Asurveyoniot based weather reporting system

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Abstract: In human life, monitoring of weather plays a very important role, as the data collection of dynamically changing weather conditions is very important. It is very important to monitor weather in the packaging industry during certain hazards. The monitoring of weather parameters in the industry and also in a room can be done by using the weather monitoring system.
The design of the system is discussed below. The weather monitoring system contains DHT by which temperature and humidity will be monitored. The data from the sensors are collected by using the communication serial as well.
Keywords: Internet of Things, sensors,detection of the weather system.

I. INTRODUCTION

Environmental monitoring and climatic change have received much attention in today's world. And also in today's er, Human always wants to stay updated about the latest weather conditions of any place. In this paper, we have presented a weather station that is very helpful for any place. This weather station is based on the internet of things(IoT). It is equipped with environmental sensors used for measurements at any place and reports in real-time on the cloud. To accomplish this, we are using Arduino Uno and different environmental sensors like soil moisture sensor,DTH11, and raindrop sensor. The sensors constantly sense the weather parameters and also keep on transmitting it to see the online web server over the wifi connection. On the cloud, the weather parameters are uploaded and they also provide the live reporting of weather information. The main focus of the paper is, IoT application in the new generation of environmental information and it provides a new paradigm for environmental monitoring.

INTERNET OF THINGS (IOT):

It is the future technology of connecting the entire world in one place. The data obtained in various locations can be connected to share and process/analyses that data for coordination of the applications like mobile health, traffic signaling industrial safety and monitoring in medical applications ensuring methods, etc. As per the estimation of technological experts, 50 billion objects will be connected in IoT by 2020. In IoT,it offers a wide range of connectivity to the devices with various protocols and various properties of applications for obtaining the complete machine.

II. LITERATURE REVIEW:

In today's world, many monitoring systems are being designed bdifferent environmental parameters. In IoT, the existing system model is presented based on a Weathermonitoringand reporting system where you can collect, process, analyze, and present your measured data on a web server. The Wireless sensor network management model also consists of router, gateway node, end device, and management monitoring center. The end device is responsible for collecting wireless sensor network data andsending them to the parent node, data sent to the gateway node from the parent by router/node directly. After receiving the data from the wireless sensor network, the node extracts data and after the analysis& packaging them into Ethernet format data which sends to the server. Any device which runs on server software could be considered a server aswell.

The services or information provided by the Internet/browsers are also connected through LAN and also are accessible to the users via smartphones, web browsers, and their devices, and many more to make the system more efficient.

TYPES OF SENSORS:

The sensor is a device, which gives output by detecting the changes in quantities and events which can be defined as a sensor. Sensors produce an electrical signal/optical output signal which corresponds to the change in the inputs.

There are many types of sensors. E.g.thermocouple which can be, considered as temperature sensors it produces output voltage based on input temperature- changes.\page

Classification of Sensors:

1.   Primary Input quantity.
2.   Principles of Transduction (Using chemicaland physicaleffects).
3.   Technology andMaterial.
4.   Properties of the sensors.
5.   Application of the (Transduction principle) is the fundamental criteria that are followed for an efficient approach. Many times, technology & material criteriaare chosen by the development engineeringgroup.

The different types of sensors such as IR sensors, ultrasonic sensors, proximity sensors, temperature sensors, touch sensors &, pressure sensors are mostly used in most electronics applications.

III.   COMPONENENTS:

1.   Arduino Uno

The microcontroller Arduino Uno board was developed by Arduino. Atmega328 is an open-source electronics platform that is based on an AVR microcontroller. The current version of Arduino Uno comes with a USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output. It makes it easy for the designers to sense the external electronic devices and control them in the real world. This comes with all features required to run the controller and can be directly connected to the computer throughout the USB cable and is used to transfer the code to the controller using IDE which is software.

Programming languages like C and C++ are used in IDE. Apart from using the USB, we can also use a battery or AC to DC adapter to power the board. Arduino Uno is the most official version that comes with the Atmega328 8-bit AVR Atmel microcontroller where RAM is 32KB.

2.   Temperature Sensor and Humidity Sensor
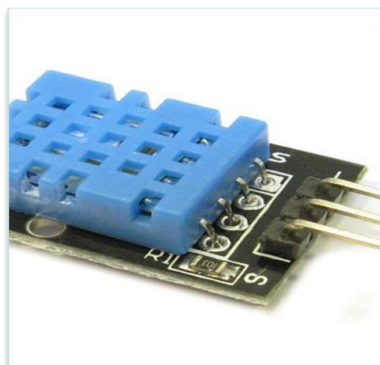
One of the most commonly measured environmental quantities for different reasons is temperature. The different types of temperature sensors which can be used to measure Temperature, e.g semiconductor

temperature sensors, thermocouples, thermistors, resistance temperature detectors (RTDs), and so on.

It is integrated with a high-performance and 8-bit microcontroller. This ensures high reliability & excellent long-term stability. It has a fast response, excellent quality, anti-interference ability & high performance.Each sensor of the DHT11 features, extremely accurate calibration of the humidity calibration chamber. A single-wire serial interface system is integrated, to become quick & easy. Low power, Small size, signal transmission which can be distance up to 20 meters.Special packages, convenient connections can be provided according to the user's need.

