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Monitoring and saving Humidity &Temperature by using the Internet of Things

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Abstract: India's biomedical, agricultural, and pharmaceutical industries are its economic backbones. Temperature and humidity monitoring are critical in all of these industries. Any form of imbalance in environmental circumstances or unset parameters might lead to a financial loss in the pharmaceutical and agriculture industries. Medication and cell culture methods require temperature and humidity monitoring in the biomedical industry. Climate-controlled environments are also necessary for life-threatening patients in the healthcare profession. ICRC and UNHCR advised monitoring relative humidity and ambient air temperature in warehouses where raw goods are stored in this document during their audit. A device was designed to constantly measure and monitor (a record) relative humidity and temperature of ambient air.

Key Words: SHT25 sensor, Aurdino Uno board, Node MCU

1. INTRODUCTION:

The Internet of Things (IoT), which collects and links heterogeneous sensor signals to the Internet to provide intelligent services in a variety of applications such as healthcare, automotive, and industrial monitoring [1-5], has given rise to smart sensor interfaces. Healthcare systems have been researching the use of physiological and biomedical sensor data to improve the efficiency of healthy people and patients' health management. New functionalities are being included in the industrial manufacturing environment, such as safety monitoring and smart factories. Combining heterogeneous systems and services from many industries, such as providing automated healthcare services in automotive settings, is a hot issue right now. Another key trend spurred by the rise of high-end mobile CPUs is the shift away from bulky platforms Smartphones to PCs are possible, although it is currently limited to healthcare applications. As a consequence, the study proposes a smartphone-centric multi-sensor platform that can accept heterogeneous sensor signals from a variety of applications, such as environmental and healthcare data [6-10]. For this aim, the proposed platform must be adaptable enough to accept various sorts of signal processing or activities. Flexibility was realized at the system level.

In Monitoring Temperature and humidity for Server Room is a system based an IoT, which provides information while regulating temperature and humidity inside the server room.[1]

Another problem that accrued is that if there is an increase and decrease in the temperature that is drastic on server space that cannot be monitored when the network admin is not in the present..[2]

Wireless Sensor Networks (WSNs) offer a wide range of applications, including next-generation intelligent Internet of Things (IoT) applications. Network nodes in WSNs do not admit their battery replacement since the phenomenon being researched is rarely accessible or inaccessible.[3]

For certain musculoskeletal complex rupture injuries, the only treatment available is the use of immobilization splints. This type of treatment usually causes discomfort and certain setbacks in patients. In addition, other complications are usually generated at the vascular, muscular, or articular level [4]

Every time these values exceed the threshold selected for each notification given to the user via the telegram application by utilizing the telegram API..[5]

In this work, an exponential observer is performed for an exothermal axial dispersion tubular reactor that involves one nonlinear sequential reaction.[6]

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2. BLOCK DIAGRAM OF MONITORING AND SAVING HUMIDITY AND TEMPERATURE:

3.

