IOT BASED WEATHER MONITORING SYSTEM

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I. INTRODUCTION

In order to monitor weather conditions efficiently . the weather Monitoring System can be either wired or wireless. In case of wireless communication, the connectivity will be more convenient and user friendly and weather monitoring would not require physical presence of the person at the location. Wireless communication is the transfer of information over a distance without the use of wires. The distances involved may be short (a few meters as in television remote control) or long (thousands or millions of kilometers for radio communications).GSM technology is the cheapest and the most convenient technology now being used for wireless communication. The wireless weather monitoring system basically requires a few basic modules such as GSM module, display module, sensors and microcontroller module.

II. COMPONENTS DESCRIPTION

A. MATERIALS REQUIRED

1] ESP8266 NodeMCU: It is an open-source IoT platform. It has firmware to run ESP8266 Wi-Fi System on Chip Module. It is the best platform to develop IoT Applications and Prototype projects. It has ESP8266 Wi-Fi Module, integrated GPIO, PWM, IIC, and serial communication pins. It can process both analog and digital signals. Node MCU 1st and 2nd generation boards have 4 MB flash memory. The firmware uses the LUA Scripting Language. Using Arduino IDE, Node MCU can be programmed. By installing ESP8266 board drivers from board manager option or web sources, Node MCU can be programmed from Arduino IDE. Node MCU has 128 Kbytes of Memory and uses eXtendable Test Operating System (XTOS). Node MCU is a very low-cost IoT development board compared with the Intel Galileo, Raspberry Pi, UDOO, and other IoT development boards. So, in this design, Node MCU is taken as a controller.

2] The DHT11: DHT11 is a humidity and temperature sensor. It has 3 pins. DHT11 gives a digital form of output (pin2), and other pins are VCC and ground. It works with a supply voltage of 3.3–5 V. It can measure humidity ranging from 20 to 90% RH. It gives an accuracy of ±5 RH. It can measure temperature range from 0° to 60 °C with an accuracy of ±2 °C

4] USB 2.0 - A-Male to B-Male Cord - 6 Feet (1.8 Meters), Black · Connects USB 2.0 Devices.

5] L293d motor driver: The L293D is a 16-pin Motor Driver IC which can contro DC motors simultaneously in any direction. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V (at pin 8!). You can use it to control small dc motors

6] Dc Motor:Small Electric Motor 3V-9V DC Motor length: 30mm|Diameter 24mm|Weight 7g|RPM: 8,500

7] 9v battery: 9V Alkaline Battery (DU CB AL 9V 1, Copper Black)

8] Battery connector: 9V Female Battery

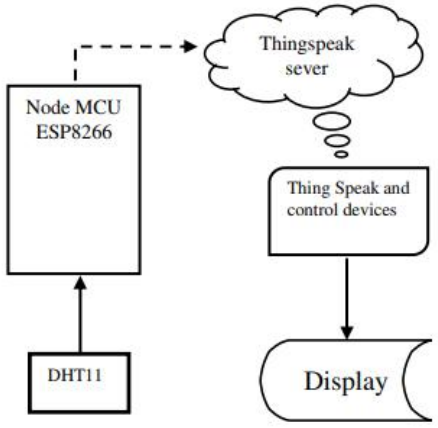
B. SOFTWARE REQUIRED

In software, Thingspeak cloud server is used to store and display the temperature and humidity values. Create a new channel in Thingspeak and the API keys will be obtained to add in source code of Node MCU. This will make Node MCU connect with ThingSpeak. In this system, the ThingSpeak can get the signal from the sensor as variables along the value temperature and humidity values are displayed in both graphs and numerical values. Temperature and humidity graph of the system on the ThingSpeak as shown in Fig

As this system is IoT based, there will be 30 sec delayed refreshing the live value in Thingspeak.The community was ready to receive information from sensible homes to ThingSpeak platform via MQTT protocol, save the information within the database and visually show within the ThingSpeak webpage

III. Implementation

The implementation of IoT based temperature and humidity monitoring system using Node MCU includes two sections: hardware implementation and software implementation monitoring system and many other sensors can be replaced for the applications of user requirements like car parking monitoring system, power consumption monitoring, etc. This system to forecast the parameters based on the historical data and to control the room temperature and humidity.



