Research on Big Data Signal Information Communication System in 5G Signal Transmission Process

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Abstract: To avoid the occurrence of 5G communication signal bandwidth cross-frequency events in the case of non-occupancy, this paper proposes a 5G communication signal bandwidth transmission method based on the cross-layer coding additive multiplexing mechanism. With the support of basic theoretical technology, the coherent bandwidth and coherence time of 5G communication signals are calculated, the signal transmission characteristics are modeled and processed, and the practical application effect of this transmission method is tested through comparative experiments. As far as the development status is concerned, technologies such as high-dimensional signals, broadband signals, and high-resolution signals are constantly being updated, which has prompted signal processing to enter the era of big data., and gradually exposed various problems. Faced with this situation, we must take effective measures and apply professional techniques to improve the signal processing effect. This paper briefly analyzes the main points of signal processing in the context of big data.

1. Introduction

5G is the abbreviation of the fifth-generation mobile communication technology. It has the advantages of low operating cost, low energy consumption, high data frequency and short delay time, and can realize real-time connection of large-scale communication equipment in a high-capacity system environment. In this data application network, the service area covered by the supplier is manually divided into multiple small cellular geographic areas, and the analog signals used to represent information such as images, sounds and texts can be obtained at the same time by the communication host the digital processing of the input data is directly converted into a bit stream output form with the help of an analog-to-digital converter [1]. All wireless devices in the cell can establish a physical connection relationship with the signal host under the action of the 5G communication network, and freely allocate or share public communication channels through automatic transceivers. Due to the incomplete transmission of communication data, the non-occupancy state of information often occurs in the 5G communication network, resulting in the occurrence of communication signal bandwidth cross-frequency events. Based on this, the research is carried out. In recent years, with the large-scale construction of 5G high-speed networks, while bringing convenience to people, it has also caused various problems. This paper proposes a communication monitoring system based on the Internet of Things and big data. It collects data such as cycles through sensors and Internet of Things technology, and then relies on computer technology to compare and analyze the monitoring data with theoretical design values and previous monitoring big data. In order to improve the accuracy of communication signal detection, an intelligent communication signal detection system based on big data analysis is proposed to improve communication security.

2. Research on the additive multiplexing mechanism of cross-layer coding

Cross-layer coding describes a hopping communication signal naming behavior, which can plan and process various types of communication information when the original transmission address, transmission destination, communication bandwidth and signal frequency period are known, and then

select the parameters that meet the requirements of communication network capture establish a communication transmission relationship with other client hosts. The wider the information coverage involved in the communication network environment, the stronger the actual processing capability of the cross-layer coding mechanism for communication signals [2]. Multiplexing is a specific method of repeated reading and writing of communication signals. In a 5G communication network, a client host often corresponds to multiple objects to be transmitted at the same time, and due to the existence of the principle of additive coding, it is difficult for a communication signal to be used in multiple cross-layer channels. Therefore, the multiplexing mechanism is extremely necessary. At present, the amount of signal transmission involved in the 5G communication network is very large, and an original data parameter needs to be encoded and decoded by the communication host multiple times within the same transmission period, which is also the cross-layer coding additive multiplexing mechanism can be widely used the main reason [3].

3. 5G communication signal bandwidth transmission method

Under the action of the cross-layer coding additive multiplexing mechanism, according to the processing flow of phase bandwidth calculation, coherence time calculation and communication signal transmission characteristic modeling, the smooth application of the 5G communication signal bandwidth transmission method is realized. See Figure 2.