The block diagram of Monitoring and saving Humidity &Temperature

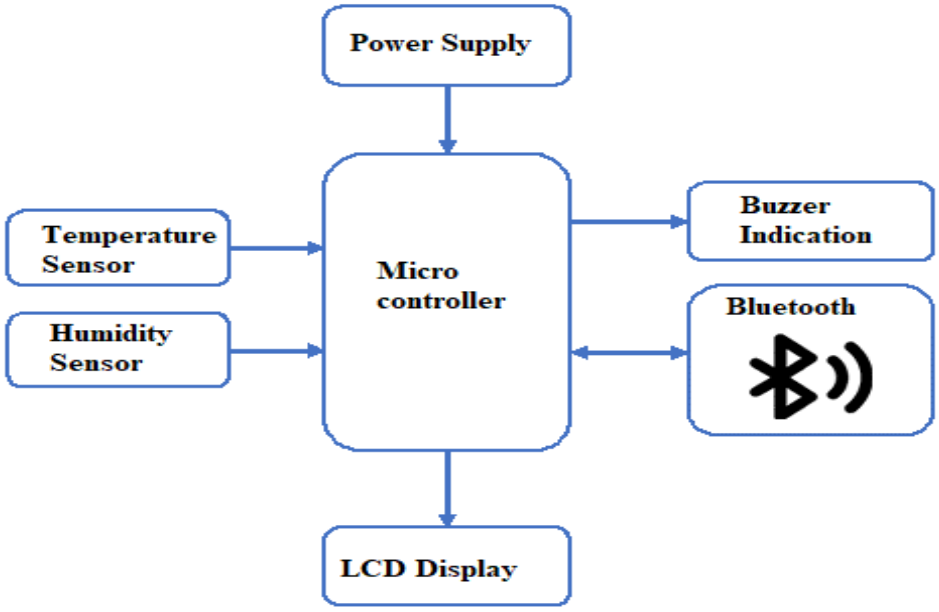

Fig 2.1 Block diagram of the system

3. HARDWARE DESCRIPTION:

3.1 SHT25 SENSOR:

The SHT25 is a popular temperature and humidity sensor with a devoted NTC for temperature measurement and an 8-bit microcontroller for serial data output of temperature and humidity data.SHT25 Pinout Identification and Configuration: Temperature and Humidity Sensor (SHT25) .Fig. 3 shows the Temperature and Humidity sensor (SHT25). The operating voltage of this sensor is 3.5V to 5.5V. The measuring operating current of this sensor is 0.3mA and its standby is 60 μA. It has serial data output. The temperature range of SHT25 is 20% to 90%, ensuring it has a temperate humidity resolution is 16-bit, and its accuracy is ±1°C and ±1%. Because the ESP-01 WIFI Transceiver Module can be addressed through SPI and UART, it's a great choice for anybody looking to develop an Internet of Things device.

FIG 3.1.1 SHT25 SENSOR

3. ESP8266 WIFI MODULE::

The SP8266 ESP-01 Serial WIFI Transceiver Module is a low-cost and modest way to connect to the Internet wirelessly. The ESP8266 has a lot of treating and storage power on board. Its high level of on-chip integration necessitates least outside circuitry and is intended to yield as tiny PCB space as conceivable.

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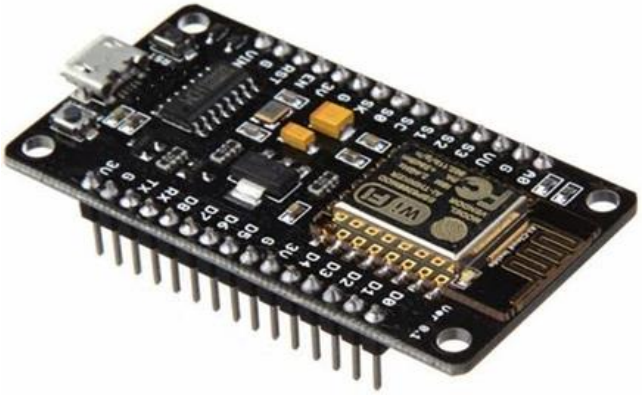

Fig 3.1.2. . ESP8266 WIFI MODULE

3.3 ARDUINO:

An Ethernet shield module, an infrared receiver, and an infrared transmitter are used as actuators, together with an Arduino Mega. The Arduino microcontroller board is based on the Atmega328. Because of its extensive collection of the infrared receiver and transmitter libraries, Arduino was chosen. The C Programming Language is the programming language used by Arduino. The Arduino circuit is an actuator that registers and sends signals to the remote air conditioner through an infrared transmitter and receiver.The infrared receiver is attached to the breadboard with the ground pin connected to the Arduino's ground pin, the power pin to the Arduino's 5-volt power pin, and the signal pin to the Arduino's Digital Pin 3. The goal of the circuit is to obtain the signal code for each temperature setting from a remote air conditioner. The signal code acquired will be input on the Arduino, which will be connected to the Infrared Transmitter. The infrared transmitter is explained to be put on a breadboard. Positive pins (+) are connected on Arduino digital pin 9 while negative pins (-) are installed on Arduino ground pin. By transmitting the infrared signal code from Arduino to the Air Conditioner, the circuit attempts to turn on the air conditioner. The Arduino controller used in this project is given in Fig. 5.