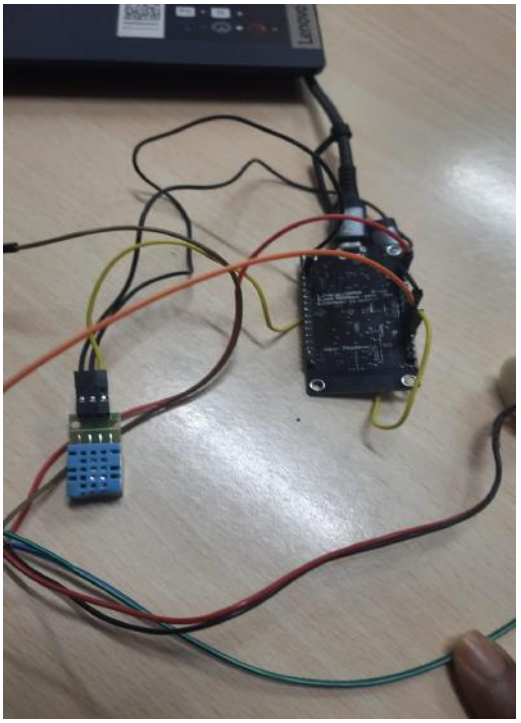
The main object in temperature system is the reading a temperature value from DHT 11 sensor. The primary use of a temperature sensor is that it is the simplest of all the temperature sensors and it has an integrated circuit that gives an output a voltage that is proportional to the temperature in degree Celsius and the sensor itself deals with non-linear effects.

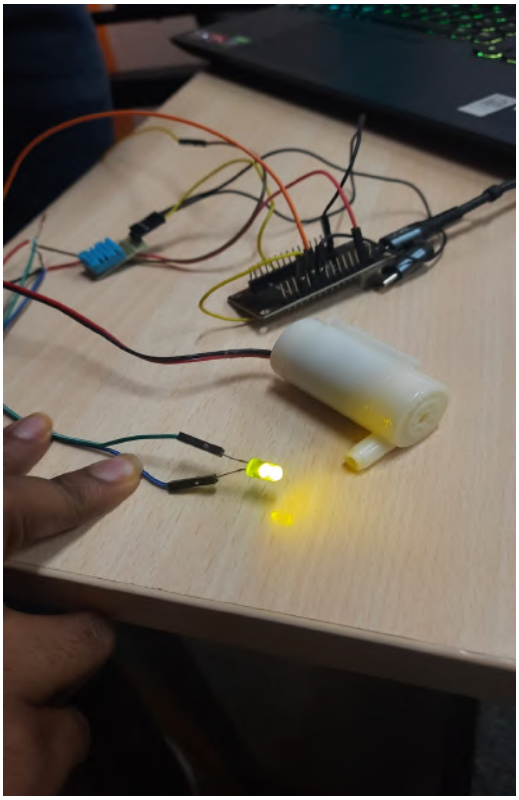
The sensor is directly connected with ESP 8266 controller with WiFi Module and sends data through the gateway via internet to the things speak. The things that speak can get the signal from the sensor as a variable along the value.

After processing, the controller will send a signal to the system. A relay is used to control the fan based on the current temperature recorded.

The fan is switched on when a temperature >30 degree celsius is recorded.

The sensing element information was monitored and supported the information the devices were controlled. The fans were turned on and off in keeping with the environmental condition.





