The Analysis of Related Problems of Bioelectric Signal Acquisition Terminal in Internet of Things

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Abstract: With the rapid development of China's economy in recent years, people are paying more and more attention to their own health issues, and the demand for intelligent collection and integrated monitoring of physical health information is also increasing. However, the traditional bioelectric signal acquisition equipment mainly based on electrocardiographs and electroencephalograms has been affected by technical conditions and cannot meet the demand for more and more sophisticated physical health monitoring. With the application and popularization of the Internet of Things technology, combined with the Internet of Things technology, the intelligent acquisition system of integrated bioelectrical information such as ECG signals, EEG signals, arterial signals will be able to more accurately analyze the bioelectrical signal data of the human body and monitor human health in real time It can effectively meet people's needs for convenient and efficient monitoring of their own bioelectric signals. Based on the outline of the Internet of Things technology, this article analyzes the related issues of the collection, processing, digital conversion, storage, and transmission of bioelectric signals, and provides real-time monitoring of human health for bioelectric signal acquisition terminals based on the Internet of Things system. Learn from.

1. Introduction

In a contemporary society where health issues are becoming increasingly prominent, human beings use all available technical means to monitor their physiological activities to protect their health. Bioelectrical signals refer to the regular and regular discharges that are closely related to life activities when cells and organisms are at rest or in motion. Effective monitoring of these discharges can accurately reflect the health of the human body. Traditional bioelectric signals are mainly monitored by electrocardiographs that reflect cardiac activity and brain wave meters that reflect human brain activity. However, in practical application, these traditional monitoring devices will have low signal collection efficiency, insufficient visual display and intelligent Problems such as limited levels, complicated operations, and inaccurate digital display results have affected people's use. Under the iterative trend of new technologies, based on the Internet of Things technology, an intelligent monitoring system capable of effectively collecting and comprehensively analyzing human bioelectrical signals is established [1]. Through comprehensive collection, analysis and management of these health information, we can more accurately judge the health of the human body. Therefore, it is necessary to analyze the related issues of the bioelectric signal acquisition terminal on the basis of clarifying the technical connotation of the Internet of Things, and then establish an Internet of Things monitoring system that meets the needs of human health monitoring.

2. The Connotation and Advantages of the Internet of Things

The Internet of Things technology is an important technical form produced by the third industrial revolution. It originated in the media field. It is a connection technology that integrates intelligent hardware technology, information transmission technology, Internet technology, and third-party

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port agreement protocols. It can use intelligent network systems Multiple intelligent hardware connections for efficient information transmission, information exchange and data sharing. The technology community currently defines IoT systems as facilities for wireless interconnection with ubiquitous "end devices". Its system components include smart sensors, mobile terminals, industrial systems, numerical control systems, intelligent hardware, video surveillance systems, and RFID smart label systems that can be used for external radio frequency identification. The Internet of Things can be simply understood as "Internet of Everything", and any information device can realize intelligent operation and real-time monitoring with the help of the Internet of Things system. As a technology ecosystem, the Internet of Things can facilitate the interconnection of different hardware systems at any time by virtue of wireless technology, wired long-distance and short-distance communication networks. The IoT system based on big data and cloud computing also has powerful data analysis capabilities and data storage capabilities. The data collected through the data terminal can be deeply mined and analyzed at any time with the help of big data analysis systems to find valuable information data for people Use [2]. In the field of medical health, the bioelectrical signal collection and analysis terminal based on the Internet of Things system can realize online real-time monitoring of human health status, and can be collected in time for the human bioelectrical signal, and processed digitally, which can be converted into a human identification Digital signals to help people monitor their physical health in a timely manner.

3. Related Issues of Bioelectric Signal Acquisition Terminal in the Internet of Things

Judging from the current application trend of the Internet of Things technology in the field of medical health, the Internet of Things is a system that provides real-time health monitoring for many people. The main problems of its bioelectric signal acquisition terminal reflect the collection, processing, digital conversion, storage, and transmission. And other links. Among them, the conversion of bioelectrical signals to digital signals that has a decisive influence on real-time monitoring. Only by breaking through this technical difficulty can the IoT bioelectric signal terminal be widely used.

3.1. Problems Related to Bioelectric Signal Acquisition

The bioelectric signal acquisition terminal is fundamentally different from the bioelectric signal acquisition. The bioelectric signal acquisition terminal is an intelligent terminal formed on the basis of integrating all bioelectric signal collection methods. The terminal must not only be able to collect all kinds of bioelectrical signals of the human body, but also be able to perform preliminary processing on the collected bioelectrical signals to ensure that the collected bioelectrical signals can reflect the health status of the human body [3]. This also determines that the collection of bioelectric signals based on the Internet of Things system must first take bioelectric signal sensors as the core, and build a bioelectric signal sensor matrix to achieve a comprehensive collection of various bioelectric signals generated from human brain activities and behavioral activities. . During the collection process, the terminal must be able to collect various types of bioelectrical information generated by the human body. Specific collection methods must be ensured for the collection of relevant bioelectrical signals, such as electroencephalograms and electrocardiograms. There are no vacancies in each of the technical links, and there are corresponding technical implementation methods.