Fig 3.1.3. ARDUINO:

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4 . PROPOSED CIRCUIT DIAGRAM

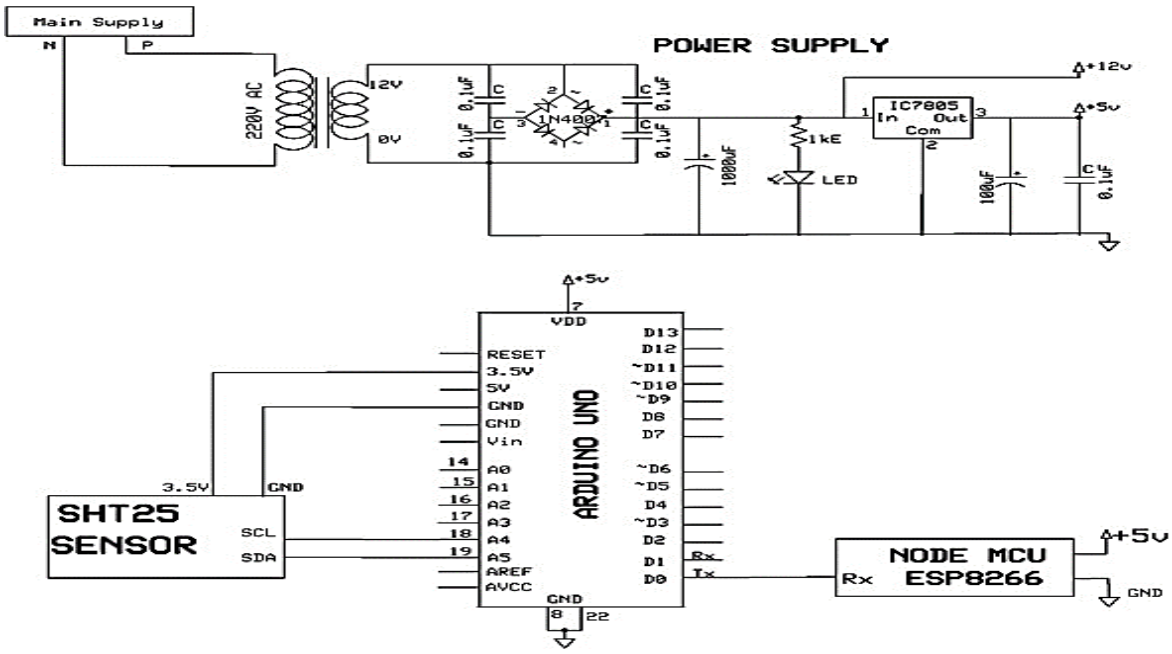
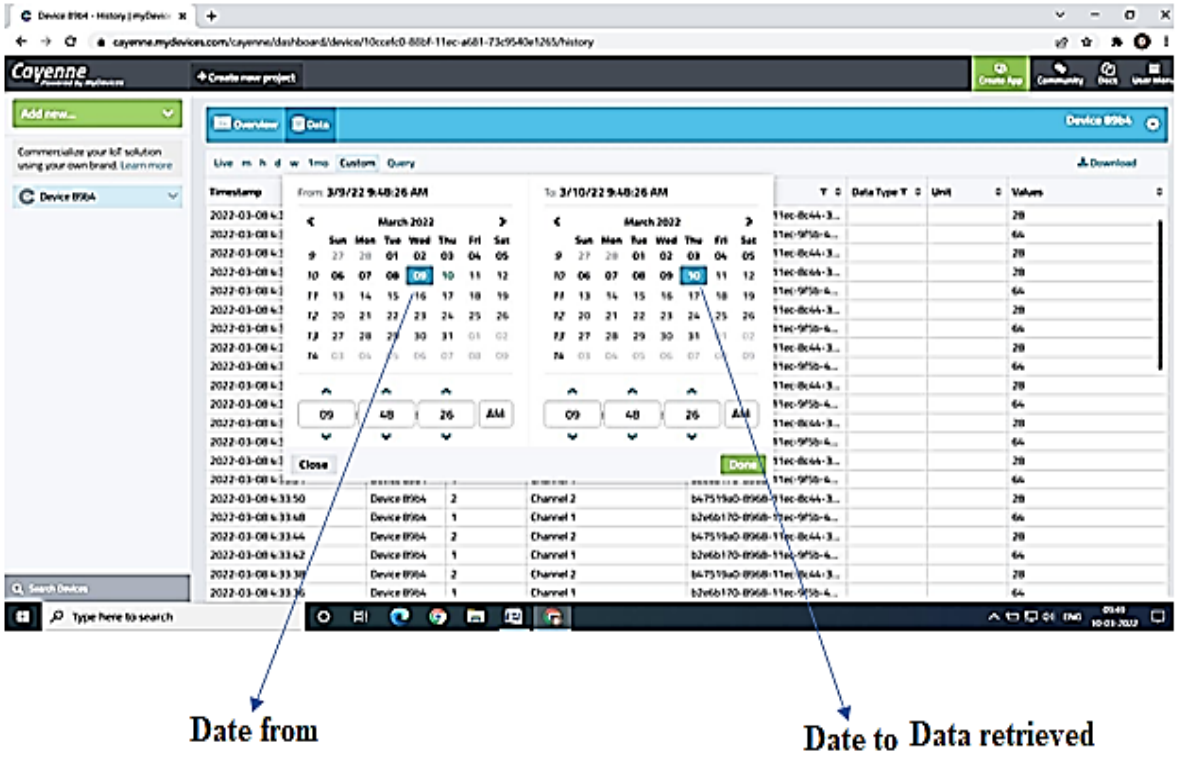