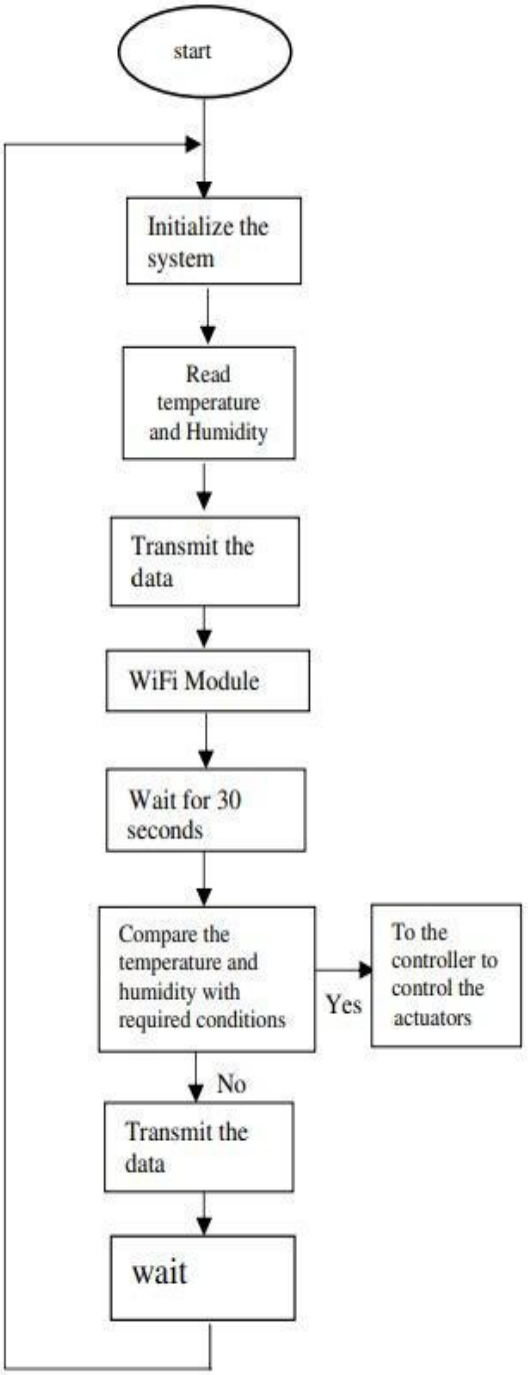
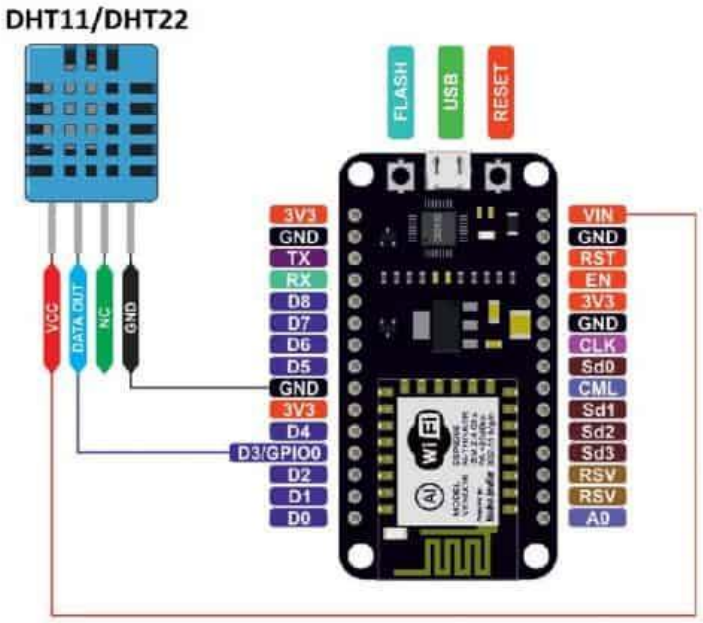


Fig 3. Flow diagram of the proposed model

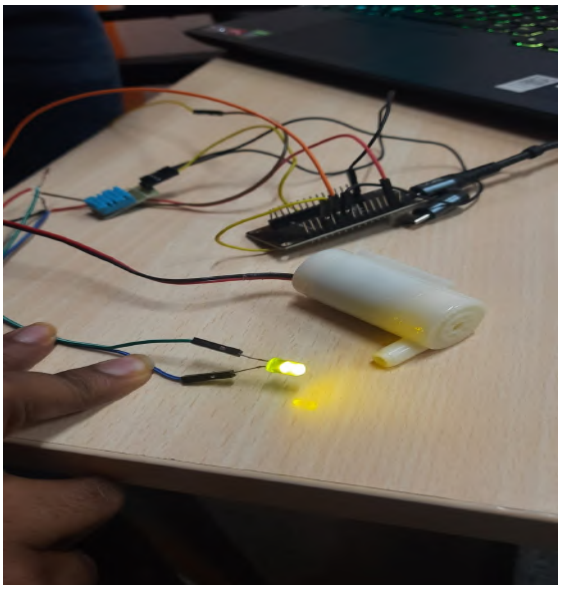


[Fig-6: Arduino board connection]

[Fig-7]

IV. RESULTS

The Proposed system prototype was built and in this system, temperature and humidity values are displayed in ThingSpeak web browser from where users can get the current latest data and statistics.



V. CONCLUSION

Technology has changed our lives day by day.
The system that was done manually is developed into an automated system that can save time and energy. Temperature and humidity values are important for many types of users or systems such as farmers, offices, cars, humidors, museums, industrial spaces, including a greenhouse. Temperature and humidity values are also useful or weather prediction. In this paper, IoT based temperature and humidity monitoring and control system is proposed. In this system, temperature and humidity values of the environment will be monitored, stored and displayed on the web via the Internet. The stored old values can also be done for predictions.
Through weather monitoring system we can collect the information about humidity and temperature and according to current and previous data we can produce the results in graphical manner in the system

VI. FUTURE SCOPE

This system can be further expanded to monitor the developing cities and industrial zones for monitoring, collecting the data and analysis.
In this system, temperature and humidity values are displayed in ThingSpeak web browser in this system. This is not easy for users to access this system. So, mobile application should be created for this system by connecting to ThingSpeak cloud server. In this way, users can monitor the temperature and humidity values easily via mobile applications.