3.2. Problems Related to Bioelectrical Signal Processing

After the comprehensive collection of bioelectrical signals, there are related measures for bioelectrical signal processing, such as noise reduction processing and signal analysis. The main technical difficulty involved here is noise reduction processing. Because all kinds of bioelectric signals collected by the bioelectric signal collection terminal are affected by the surrounding environment, there will be various background noises and environmental noises. This also determines that after the comprehensive collection of bioelectrical signals, the electric signal acquisition terminal based on the Internet of Things can effectively filter various noises, timely

filter out environmental noise and background noise, and quickly identify the original bioelectrical signals. It is convenient to provide effective data support for later technical processing [4].

3.3. Analysis of Issues Related to Digital Conversion

After comprehensive collection and effective noise reduction processing of the original bioelectrical signals, the bioelectrical signals are then converted into digital signals to help people identify them in a digital visualization manner. Bioelectrical signals are a primitive type of electrical signals that are produced by living organisms in their natural state. After collecting the bio-electrical signal information, the electrical signal is used to find the original bio-electrical signal through signal analysis. But bioelectrical signals and digital signals are two different types of signal data. Bioelectrical signals are usually presented in different waveforms, and digital signals are usually displayed by visual tools [5]. In the Internet of Things system, bioelectric signals can be realized by the same exchange with digital signals. Digital signals are used as a way to display bioelectric signals, and digital waveforms are used to display the waveform of bioelectric signals. The visual display of the signal can also restore the original state of the bioelectric signal to the greatest extent, which is convenient for the Internet of Things system to detect the health changes of the human body in a timely manner during the later monitoring process.

3.4. Bioelectrical Signal Storage Related Issues

After the bioelectric signal is digitally converted, the bioelectric signal must also be stored and processed. The original bioelectrical signals cannot be effectively stored, and only the digital signals related to them can be stored. However, traditional hardware storage technology is difficult to meet the storage requirements of bioelectric signals after digital processing. This requires the application of cloud storage technology to the digital processing of bioelectric signals, relying on the powerful functional advantages of cloud systems and massive storage space for related signals Data is stored for a long time. It is worth noting that although the storage mode of the SD card can meet the information and data processing requirements of bioelectric signals under specific needs, it can also solve the problem of localized storage to a certain extent [6]. However, in the face of storage requirements for massive bioelectrical signal data, the localized storage model can neither promote data sharing nor store data for massive bioelectrical signal information. The above two types of problems can only be solved with the help of the Internet "cloud" through cloud storage technology.

3.5. Problems related to bioelectrical signal transmission

The main transmission problem that bioelectrical signals face after acquisition is the speed matching between various functional modules inside the acquisition device and the CPU. If the signal acquisition speed of the acquisition device is too fast, and the CPU operation speed is slow, the coordination between signal acquisition and operation cannot be achieved. If the CPU operation speed is fast, the signal acquisition efficiency of each functional module of the acquisition device is not high, and it will appear. Inconsistent and incompatible issues. Therefore, it is necessary to synchronize the coordination between each module in the acquisition device and the CPU, and use a balanced strategy to maintain the mutual promotion of the two. At the same time, in order to solve the wireless transmission problem, a transmission protocol based on 3G technology and suitable for bioelectric signals can be selected. In order to ensure that no signal damage or packet loss occurs during signal data transmission, a data redundancy strategy can be selected to avoid data packet loss [7]. In this way, a balanced strategy for data transmission is selected, a data transmission scheme based on 3G technology is constructed, and a data redundancy strategy can be used to solve the problem of transmission of bioelectric signals, ensuring that bioelectric signals have good transmission efficiency.

4. Conclusion

The Internet of Things technology, as a new intelligent technology system formed with the modern technology ecology, has shown a strong vitality in the era of the information industry, and has been widely used in the field of medicine and health. The design of the bioelectric signal acquisition terminal based on the Internet of Things technology can avoid the shortcomings of traditional bioelectric signal collection equipment. With the powerful functions of the Internet of Things system, it can realize the various technical links from the bioelectric signal acquisition, processing, digital conversion, storage, and transmission. Effective through, solve related technical problems, and meet people's physical health monitoring needs.

5. References

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