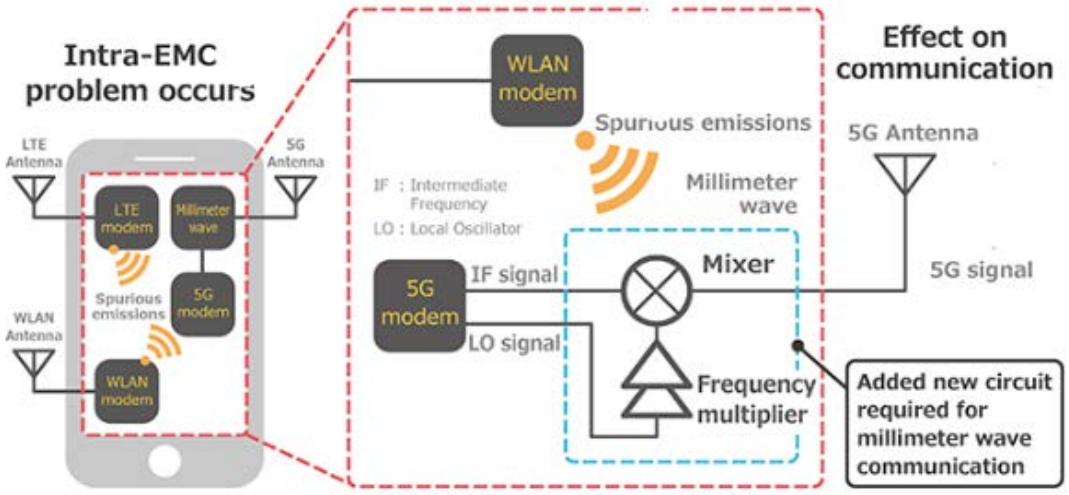

Figure 1. 5G communication signal bandwidth transmission process technology

3.1 Amount of coherent bandwidth

The amount of coherent bandwidth refers to the specific change value of the 5G communication signal transmission bandwidth per unit time, which is directly affected by the channel width and the total amount of communication signals. The channel width is also called the channel load strength, which refers to the coherence information aggregation capability of the 5G signal transmission path. In a non-fluctuating 5G communication environment, the data signal sent by the communication host can be directly transmitted to the client host, and the higher the level of the signal sent, the higher the integrity of the received signal [4]. The total amount of communication signals is a defining indicator and is not affected by other dry conditions than the physical communication environment. If the entire signal transmission network is always maintained in the form of 5G communication, and there is no obvious data interference behavior, it can be considered that the amount of communication signals received by the client host is the amount of communication signals output by the 5G communication host.

3.2 Amount of coherence time

The amount of coherence time is the barrier expression condition set by the 5G communication host for the data information in the dimension of signal transmission, and is directly affected by the signal

encoding authority and the cross-layer communication authority. Under the action of the cross-layer coding additive multiplexing mechanism, the signal coding authority belongs to a non-occupying form of communication description index. The more, and vice versa, the less, so it has strong transmission variability [5]. Cross-layer communication authority has strong application stability. In the entire 5G communication signal coverage range, the actual value level of this physical quantity will never be released.

However, with the change of the signal connection behavior, the action strength of the indicator parameters may change irreversibly.

3.3 Modeling of the transmission characteristics of communication signals

The modeling of communication signal transmission characteristics is the last step in the realization of the 5G communication signal bandwidth transmission method. Under normal circumstances, with the enhancement of the cross-layer coding additive multiplexing mechanism, a certain amount of unoccupied data information will be generated in the channel organization, and these signal parameters cannot be transmitted from the original communication position to the target communication in a non-coding environment. Location. After the transmission characteristics of the communication signal are statistically modeled, the accumulated non-occupancy data information can quickly change the original existing form, and under the condition that the coherent bandwidth and coherence time conditions do not change, the channel organization that tends to be stable is transmitted directly to the target communication location. See Figure 2.