Fig. 4.1 Circuit diagram of the Proposed circuit

5. SOFTWARE DESCRIPTION:

5.1: CAYENNE :

Cayenne is an app for smartphones and computers that allows you to control the Raspberry Pi and soon also the Arduino through the use of an elegant graphical interface and a solid nice communication protocol. The features are: Add and remotely control sensors, motors, actuators, GPIO boards, and more.



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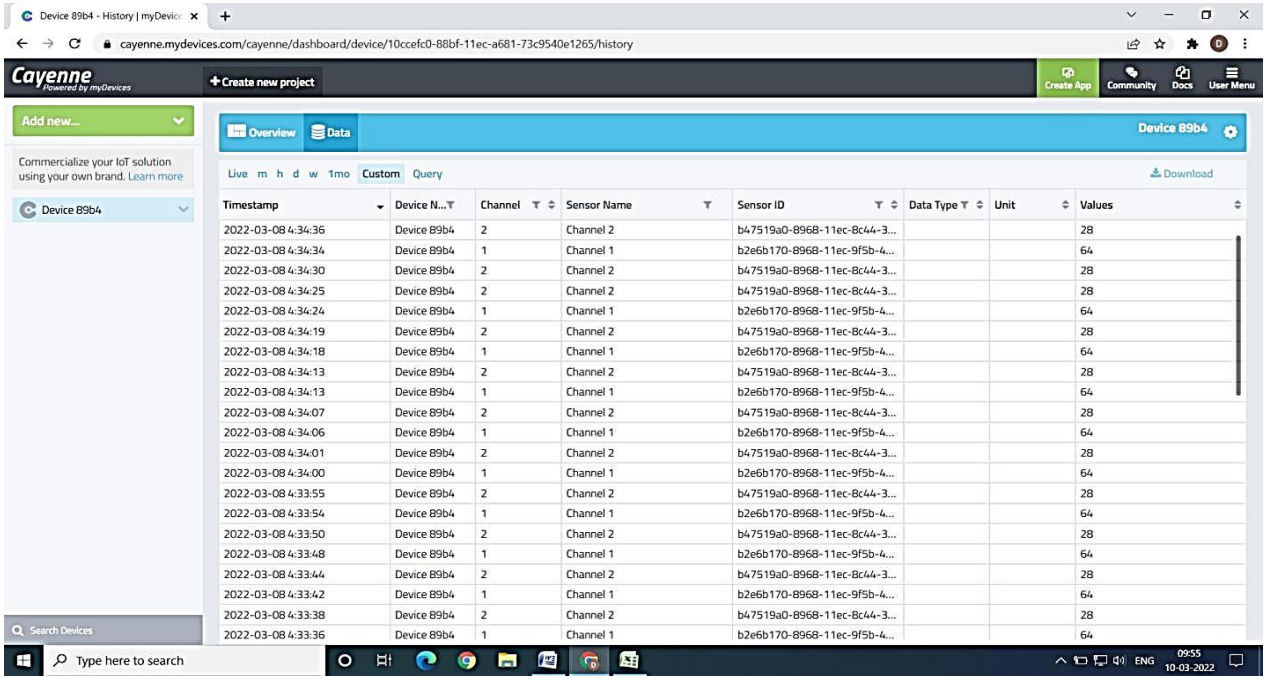

Fig 5.1.1 CAYENNE

5.2 AURDINO :

The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics.

