and humidity should be measured, Weather station in the area, Climate control that is automated and monitoring of the environment.

Open source prototype board designs are available for Node-MCU, an open source firmware. The term "Node-MCU" is a combination of the words "node" and "MCU" (micro-controller unit). Lua is the scripting language used by the firmware. The firmware was created using the Espressif Non-OS SDK for ESP8266 and is based on the eLua project. It may be used in any application where a device has to be connected to a local network or the internet. v1. 0 Node-MCU Development Board/Kit (Version2) Node-MCU is a gadget that looks like an Arduino. The ESP8266 is the key component. The ESP-12E module, which contains the ESP8266 chip with Tensilica Xtensa 32-bit LX106 RISC CPU, is included with the Node-MCU ESP8266 development board. This microprocessor runs on a configurable clock frequency of 80MHz to 160MHz and supports RTOS. To store data and applications, the Node-MCU contains 128 KB of RAM and 4MB of Flash memory. Its high processing power, together with built-in Wi-Fi/Bluetooth and Deep Sleep Operating characteristics, make it ideal for IOT projects.

A rain sensor is a type of switching device that detects the presence of rain. It operates like a switch, and the theory behind it is that whenever it rains, the switch is generally closed. This sensor is attached to the irrigation system and acts as a water conservation device, shutting down the system in the case of rain. Rain sensors is used as a water preservation device and this is connected to the irrigation system to shut down the system in the event of rainfall. also it used to guard the internal parts of an automobile against the rainfall as well as to support the regular windscreen wiper's mode.

I2C LCD (Liquid Crystal Display) screens are a type of electronic display that can be used in a range of applications. Only four pins connect the I2C LCD to the outside world. The I2C LCD is a simple display module that makes display easier. It can help producers focus on the core of their work by making it easier to produce. With just a few lines of code, a programmer designed an Arduino library for I2C LCD that allows users to achieve complex graphics and text display features. It can be used to collect operating information without the usage of a computer in place of the Arduino serial monitor.

III. CIRCUIT DIAGRAM WITH EXPLANATION

In this project Using Node-MCU and Blynk app, we create an IOT-based weather monitoring system. This project is mostly built on Internet of Things (IOT) technology. Temperature, humidity, amount of light, and rainfall can all be measured using this system. We used the DHT11, LDR, and Rain sensors to set up our system, which are all connected to the Node-MCU as seen in this circuit diagram.

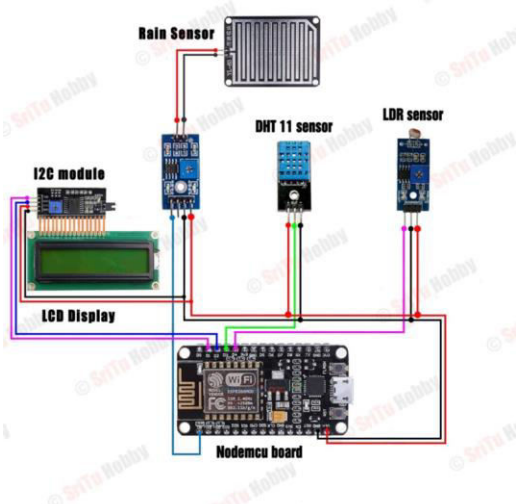


Fig.1 Connection diagram

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.18|

||Volume 11, Issue 4, April 2022||

|DOI:10.15662/IJAREEIE.2022.1104001 |

IV. RESULT AND DISCUSSION

When a proper connection is established with the server device after gathering data from various sensor devices installed in a specific region of interest, the collected data will be automatically transferred to the I2C LCD and phone app. Temperature, humidity, light, and rain level changes in the location where the embedded monitoring system is placed are all displayed on the two displays. The information gathered will be stored in the cloud. Parameter analysis and continuous monitoring can be done with the data stored in the cloud. As you can see, the results on both the I2C LCD and the Blynk app are identical, indicating that our system is accurate and capable of transferring data in the blink of an eye.

