IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

National Conference on Recent Trends in Engineering and Technology

Adarsh Institute of Technology & Research Centre, Vita, Maharashtra

Vol. 10, Special Issue 1, May 2023

Industrial Mains Power monitoring and alert system over LAN network

Ms. Shakti Yadav[1], Ms. Prerna More[2], Mr. Vishwajeet Kadam[3], Dr. A. R. Nichal[4], Ms.S.R .Gore[5]

Student, E&TC, AITRC, City, Maharashtra[1]

Student, E&TC, AITRC, Vita, Maharashtra[2]

Student, E&TC, AITRC, Vita, Maharashtra[3]

Associate prof., E&TC, AITRC, Vita, Maharashtra[4]

Teaching Assistant, E&TC, AITRC, Vita, Maharashtra[5]

Abstract: The server room's temperature and humidity must be taken into account in order to keep the server functioning properly, as either condition will disrupt or harm the current server if it does not meet criteria. This calls for constant observation of the server room's condition as well as upkeep of the space's humidity and temperature. The mains power supply status should also be taken into consideration. The device will read the status and, if the mains power supply fails, will activate the inverter power supply and send a notification to the user's Email account**.**

Keywords*:* Arduino UNO, LAN, DHT11 Temperature and Humidity sensor, LCD16x2, Ethernet.

I. INTRODUCTION

The internet of things (IoT), which enables the linking of systems and the sharing of data among them, was made possible by the widespread use of wireless devices. One of the factors contributing to the Internet of Things' recent rise and appeal is its ability to be utilised for real-time monitoring. This serves as the basis for the proposed IoT-based system, which has been proven to be accurate and useful for monitoring particular environmental characteristics like temperature, humidity, air pollution, sunshine intensity, and rain. Temperature, humidity, air pollution, sunshine intensity, and rainfall are all determined using traditional methods, which are more time-consuming, expensive, and frequently unreliable. Furthermore, it's not always viable to impose such legislation on a single platform.IoT-based real-time monitoring of environmental factors like temperature, humidity, air pollution, sunshine intensity, and rain has shown to be an effective and affordable option as mobile communication networks have expanded to rural locations. The above-mentioned environmental criteria would have a wide range of applications, including agriculture for monitoring healthy crop growth, industry for guaranteeing a clean working environment, and city life for maintaining a healthy lifestyle, if they were properly controlled using an integrated framework.

In order to create smart ecosystems, smart cyberspaces, and smart apps, the Internet of Things (IoT) has been rapidly developing. The Internet of Things (IoT) and big data, among other technologies, will play a significant role in education since many students expect to receive individualised teaching at their workstations. Applications for waste management, water use, and pollution monitoring have all been recorded. The cheapest real-time monitoring gadget now available is rather expensive, and even then, it has subpar features. For features like alarm notices, reminders, and additional sensors, the majority of devices are vendor-specific and need additional fees. IoT improves system performance and allows for more creation and flexibility.

II. LITERATURE REVIEW

Companies or other institutions are in growing up process usually have server space as a place to store digital data, various digital data such as data letters, photos and other data stored in the server hard drive. To keep the server running properly, the temperature and humidity in the server room need to be considered because if the temperature or humidity in the server room is not suitable with standards it will disturb or damage the existing server [1]. Generally, the server room has been prepared with an air conditioner cooling with the standard needed for the server room. However, the condition of the server room must l be monitored and the temperature and humidity in the room are maintained. Monitoring of temperature and humidity done by installing a temperature and humidity measuring instrument in the server room. However, if monitoring is done by entering the server room, it will be bother because the temperature in the server room is cold. In addition direct monitoring in the server room will be difficult if we want to monitor continuously. [2,3] To handle this problem, we design a remote monitoring system to monitor the temperature and server room. Along with the development of Internet of Things (IoT) remote monitoring has been developed [4]. Pop or (Point of Presence) is a part of the outermost infrastructure of an ISP that is used to connect the ISP the customer. PoP is a room which contains servers and aic conditioners. The air conditioners are used to make room remains cool

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

National Conference on Recent Trends in Engineering and Technology

Adarsh Institute of Technology & Research Centre, Vita, Maharashtra

Vol. 10, Special Issue 1, May 2023

and prevent servers from overheat. In most PoP out there, the operator monitors room every month in order to ensure the cool temperature. In this research, a system that can monitor the temperature and humidity of the PoP room directly anytime and anywhere is proposed. This monitoring system is based on the microcontroller and the web service. The proposed system will make monitoring PoP room becomes much easier and effective. [5]In order to ensure that the server's performance is not impacted by excessive room temperature and humidity, real-time monitoring of the room's temperature and humidity has become essential. Increases in server room humidity and temperature that are unchecked and unregulated could harm equipment. While the Bicubic method interpolates data points on a two-dimensional grid, the Color mapping technique alters the temperature colours of the image collected by the IP camera. When the temperature and humidity in the server room exceed the critical value, the system is designed to send an alarm to the administrator.[6]