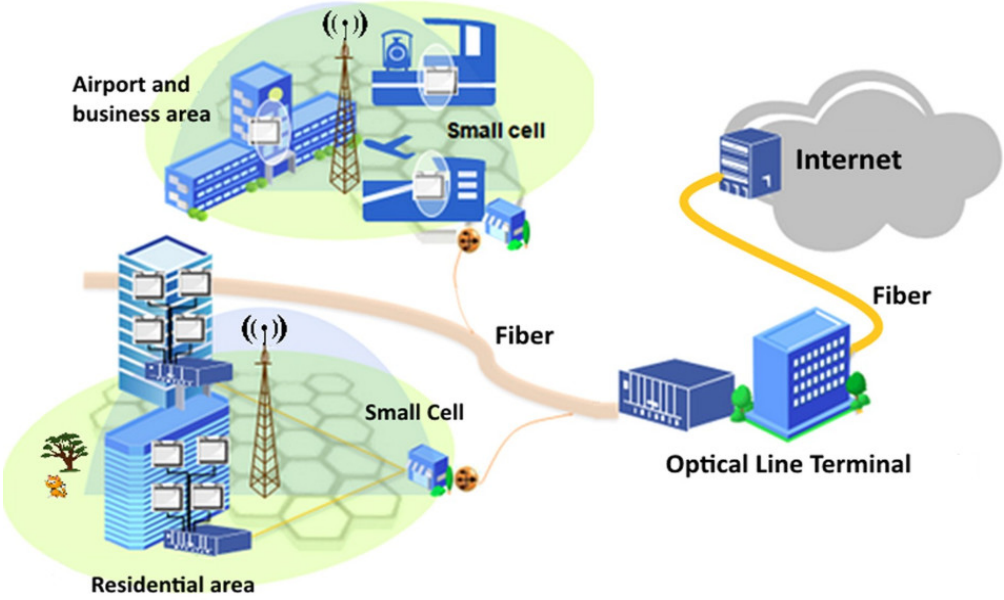

Figure 2. 5G communication signal combined with optical fiber transmission technology application

4. Intelligent detection system of communication signal based on big data analysis

4.1 The overall structure of the system

Based on cloud computing platform, combined with modern equipment functions and reasonable network devices, an intelligent detection system of communication signals for big data analysis is designed, which is mainly composed of infrastructure layer, network communication layer, core service layer and user interface layer.

Infrastructure layer: Create multiple virtual machines on VM virtual machines to realize virtualization management. MySQL database not only provides storage space for data persistence, but also provides a guarantee for users to view historical data. In summary, the infrastructure layer provides the underlying support for the entire system of infrastructure as a service. Network communication layer: including man-machine interface, communication server and communication

gateway, mainly responsible for the transmission of communication signals. Core service layer: It is the core of the whole system. It adopts the communication signal detection method of deep learning to realize the abnormal signal detection and monitoring of communication. User interface layer: Users can view the abnormal information of the virtual machine, and can also query the status information of the virtual machine.

4.2 Data Persistence Design

Persistence of virtual machine information at the infrastructure layer uses data persistence design to store data in real time. When the node machine recognizes the abnormal signal, the system will send the abnormal information to the main control machine, and the main control machine will issue a warning after receiving the abnormal information. The monitoring personnel can use SSH to log in to the node machine on the main control machine side to view the relevant information of its various attributes and determine the location of the abnormality. The persistence of data is realized by real-time storage of data in MySQL database, but the storage data space of MySQL database is not infinitely increased, so in order to delete the data beyond the storage period in the database, a data deletion module is designed.

4.2.1 Data storage module

The data filtered by the node machine is directly stored in the MySQL database, and the database names and table names of all the node machines are unified as datanode and storedata, so that the data can be queried on the main control machine. First use SQL language to create a database, and then use C language to call storedata.sh written in the shell to complete the real-time storage of data. The above-mentioned data persistence method can be used to store the monitored historical data into the MySQL database. The data table shows the data storage time and the attribute values that need to be monitored. Since the data is filtered and merged and stored in the database, there will be a certain time delay. However, after many verifications, the difference between the data acquisition time and the data storage time is less than 1s, which meets the conditions of real-time monitoring. See Figure 3.