DATA ACQUISITION PROCESS:

- **Rain level:** first we spray same water in rain sensor, then we can see the change immediately in the LCD as well as Blynk app

Fig. 2 Rain measurement and result

- **Temperature and humidity**: we applied hot air close to the sensor and the change is clearly showed at both displays.

Fig. 3 Temperature and humidity measurement and result

- **Light availability:** we closed the sensor by hand to assume that is no light is available and is immediately showed (Low) in LCD and zero in Blynk app.

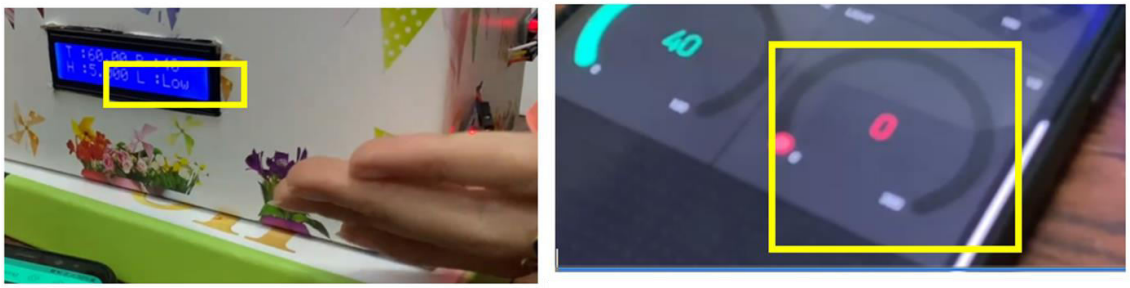


Fig .4 light measurement and result

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.18|

||Volume 11, Issue 4, April 2022||

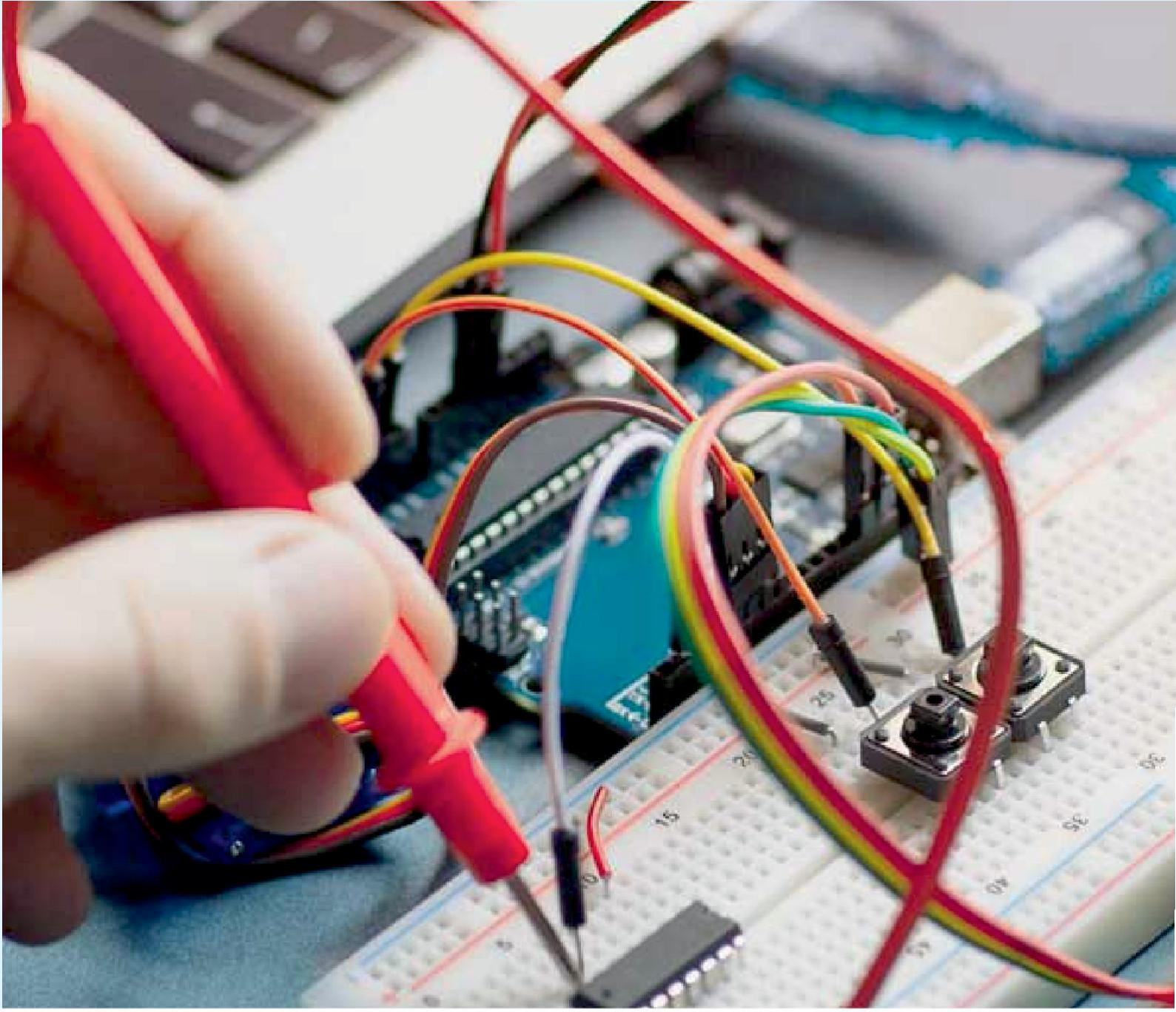
|DOI:10.15662/IJAREEIE.2022.1104001 |

V.CONCLUSION

Since the embedded devices are kept in the environment for monitoring, all sensors will begin collecting data and performing analyses as soon as the system is turned on. The end user will then have access to the collected data and analysis results using Wi-Fi. Different models present a clever technique to monitor the environment and an efficient, low-cost embedded system.The temperature, humidity, light, and rain level values can be monitored in this report using the Internet of Things (IOT) concept, which has been experimentally validated. The sensor parameters were also communicated to the phone application. This information will be useful for future study and can easily be shared with other users.

