Design and Implementation of Information Collector Based on Computer in Internet of Things

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Abstract. The information collector based on MCU is helpful to realize the collection, transmission and display of information, and has high stability and cost advantages, so it has high research value. Based on this, this paper first analyzes the key technology, demand and overall scheme of SCM information collector based on computer, and then studies the principle of hardware design, hardware architecture and information adoption and analysis process of SCM information collector system.

Keywords: Information Collector, IoT, Single Chip Microcomputer

1. Introduction

With the rapid development of information technology represented by computer technology, a large number of data information need to be collected and processed in time, so the requirement of information collection and processing efficiency is higher and higher [1]. In the era of Internet of things, the collection and processing of information and data is one of the essential basic functions of computer technology and equipment. In the process of data acquisition, in order to ensure the accuracy, integrity and reliability of information, the requirements of acquisition process and collector are high, so as to ensure the stability of the whole system operation process.

The information collector based on MCU can collect, transmit and display information by receiving, transmitting and displaying the information [2]. It has high stability and cost advantages, and can greatly improve the efficiency of information collection and processing. Based on the overall analysis of various factors, the standardized design of information acquisition system hardware based on the Internet of things has a great effect on the security and stability of the information collection system. Therefore, it is of great practical value to study the design of the information collector of the Internet of things based on the computer.

2. Overall design of single chip microcomputer information collector based on computer

2.1. Key technology of SCM information collection based on computer

With the rapid change of Internet of things technology, computer-based information collector integrates the functions of information access, collection and transmission for specific scenarios, and the efficiency and flexibility of information configuration are also constantly improving [3]. Not only
that, information perception and recognition based on computer Internet of things technology, as well as the calculation and processing of data, realize the information processing and fusion. The architecture of information collector based on computer Internet of things technology is mainly composed of multiple layers, as shown in Figure 1 below, so as to realize the automatic collection of information data and lay the foundation for intelligent information processing.

![Architecture of information collector based on Internet of things](image)

**Figure 1.** Architecture of information collector based on Internet of things

2.2. *Analysis of the overall demand of SCM information collector*

The functional requirements of SCM information collector system based on computer mainly include the authentication, viewing and collection of information, so as to realize the user's view and application of information in the Internet environment. The collection of information is mainly based on the sensor in the MCU architecture. In addition, the sensor information includes the energy and topology information of network nodes, as well as the node information needed in specific application fields. In general, the single-chip microcomputer information collector system mainly realizes the collection and transmission of information in sensor nodes and intelligent ports, so as to ensure the safety and temperature of information.

The single-chip microcomputer information collector system of Internet of things based on computer adopts hierarchical system design, so as to ensure the independent operation of information acquisition and processing by the information collector under the action of the Internet of things, realize the high coupling degree between each other, and ensure the stability and reliability of the system under the effect and influence of external environmental interference factors. In addition, the accuracy of information data acquisition and processing is mainly achieved through the synchronous operation between the two and the reasonable design of hardware architecture.

2.3. *Scheme of single chip microcomputer information collector system*

Based on the overall functional requirements of SCM information collector system, the host of the system is mainly composed of MCU module, display module, information transmission module and early warning module. And the circuit architecture of single chip microcomputer information collector system node is shown in Figure 2. Among them, as the unit of receiving and processing information, the controller module is composed of MCU with control and storage functions, and can realize the programming operation of data information storage. The display unit adopts the display module with high resolution and refresh rate, so as to realize the stable and clear display of information data.

In addition, the information transmission unit selects highly integrated wireless transmission module, and realizes the high-speed transmission of information through the integrated high-speed single-chip microcomputer and information processing chip [4, 5]. The information detection unit uses intelligent sensors to achieve accurate detection of information data, while the information storage unit uses low-power storage buffer to achieve high-precision and low-power information measurement and storage.
3. Hardware Design and Implementation of SCM Information Collector System

3.1. Design principle of SCM information collector system
The design and implementation of SCM information collector system follows the principles of reliability, scalability, openness and practicability, as shown in Table 1 below, so as to ensure the realization of fault tolerance, stability, availability and data information sharing of the system.

| Principle     | Characteristics                                         |
|---------------|---------------------------------------------------------|
| Reliability   | Reliable operation and fault tolerance                  |
| Scalability   | It can be configured according to the actual needs      |
| Openness      | Data exchange and sharing with other systems through standard interface. |
| Practicability| Interface with strong operability                       |

3.2. Hardware design of SCM information collector system
SCM information collector system hardware consists of the main control circuit, node control circuit, display circuit and sensor, etc. The main control circuit realizes wireless transmission, display and storage functions, and node control circuit realizes wireless transmission and control of display and alarm module nodes. The sensor is responsible for inputting the collected information data into the single chip microcomputer, and converting the signal into the signal that can be processed by the single chip microcomputer through the conversion circuit. In order to realize programmed control, the main program of SCM information collector system is initialized, and its node program and main control program are constructed respectively.

In the aspect of SCM information collector signal acquisition, firstly, the current mode is designed by amplifier and mixer to realize the quadrature output of harmonic capacitance coupling. Secondly, the receiver oscillator adopts zero if structure to realize the image suppression and demodulation of information, as well as the circuit diagram and signal conversion.

3.3. Sampling and analysis of circuit diagram information
When the electronic circuit gets the charge, the electron beam bends in the horizontal direction in the tube, so that the observer can observe the circuit diagram information on the display. In addition, the circuit driving system of SCM information collector system drives the display module to display the information to be observed, and realizes the high-quality collection and analysis display of information in several aspects as shown in Figure 3.
4. Conclusion
In summary, the important research content of the Internet of things based on computer is the efficient collection and processing of a large amount of information. Therefore, it is necessary to select different functional modules according to the architecture and hardware characteristics of the designed collector system, and determine the system architecture with high practicability, stability and scalability. In addition, in the process of design and implementation of SCM information collector, it is necessary to make each hardware have a high degree of integration, which can record information based on computer, achieve the goal of high-speed information interconnection based on information networking, promote the scientific scheduling and management of information collection process, and provide data support for the development of the Internet of things era.

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