3.   Rain level sensor

Photo by ElectroPeak

An easy tool for rain detection is a rain level sensor,it can be used as a switch during raining and also it canbe used to measure the intensity of the rainfall. The LED will turn on when the induction board has no raindrop when it is connected to a 5v power supply, and DO output is high. Then we need to brush off water droplets and where restored, DO output is high. The rain switch or a rain sensor is a switching device activated by the rainfall.

4.   Soil Moisture Sensor
Soil moisture sensors, measure contents in the soil. The direct gravimetric measurement of the free soil moisture requires removing as well as drying and also weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as dielectric constant, or interaction with neutrons, as a proxy for the moisture content in that.
The relation between both the measured property and soil moisture can be calibrated and also can be varying depending on factors of environments such as temperature, electric conductivity, or type of soil.

Reflected microwave radiation is affected by soil moisture and is used for remote sensing in hydrology and agriculture.

A.   Components required: (Hardware) 1)NodeMCU 2)DHT11 Sensor 3)Rain Gauge 4)Soil moisture.
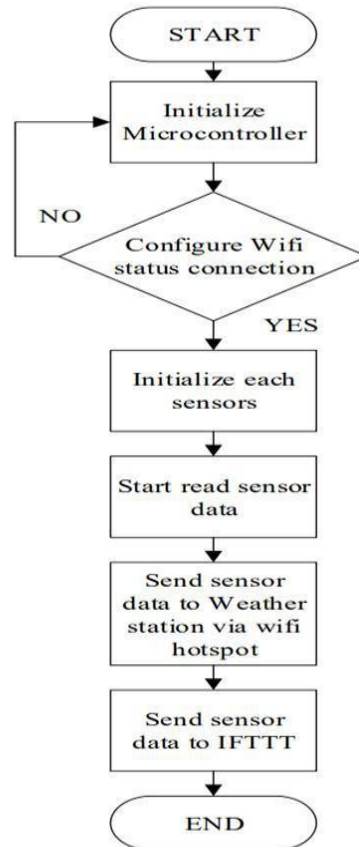B.   Components required:(Software) 1)ArduinoIDE

FLOWCHART

Figure 1. Control unit flowchart.

IV.   SYSTEM MODEL

The system mainly is used for maintaining the temperature and humidity in a room. Whether it is the food, cosmetics, or pharmaceutical industry, packaging requirements are as varied as the products we deal with every day. The developed system can be used to sense the temperature and humidity so that the appropriate temperature can be maintained as per the requirements in the industry. Temperature and humidity can be maintained in a room by using this system. With the help of this system, we can monitor the humidity and room temperature.

In particular range, the newborn or old age people prefer to have humidity and temperature. It is going to sense the temperature and humidity of the targeted area, not the city or village. In this way, we get specific results regarding environmental factors like temperature and humidity Experimental

V.   RESULTS

The Arduino Uno board is connected to the CPU by using a data cable. DHT 11 temperature andhumidity sensor is placed on the breadboard. Again connection is done to Arduino Uno board by using connecting wires which are in serial communication. Then upload the required program in the Arduino Software (IDE) and the humidity and temperaturereadingsare displayed. The environmental monitoring data sensors detect the humidity and temperature. The hardware screenshot and temperature and humidity readings are shown below. Temperature and humidity can be maintained in a room by using thissystem.

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ADVANTAGES:
• IoT weather monitoring system is fullyautomated.
• Also there is no need for humanattention.
• We can get prior alerts of weatherconditions.
• In this system cost is low and effortstoo.
• There is highAccuracy.
• SelfProtection.

APPLICATIONS:
• In the field of agriculture Theweather forecasting plays a very important role.
• It is also helpful at places like volcanoes andrain forests.
• It is very difficult for a human being to stayfor a longer time at suchplaces.

FUTURE SCOPE:
• We can also implement some more sensors & can connect them to satellite as it can be a global feature of the system.
Adding some more sensors to monitor other environmental parameters such as Carbon, Oxygen sensors, and pressure in aircraft, military, and navigation there is a vast extent.
• It can also be implemented in the medicalfield/institutes for research & study.

VI.   RESULTSANDDISCUSSION

First, the circuit of the control unit system has been made that ESP32 microcontroller control all weather parameters sensor, are BME280 (which is Temperature Humidity, and Pressure) sensor, MQ135 (Air quality sensor), Rain Sensor, and LDR sensor. Then it is powered by a USB cable also to upload the sketch of coding in the ESP32 microcontroller. The sensor data can be displayed on a serial monitor in Arduino IDE using the Software. ESP32 will connect with the Wi-Fi hotspot that hasbeen applied to this system so that the webserver can be created to display all the sensordata.

VII.   CONCLUSION

The proposed system senses the room temperature and humidity after some intervals. The system mainly is used for maintaining the temperature and humidity in a room. It can also be used in the packaging industry where weather monitoring plays a crucial role. Whether it is the cosmetics, food, pharmaceutical, or consumer goods industry, packaging requirements are as varied as the products we deal with everyday.
Temperature and humidity can be sensed in a room.

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