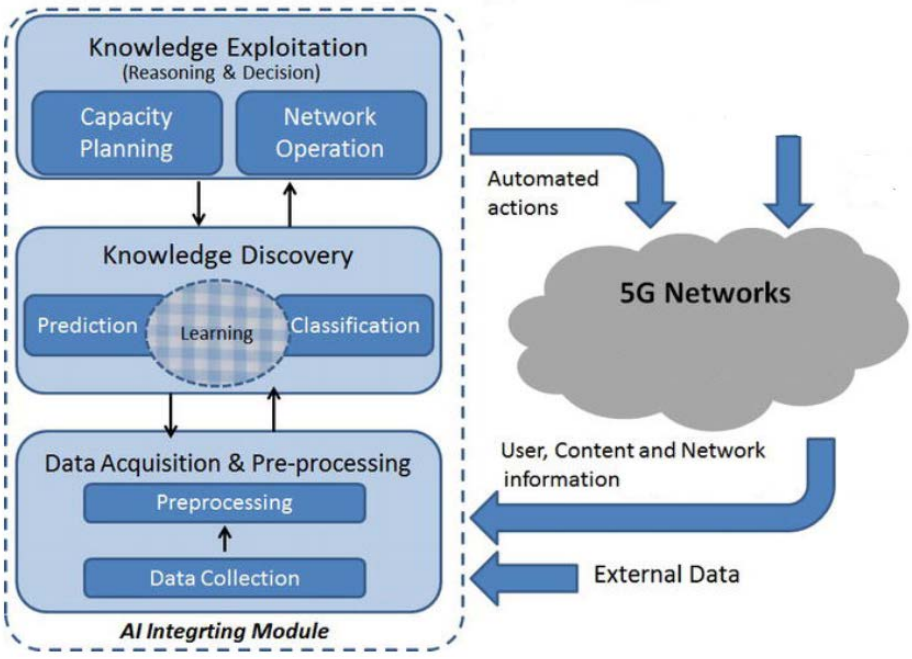

Figure 3. 5G signal processing flow in the context of big data

4.2.2 Data deletion module

In order to achieve continuous storage of data, it is necessary to delete expired and useless data in time, because the data collected by nodes is large and the frequency of collection is fast, and these data will continue to increase over time, resulting in increased memory utilization. This paper sets 7 days

as the data storage period, the data stored in the last week can be saved in the database, and the other earlier data can be deleted.

5. Signal processing in the context of big data

5.1 High-speed digital signal processing

The performance of the sensor is constantly improving, and the application environment is more complex. It is required that the digital signal processing system must update the performance. On the basis of establishing higher signal processing and 1/0 bandwidth, it is also necessary to realize the characteristics of low power consumption and fast upgrade and expansion. In the context of big data, the amount of data signals continues to increase, and high-speed data transmission and processing will face greater challenges. Among them, the high-speed analog-to-digital conversion (A/D) technology and the improvement of sensor performance can achieve effective extraction at higher frequencies. Extracting wider-band signals with higher resolution. For signal processing, it is necessary to effectively process raw data with larger bandwidth, more channels and higher data rates. For the purpose of improving signal processing efficiency, it is necessary to further study multi-core signals. Processor and high-speed multi-processor interconnection technology

5.2 High-speed digital signal processing chip

5.2.1 Multi-core DSP chip

The on-chip multi-core technology uses the bus to effectively integrate multiple DSPs, and adopts the method of resource duplication to improve the signal processing capability. Now many high-end DSP chips of TI and Freescale adopt this kind of structure. For example, TI's C665x, C667x series and other reconfigurable array structure DSPs are based on the SIMD design concept, decompose the input long data into multiple short data, and then use A single instruction to complete the operation can further improve the ability to handle data-intensive operations. Such as TILE64 processor and XETAL-II processor. It mainly adopts a data-driven mechanism, and the architecture mainly includes several parts such as instruction memory, path network, processing components and output components. In practical applications, this structure can realize highly parallel operation and can be highly adaptable to modern VLSI technology. Spend.

5.2.2 High-performance FPGA chips

FPCA has now achieved updates in terms of cost, performance, power consumption, etc., and has greatly improved the parallel processing capability of the chip, which is of great significance to signal processing in the context of big data. Therefore, based on 90m integrated circuit technology, FPGA has realized the design of high-end FPGA platform optimized for DSP application, which effectively improves the DSP function and its interconnection performance.

5.2.3 Dedicated ASIC chips

ASIC integrated circuits have a certain design purpose, which can effectively realize the processing of specific high-speed signals. Compared with conventional integrated circuits, the chips have the characteristics of low power consumption, small size, high performance, high reliability and strong confidentiality, and are effective Reduced production costs. For example, the Hardcopy series chips combine the advantages of FPGA design and the advantages of ASIC mass production, which can realize the conversion from FPGA to ASIC in a shorter time, and require lower power consumption in practical applications, which can better meet the Information processing needs. See Figure 4.