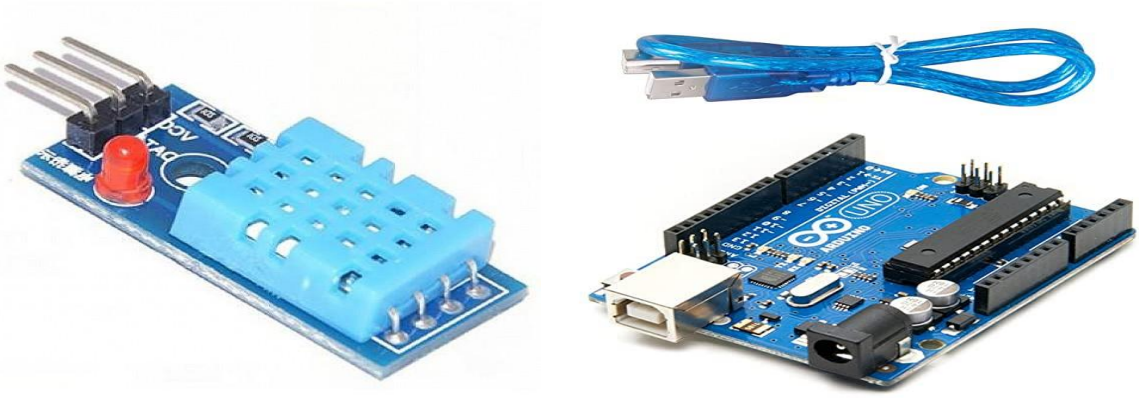

Diagram of arduino and DTH11 sensor

The DHT11 sensor comprises of a thermistor for measuring temperature and a capacitive humidity sensing device. The humidity detecting capacitor consists of two electrodes separated by a substrate that can hold moisture as a dielectric. The capacitance value changes as the humidity levels fluctuate. The IC calculates, interprets, and converts the modified resistance values into digital form.This sensor uses a negative temperature coefficient thermistor to measure temperature, which results in a drop in resistance value as temperature rises. This sensor is typically built of semiconductor ceramics or polymers in order to obtain higher resistance values even for the smallest change in temperature. The temperature range of DHT11 is from 0 to 50 degree Celsius with a 2-degree accuracy. Humidity range of this sensor is from 20 to 80% with 5% accuracy. The sampling rate of this sensor is 1Hz.i.e. it gives one reading for every second. DHT11 is small in size with operating voltage from 3 to 5 volts. The maximum current used while measuring is 2.5mA.

UART TTL-serial communication is available on the digital pins TX (1) and RX of the Arduino Uno ATmega328 (0). An Arduino's software has a serial monitor that makes it simple to input data. When data is being transmitted through the USB, two LEDs on the board labelled RX and TX will blink

The Arduino Uno digital pins can be used for serial communication thanks to the serial library, and the ATmega328P chip supports both TWI (I2C) and SPI connection. A wired library is included in the Arduino software to make it easier to use the I2C bus.

III. EXPERIMENTATION

Transmitter device is a devices which monitor mains power supply and environmental status such as temperature and humidity. Whenever mains power is ON the device is working on 12v adapter power supply but when power cut OFF then device get switched on battery and ESPO1 sense the cut off then generate alert on wireless LAN network, Receiver device is a device which continue monitors the signal of transmitter device on wireless LAN network. Whenever we detect power cut off notifications then buzzer will turn ON.

A transmitter device keeps track of the mains power supply and ambient conditions like humidity and temperature. When the mains power is on, the device uses a 12 volt adapter to power it. However, when the mains power is cut, the device switches to battery power. When ESPO1 detects the cut-off, an alert is generated on the wireless LAN network. A receiver device is a device that continuously monitors the signal of a transmitter device on the wireless LAN network. The buzzer will turn on once we receive notifications of a power outage.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

