Wireless Temperature Sensor Network

A Rereport submitted for Project of IoT

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ABSTRACT

The first wireless network that bore any real resemblance to a modern WSN is the Sound Surveillance System (SOSUS). Wireless Temperature Sensors are a type of small, low-cost measuring device that record and wirelessly transmit temperature readings to a receiver or gateway. The smart temperature sensor measures the room temperature and converts it to the digital domain, thus making it easier to process and store data. It works by detecting changes in temperature and then transmitting that data wirelessly to a receiver (gateway). The two main components of a wireless temperature sensor are the transmitter.

Keywords: Wireless, Sensor

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* Introduction:

A Wireless temperature sensor network is a sophisticated system that utilizes wireless communication technology to gather, monitor, and transmit temperature data from various location in real-time. These networks are designed to offer flexibility, scalability, and efficiency in temperature monitoring across diverse environments, from industrial settings to residential buildings and beyond.

* Key components of a wireless temperature sensor networks
* Wireless Sensor: These are the devices deployed through the monitored area to measure and transmit temperature data wirelessly to a central hub or a data collection point. These sensors can be placed in various location depending on the application, such as rooms, machinery, refrigeration units, or outdoor environments.
* Wireless Communication Technology: Typically, Wireless temperature sensor networks utilize technologies such as Wi-Fi, Bluetooth, Zigbee, LoRaWAN, or cellular networks for transmitting data. The choice of technology depends on factors like range, data rate, power consumption, and the size of the network.
* Centralized Data Collection and Processing: Data from the sensors is collected and processed centrally, usually in a server or a cloud-based platform. This centralization allows for real-time monitoring, analysis, and control of temperature conditions across all monitored locations.
* Monitoring and Control Interface: Users can access the temperature data through a user-friendly interface, such as a web application or a dedicated software platform. This interface enables them to view temperature trends, set alerts for critical temperature thresholds, and remotely control temperature-regulating devices if integrated.
* Power Management: Wireless temperature sensors often operate on battery power. Efficient power management techniques, such as low-power sensors and sleep modes, are implemented to extend battery life and reduce maintenance needs.
* Assumption:
* When designing or implementing a wireless temperature sensor network, several assumptions are typically made to ensure its effective operation and performance. These assumptions often revolve around the environment, the technology used, and the behaviour of the sensors themselves.
* The assumptions form the basis for planning, deploying, and maintaining a wireless temperature sensor network effectively, ensuring that it meets operational requirements and delivers reliable performance in monitoring temperature conditions.
* Benefits of this sensor:
* Wireless temperature sensors offer a number of benefits for temperature monitoring applications.
* First, they are wireless and can be placed in difficult-to-reach locations.
* Second, they are often part of the IoT (Internet of Things), which means that they can be monitored remotely.
* Third, wireless temperature sensors can take frequent readings, which helps to ensure that temperatures are within the desired range.
* Fourth, wireless temperature sensors can trigger alarms if temperatures exceed a certain threshold. This helps to prevent damage to equipment or product.
* Finally, wireless temperature sensors can provide valuable data for trend analysis and process improvement.
* As a result, wireless IoT sensors offer a number of advantages for business organizations in virtually every industry.
* How do Wireless Temperature Sensors Work?

Wireless temperature sensors are becoming an essential part of operations management for most all businesses.

By remotely monitoring the temperature of equipment, wireless sensors can help to ensure that temperatures are where they need to be.

Each wireless temperature sensor includes a common wireless sensor component such as processor, power source (usually battery), radio sending unit and a sensing device. These sensors take measurement readings around the clock and transmits these readings in real-time to a central gateway.

The gateway is a small network device connected to the internet and typically resides in a central location. The range of the Swift Sensors gateway is 300 ft. and one gateway can support up to 150 sensors. The sensor sends a temperature reading in the form of a wireless signal to the gateway. The gateway then forwards the data to the cloud.

From there, the data can be accessed and analysed via a mobile app, web portal, desktop, laptop, etc. With this temperature information, users can track trends over time and make adjustments as needed to maintain proper temperature requirements.

Wireless temperature sensors are an essential part of today’s connected world, and they are only becoming more prevalent as businesses demand better insights into their operations.

* Code:

#include "DHT.h"

#include "BluetoothSerial.h"

#define DHTPIN 4

#define DHTTYPE DHT22

String device\_name = "ESP32-BT-BB";

#if !defined(CONFIG\_BT\_ENABLED) || !defined(CONFIG\_BLUEDROID\_ENABLED)

#error Bluetooth is not enabled! Please run `make menuconfig` to and enable it

#endif

// Check Serial Port Profile

#if !defined(CONFIG\_BT\_SPP\_ENABLED)

#error Serial Port Profile for Bluetooth is not available or not enabled. It is only available for the ESP32 chip.

#endif

BluetoothSerial SerialBT;

// Declare

DHT dht(DHTPIN, DHTTYPE);

void setup() {

  Serial.begin(115200);

  SerialBT.begin(ESP32-BT-BB);  // Bluetooth device name

  Serial.printf("The device with name \"%s\" is started.\nNow you can pair it with Bluetooth!\n", ESP32-BT-BB.c\_str());

  dht.begin();

}

void loop() {

  delay(2000);

  float h = dht.readHumidity();

  float t = dht.readTemperature();

  float f = dht.readTemperature(true);

  if (isnan(h) || isnan(t) || isnan(f)) {

    Serial.println(F("Failed to read from DHT sensor!"));

    return;

  }

  float hif = dht.computeHeatIndex(f, h);

  float hic = dht.computeHeatIndex(t, h, false);

  Serial.print(F("Humidity: "));

  Serial.print(h);

  Serial.print(F("% Temperature: "));

  Serial.print(t);

  Serial.print(F("°C "));

  Serial.print(f);

  Serial.print(F("°F  Heat index: "));

  Serial.print(hic);

  Serial.print(F("°C "));

  Serial.print(hif);

  Serial.println(F("°F"));

  // You can also send data over Bluetooth

}

* Conclusion:

In conclusion, wireless temperature sensor networks represent a transformative advancement in the field of temperature monitoring and management across diverse industries. These networks offer unparalleled flexibility, scalability, and efficiency compared to traditional wired systems. By leveraging wireless communication technology, they enable real-time monitoring of temperature conditions from remote locations, facilitating proactive maintenance, and rapid response to critical events.