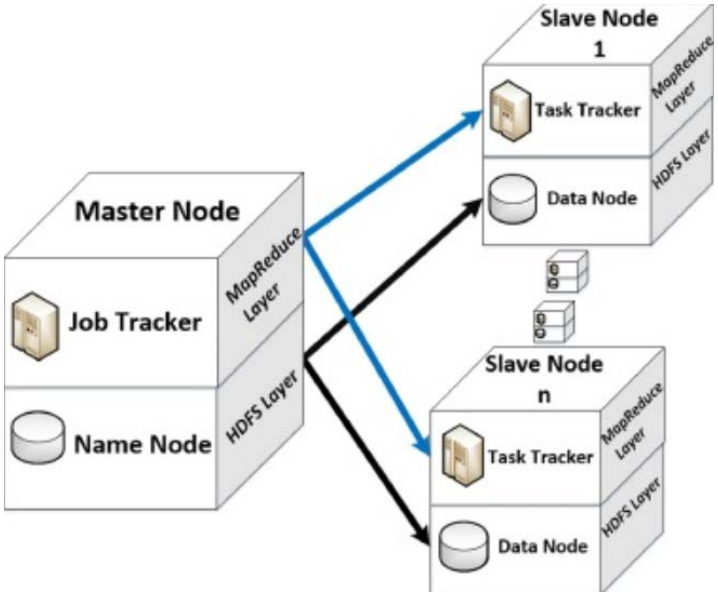

Figure 4. Communication signal transceiver control system for big data analysis

6. Communication signal transceiver control system based on big data analysis

The formation of big data usually requires the long-term accumulation of a large amount of text data, often relying on traditional methods to obtain original data. When applied to 5G communication signals, data mining technology is used according to the communication data collected by 5G and received by the 5G communication signal receiver. Get more data about 5G communications. Data mining technology refers to the process of extracting relevant information from massive unknown actual data. By inputting 5G communication signal data, preprocessing data information, processing the input 5G communication signal data, processing communication signal noise data, using data mining technology to classify 5G communication signal data, obtaining relevant data information, and then obtaining classification rules through training, build a model for parameter tuning, and output 5G communication data parameters. Because the parameter adjustment of 5G communication data is more complicated, data mining technology is used to apply to the transmission, transmission and reception of 5G communication signals. According to the existing 5G communication data, the optimization of 5G communication signals is realized, the response sensitivity of communication equipment is improved, and the Anti-jamming capability of 5G communication signals. And using data mining technology, it can mine the connection relationship between 5G and 5G signals, obtain target parameters of communication signals in real time through raw data, track and identify differences in clutter signals, and extract attribute characteristics of different 5G communication signals. Ground tracking 5G communication signal anti-jamming data. It can be seen that the 5G communication signal transmission and reception control adopts a certain order. First, after data mining, the original 5G communication data is uploaded to the demodulator to generate sinusoidal ripple, noise data and standard communication data parameters, which are transmitted to the corresponding memory through a single channel. For storage, the entire process of sending 5G communication signals is controlled by the communication signal controller. According to the format command and address sent by the sending program, the communication signal is sent to the main control program, and then the main control program controls the receiver to receive the command, and transmits the received command and communication data to the bus of the receiver, and the data is automatically saved and stored. download. Then through the command received by the bus, the 5G communication signal receiver receives the sent data, locates the sending node address, and reads and writes the 5G communication data to the receiver. The received communication data belongs to the standard of 5G communication, and the channel transmission needs to be closed. channel, waiting to receive a new command to transmit 5G communication data, and determine the new command address. Finally, write 4k bytes of

data in the communication signal controller, record the communication signal address through programming, move the communication data to the CPU of the program, use data buffering to exchange and calculate the data, when the sine wave of the communication channel, suppress the After the download of noise and communication data is completed, the channel channel is activated to perform A/D conversion on the 5G communication data, and the transmission, reception, processing and control of 5G communication signals are completed, thereby realizing the control of 5G communication signal transmission and reception.

7. Conclusion

In the context of big data, signal processing will face greater challenges. In order to effectively process massive data, it is necessary to focus on research and realize information fusion, effectively process complex and multi-source information, and use intelligent sensor network technology to match high-speed signals. Processing technology, applying high-speed signal processing chips to improve the quality and efficiency of signal processing. This paper proposes a design idea of a communication 5G monitoring and early warning system based on the combination of the Internet of Things and big data. The system collects information according to certain procedures through the signal collection points placed on the top of the tower, and compares and analyzes the theoretical model data and previous data preset in the analysis system to realize real-time monitoring of 5G communication, and early warning and alarm for abnormal conditions. , to provide an implementation plan for 5G maintenance, which can effectively improve maintenance efficiency and ensure the stable operation of communications.

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