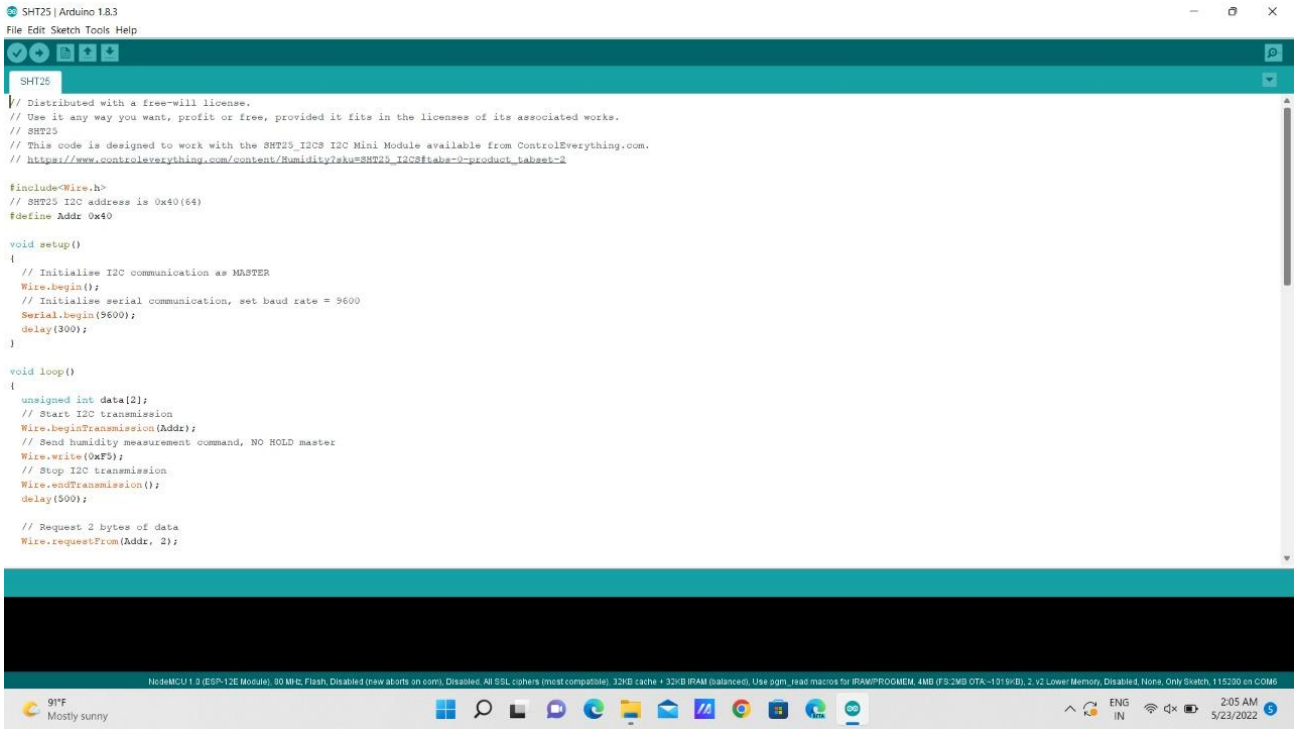

Fig 5.2.1 AURDINO

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6. EXPERIMENTAL SETUP / HARDWARE PROTOTYPE