National Conference on Recent Trends in Engineering and Technology

Adarsh Institute of Technology & Research Centre, Vita, Maharashtra

Vol. 10, Special Issue 1, May 2023

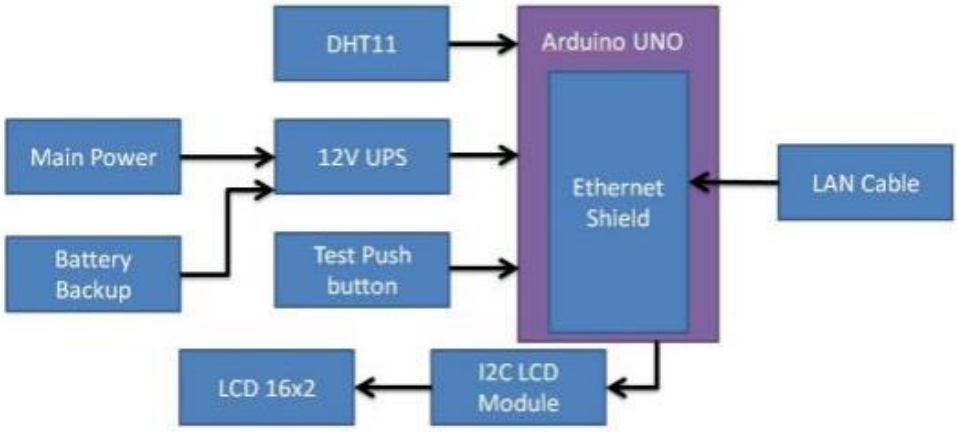

Fig. block diagram of transmitter device

DHT11 The DHT11 is a three-pin sensor that measures the temperature and humidity of the surrounding air. Its digital sensor measures the ambient air by using a thermistor and a capacitive humidity sensor. Good for reading temperatures from 0 to 50 degrees Celsius with a 2 degree accuracy and 2080% humidity measurements with a 5% accuracy.

12V UPS In order for the controller to transmit mail to the monitoring station, the 12V UPS must both provide battery backup and be able to identify when the main power supply has been shut off. Through a wire, a magnetic field is set up around the wire.

Test Push Only three server rooms are tested or checked at any given time using the test push button. All three server rooms will alert the monitoring station, and if any station doesn't respond to the push-button
signal, the corresponding device is offline.

LCD16x2 The status of all connected devices is displayed on LCD16x2 so that users can instantly obtain information rather than waiting for mail.

Arduino UNO: The widely used and freely accessible Arduino UNO is a quick and efficient programmable controller. There are several libraries available to cut down on programming time.

Ethernet Shield The Arduino UNO may send data across the LAN network using the Ethernet shield. In order for the device to fully connect to the network and communicate with the other 3 devices as well as the mail server.

Buzzer A buzzer is just a sound-producing device that beeps to signal alertness. There are two different alert types in this device. buzzer and light. There are 3 server rooms, each with a dedicated bulb for light indication and a shared buzzer for sound alert in all server rooms.

IV. RESULTS

Results on hardware after the operation of mains power monitoring

Fig 1. Hardware when mains power goes down.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

National Conference on Recent Trends in Engineering and Technology

Adarsh Institute of Technology & Research Centre, Vita, Maharashtra

Vol. 10, Special Issue 1, May 2023

Fig 2 Hardware when mains power supply

Result table I

Sr. No	Main Supply	UPS Supply	Temp	Fan	Humidity	Humidity
1	**OFF**	**ON**	**34.90**	**OFF**	**72.00%**	**ON**
2	**ON**	**OFF**	**34.90**	**ON**	**95.00%**	**ON**

V. CONCLUSION

The mains power supply, temperature and humidity can be monitored in real time (every 30 sec). For work, acceleration done by increasing the number of points and sensor to obtain more accurate data.

REFERENCES

[1] Ham S W, Kim M H, Choi B N and Jeong J W 2015 Simplified server model to simulate data center cooling energy consumption Energy Build.

[2] Rahmat R F, Syahputra M F and Lydia M S 2016 Real Time Monitoring System for Water Pollution in Lake Toba 2016 International Conference on Informatics and Computing (ICIC) pp 383–8

[3]Nasution T H, Siregar I and Yasir M 2017 UAV telemetry communications using ZigBee protocol Journal of Physics: Conference Series vol 914

[4]Nasution T H, Siagian E C, Tanjung K and Soeharwinto 2018 Design of river height and speed monitoring system by using Arduino IOP Conference Series: Materials Science and Engineering vol 308

[5] Anwar H, Santoso H, Khameswara T D and PriantoroA U 2017 Monitor-PoP — ISP's PoP room temperature and humidity web based monitoring using microcontroller 2017 IEEE 8th Control and System Graduate Research Colloquium (ICSGRC) (IEEE) pp 212–6

[6]Yumang A N, Paglinawan C C, Sejera M M, Lazam A S, Pagtakhan J C and Santos J S B 2016 ZigBee Based Monitoring of Temperature and Humidity of Server Rooms using Thermal Imaging 2016 6th IEEE International Conference on Control System, Computing and Engineering (ICCSCE) (IEEE) pp 452–4