Analysis of star structure data transmission mode in sensor network system

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Abstract. Based on the wide application of sensor networks and data transmission in the network, the star structure of sensor networks is composed by using the basic principle and superior performance of sensor nodes, flexible technology and convenient construction. According to the rules and protocols of sensor networks, the star data transmission process is completed. After a large number of data transmission experiments, good experimental results are obtained, and a large number of experimental data are obtained. And the star data transmission process of sensor network is applied to teaching and scientific research practice.

1. introduce
Wireless sensor network integrates sensor technology, embedded technology, computer technology, network technology, wireless communication technology, distributed information processing technology, etc. It can monitor, perceive and collect the information of various environment or monitoring objects in real time through various integrated micro sensors. The embedded system processes the information, and the random self-organizing wireless communication network transmits the perceived information to the user terminal of the Internet of things system in different ways.

2. Composition and principle of sensor node
The composition and function of sensor network nodes include the following four basic units
   Sensor unit: sensor and a / D conversion function module;
   Processing unit: composed of embedded system, including CPU, memory and embedded operating system;
   Communication unit: wireless communication module;
   The power part.

Figure 1 schematic diagram of system composition of sensor node in wireless sensor network
As an important part of the Internet of things, sensor network extends the scope of intelligent sensors to RFID and other data acquisition technologies. From the perspective of technical composition and application fields, ubiquitous sensor network is equivalent to the Internet of things.

In sensor networks, a large number of nodes are deployed in or near the perceived objects in various ways. Nodes form a wireless network through self-organization, and perceive, collect and process specific information in the network coverage area in a cooperative way, so as to realize the collection, processing and analysis of information at any time at any place. The structure of sensor network includes distributed sensor node, aggregation node, network and user interface.

Sensor nodes can communicate with each other, self organize into a network and connect to the base station node through a variety of ways. After receiving the data, the base station node completes the connection with the public network through the gateway. The task manager manages and controls the system.

3. Star structure of sensor networks

Sensor network, which enables objects to speak and release information through perception and recognition technology, is an important part of the integration of physical world and information world, and the most unique part of the Internet of things from other networks. The tentacle of the Internet of things is a large number of information generation nodes located in the perception and identification layer, including RFID, sensor components, sensor devices and identification systems. The data sensed by sensor networks is an important source of massive information in the Internet of things.

Star data transmission mode is that data is transmitted from point to collection point in the Internet of things or communication equipment. Many network types adopt this transmission mode. The schematic diagram of star mode composition.

![Figure 2 star structure type of sensor network](image)

According to the network protocol and rules, each node in the sensor network completes the star data transmission process based on the requirements of networking.

Shared resources: users can share various resources in the network, such as files, devices, components, components, scanners, plotters, printers and various services. The Internet of things is a shared resource network.

Data processing: Internet of things for data processing, network for scientific computing, system planning, information processing, industrial control, enterprise operation and management.

Data transmission: network for data collection, data exchange, data transmission, data classification, data retrieval and information retrieval.

Network sharing: the purpose of using the Internet of things is not unique, and there are many purposes and requirements.

Wireless sensor network: use electromagnetic wave as carrier to transmit data, wireless network networking communication is reliable, accurate transmission of data. The transmission mode is flexible and convenient. Wireless sensor network is a promising network.
4. Data transmission process of star sensor network
Sensor nodes can communicate with each other, self organize into a network, and connect to the base station node through a variety of ways. After receiving the data, the base station node completes the connection with the public network through the gateway. The whole system manages and controls the Internet of things system through task manager.

As an important part of the Internet of things, sensor network extends the scope of intelligent sensors to RFID and other data acquisition technologies. From the perspective of technical composition and application fields, ubiquitous sensor network is equivalent to the Internet of things. The timing relationship of star data transmission in sensor networks is shown in the figure.

In star data transmission mode, data is transmitted between sensor network nodes or communication devices in the form of point to collection point.

Star data transmission process
Data1 → node i → collection point.
1001100 → node 01 → convergence point.

Topology of sensor networks
The topological structure of IOT network refers to the geometric arrangement of communication lines and stations, nodes and convergence points in the network.

Star Network: each node is connected with the central station through the point-to-point link. It is easy to add new sites in the network, easy to control the security and priority of data, and easy to realize network monitoring.

The star structure completes the data transmission from node to collection point.

Classification of wireless sensor network communication
Point to point data is transmitted in computer or communication equipment in a point-to-point way.

Star network and ring network adopt this transmission mode.

Broadcast data is transmitted in the common medium. Wireless network and bus network belong to this type.

Table sensor network star data acquisition
The star data acquisition table of sensor network is shown in table 01.

| Data | Nodei | Point of convergence |
|------|-------|----------------------|
| d1   | 01    |                      |
| d2   | 02    |                      |
| d3   | 03    |                      |
| d4   | 04    |                      |
| d5   | 05    |                      |
| d6   | 06    |                      |
| d7   | 07    |                      |
| ...  | ...   |                      |
| d16  | 16    |                      |

Figure 3 time sequence diagram of star data transmission in sensor network

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| node | data  | Point of convergence |
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| 01   | 10100010 | 10100010 |

3
5. summary
A analyzes the composition and working principle of wireless sensor network and sensor node, explains the main function of sensor node, and constructs sensor network;

B discusses the star topology of wireless sensor network. The working process of the star is described;

C analyzes the running time sequence of star system, gives the process of star data transmission and its experimental data.

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