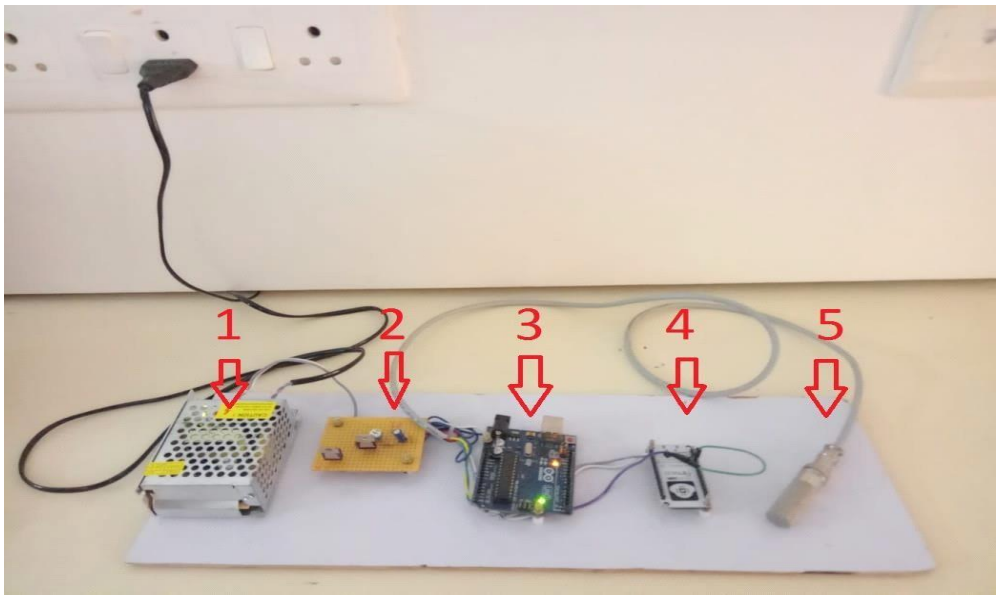
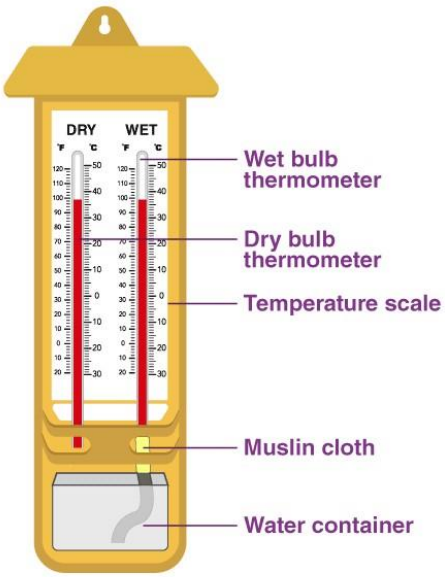


Fig 6.1 Experimental Setup

The below figure depicts the hardware prototype that has been developed to realize the proposed methodology. The tests were conducted using the below experimental setup

7. VALIDATION OF DATA CALIBRATION OF SENSORS) USING HYGROMETER

The device's humidity and temperature data are compared to the temperature and humidity measured by a wet and dry bulb thermometer. The results collected with the new electronic instrument and the traditional standard way of measurement are quite similar.



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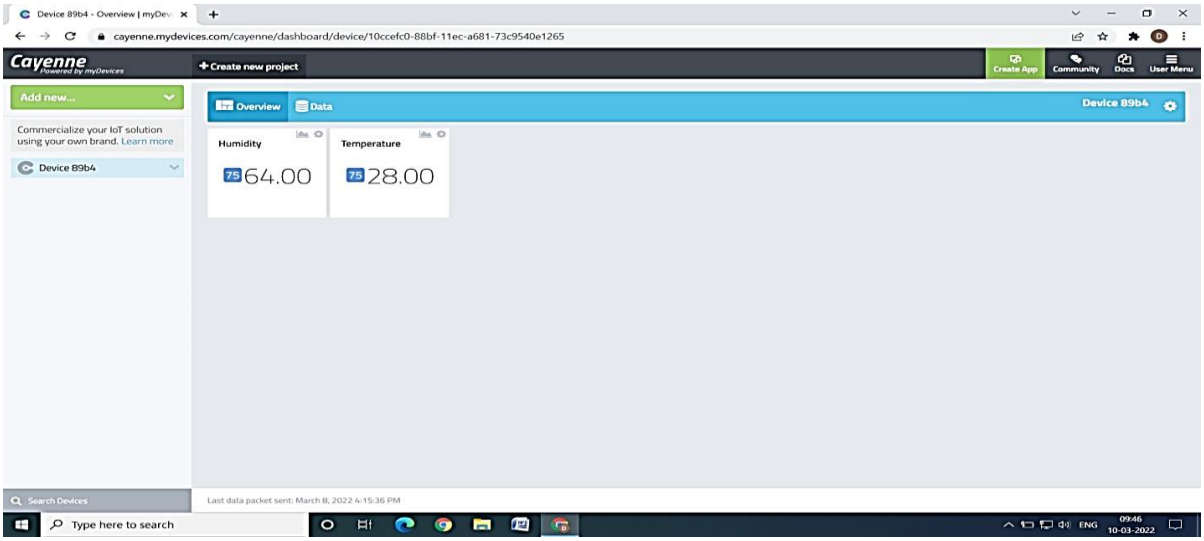
D10 | 09.00AM