REFERENCES

[1] https://srituhobby.com/iot-based-weather-monitoring-system-using-nodemcu-and-blynk/
[2]https://www.researchgate.net/publication/276145676_Design_and_Construction_of_a_Low_Cost_Digital_Weather_Station
[3]https://www.researchgate.net/publication/280976055_Design_and_Implementation_of_a_Effective_Portable_and_Scalable_Electronic_Weather_Station
[4]https://www.researchgate.net/publication/288873843_Bluetooth_Based_Weather_Station
[5]https://www.granthaalayahpublication.org/ijetmrojms/index.php/ijetmr/article/view/06_IJETMR15_A04_03/15
[6] https://www.watelectronics.com/light-dependent-resistor-ldr-with-applications/
[7] https://www.robocraft.ru/files/datasheet/DHT11.pdf
[8] https://www.circuito.io/blog/nodemcu-esp8266/.
[9] https://components101.com/development-boards/nodemcu-esp8266-pinout-features-and-datasheet
[10] https://www.electronicshub.org/getting-started-with-nodemcu/
[11] https://www.watelectronics.com/rain-sensor/
[12] https://www.elprocus.com/rain-sensor-working-and-its-applications/
[13]https://lastminuteengineers.com/i2c-lcd-arduino
[14] https://docs.blynk.cc/



INNO SPACE
SJIF Scientific Journal Impact Factor

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

Impact Factor: 8.18

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details