	A	B	C	D
1	DATE	RELATIVE HUMIDITY	ROOM TEMPERATURE	TIME
2				
3	23.3.22	65%	31'C	12.00PM
4	24.3.22	65%	31'C	10.30AM
5	25.3.22	65%	31'C	09.00AM
6	28.3.22	65%	28'C	11.45AM
7	29.3.22	65%	31'C	09.30AM
8	30.3.22	65%	31'C	09.30AM
9	31.3.22	65%	31'C	09.30AM
10	1.4.22	65%	32'C	09.00AM
11	4.4.22	65%	27'C	09.15AM
12	05.4.22	65%	30'C	01.15PM
13	06.4.22	65%	30'C	09.20AM
14	07.4.22	65%	27'C	09.15AM
15	08.4.22	65%	28'C	09.15AM
16	09.4.22	65%	28'C	09.17AM
17	11.4.22	65%	30'C	10.30AM
18	12.4.22	65%	30'C	10.30AM

FIG:7.1 HYGROMETER

7. RESULT



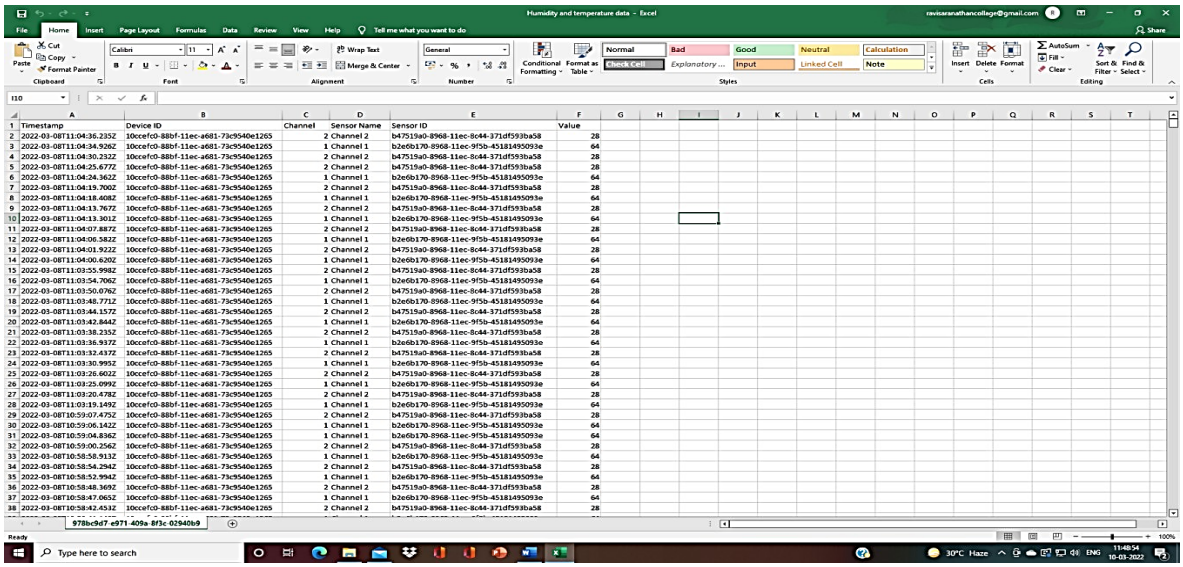


Fig 7.1 Real-time output in IoT

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The device (RH and temperature monitor) is built using components such as the SHT25 sensor, Aurdino Uno board, Node MCU, Switch Mode Power Supply (step down power supply), and Cayenne software.An SMPS is a device that converts 230 V to a 12 V power supply. 12V is converted to 3.5V using a voltage regulator. Because components like the SHT25, UNO, and Nod MCU only work at 3.5 V, this is required.The SEL pin of the SHT25 sensor is linked to Arduino UNO pin A4 and the SDA pin is attached to Arduino UNO pin A5. The Arduino UNO and SHT25 were then connected. The Rx pin of the Node MCU is linked to the Tx pin of the Arduino UNO.The SHT25 sensor collects data on humidity and temperature and delivers it to the Node MCU through Arduino UNO.The data is sent to the CAYENNE cloud through the internet via the Node MCU. Data from the cloud can be sent to a registered user. It is critical to know that the data may be seen and restored from any location using a mobile phone or laptop. A datasheet or a graphical representation can be used as the output.

8. CONCLUSION

Wireless sensor networks in cold storage rooms may be connected to the internet with the help of an IoT gateway, allowing for product monitoring. This type of application can also help with continuous temperature and humidity monitoring, with the resulting instructions being sent to the server. This approach may be used to monitor the environment within the storage rooms. This type of gadget can help with Industrial Automation via the Internet of Things, allowing us to make better decisionspractice.

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