Signal Processing from the First Exploration of Big Data Horizon

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Abstract: Under the background of the popularization and application of computers in various fields, the amount of diversified data has been greatly increased, which also means that the era of big data is gradually coming. At the same time, various signal equipment and sensor equipment are widely used in various fields. People from the perspective of big data expect to collect, analyze and process the signal data by means of big data. However, due to the diversity of signal data and the huge and complex amount of data, the future development trend of signal from the perspective of big data is the information fusion of signal data. Therefore, it is necessary to explore signal processing from the perspective of big data. With the application of signal processing technology, the efficiency and quality of information processing can be improved gradually.

Keywords: Big Data Horizon; Signal Processing; Information Fusion

In the view of big data, a variety of signal forms need to be processed, so the difficulty of signal processing is increased to a certain extent. Under the background of the progress and development of science and technology, the application field of signal processing technology has been expanded to a great extent, which makes the signal processing technology gradually widely applied to many fields such as network and finance, and the amount of signal data generated at this time is bound to be very complicated and huge. In addition, in the face of increasingly complex signal data processing, in order to ensure the gradual improvement of signal processing efficiency, it is necessary to implement signal information fusion processing mode.

1. Multi-sensor information fusion

1.1 multi-sensor information fusion model

In the current society, the multi-sensor networking system has been widely used in many fields, such as intelligent robot and intelligent vehicle system. In the process of the system operation, there will be a large number of data information generated, coupled with constantly updated data, so the system communication link data transmission rate is often required. In addition, because many kinds of sensors on various platforms often collect a large amount of data and information, and these rich and diverse contents and effective complements between them are likely to be carried out as the case may be. At this time, from the perspective of a single sensor node, most of the information and data has an accuracy of less than 95%. From the aspect of sensor analysis, there are often big differences in the signal data types between each other, in addition to different structure and size, contradictory format, incomplete content, complex redundancy and other factors. At this time, in order to effectively extract useful and real-time information from massive data information, and then determine the target attributes and characteristics, it is necessary to actively carry out information fusion for a variety of signal source data, which can promote the information processing efficiency under

the perspective of big data gradually[1]. In the context of information fusion, coordinate and use diverse information, and optimize the processing of complementary and redundant information in time and space, the attribute and essence of the detection object can be accurately estimated, and the performance of the whole system can be promoted to be further improved. In the current society, JDL data fusion, boyd control loop, waterfall and other models are the main ways of information fusion.

1.2 Information fusion development

From the perspective of multi-sensor system analysis, it needs to be ensured that its information storage capacity is very large, so as to fully meet the requirements of sensor signal data acquisition and storage. In order to ensure the convenience and rapidity of sensor information collection, the information fusion method should be applied and the processing of redundant signal data should be optimized. In addition, the attributes of observation objects based on the complementary advantages of various signal data should be refined, so as to effectively improve the operation efficiency of multi-sensor system[2]. At present, there is no corresponding digital tool to describe and deal with the problem of information fusion. In this regard, the theory of information fusion should be constantly enriched, and the deep foundation should be consolidated. And more common and reasonable solutions should be actively explored.

2. Intelligent sensor networking technology

2.1 Intelligent sensor node technology

A typical intelligent sensor in visual sensor network is a smart camera. It can integrate video collection and compression functions on an embedded platform by intelligent camera, and then from a video camera system with video processing and communication functions. The application of smart camera can facilitate the migration of computer vision algorithm from the original central workstation to the camera, and ensure the good implementation of distributed computing. This calculation method can not only effectively reduce the network communication load, promote the gradual improvement of network application reliability, but also ensure the effective enhancement of network scalability. This calculation method can not only effectively reduce the network communication load, promote the gradual improvement of network application reliability, but also ensure the effective enhancement of network scalability.

2.2 Calculation of sensor network

In the case of gradually increasing the number of sensor nodes, the scale of signal data acquisition is significantly expanded. At this time, the problem of big data processing has become increasingly prominent, which requires people to strengthen the application in advanced and scientific and technological means, so as to promote the computational performance of intelligent sensor network gradually improve[3]. If the calculation problem of intelligent sensor is described based on the construction of visual sensor network, the relationship of devices in the network is not the same. However, in the case of expanding and supplementing vision, it can fully reflect the relationship between adjacent sites, camera space and coverage, and then calculate the source and sink with the aid of visual extension structure, and carry out the modeling operation based on the corresponding calculation path.

3. High speed digital signal processing

3.1 Current situation of high speed digital signal processing

Due to the continuous improvement of sensor performance and highly complex application environment, the digital signal processing system began to face higher requirements, that is, the digital signal processing system should constantly update its performance. Based on the higher signal processing and the effective establishment of I/0 port broadband, the features of low power consumption and fast upgrade and expansion should be well realized. The continuous increase in the amount of data signals in the view of big data makes the challenges faced by high-speed data transmission and processing more severe. At this time, under the condition of effectively improving the high-speed analog-to-digital conversion technology and sensor performance, it can ensure that the extraction of wider frequency sig-

nals at higher frequency can be well realized[4]. In signal processing, it is often necessary to process the original data with larger bandwidth, more channels and higher data rate. Based on the purpose of improving signal processing efficiency, the multi-core signal processor and high-speed multiprocessor interconnection technology should be further explored.

3.2 High speed digital signal processing chip

First of all, multi-core DSP chip will be discussed. Firstly, multi-core on chip is combined with DSP. Based on the use of bus, it can effectively integrate multiple DSPs. At the same time, with the application of resource replication, the signal processing ability can be improved. This technology is multi-core technology on chip. This structure is widely used in Ti and Freescale high-end DSP chips. Second is reconfigurable array structure DSP. This chip is mainly based on the SIMD design concept, which decomposes the input long data into multiple short data, and then applies the single instruction and completes the corresponding operation. This kind of chip can further improve the ability of processing data intensive computing[5]. Third is DSP of stream architecture. This chip is mainly used for data-driven mechanism. Instruction memory, path network and output components are the main contents of the architecture. In the specific application of this architecture, it can ensure that the highly parallel operation can be well implemented, and it has higher adaptability with modern VLSI technology.

Secondly, high performance FPGA chip. In the current society, the cost, performance and power consumption of the chip have been updated well. At the same time, it also promotes the parallel processing ability of the chip. This chip is very important for signal processing in the field of big data. Therefore, based on the 90nm integrated circuit technology, the design of the high-end FPGA platform for DSP application optimization has been realized, which effectively improves the DSP function and interconnection performance.

Finally, special ASIC chip. Because of the corresponding design purpose of ASIC, it can ensure that the processing of specific high-speed signal can be well realized. Compared with conventional integrated circuits, low power consumption, small size, high performance and reliability are the significant features of the chip. At the same time, the application of chips can effectively reduce the production cost[6]. Taking hardcopy series chips as an example, it fully integrates the advantages of FPGA design and ASIC mass production, so it can ensure that the conversion from FPGA to ASIC can be realized quickly.At the same time, in specific applications, it does not need high power consumption, and can also make the signal processing requirements can be fully met.

3.3 Development trend of high speed digital signal processing technology

In order to ensure that the status quo of this processing technology can be improved and the dilemma faced by signal processing technology can be effectively extricated, the bus frame of corresponding standard should be designed based on the development orientation of high-performance open standard. At the same time, the advanced high-speed multiprocessor interconnection technology is researched and developed, and the corresponding multi-core processor is designed. First of all, based on RapidIO core technology to develop higher performance embedded interconnection technology, and then simplify the flow control mechanism, effectively reduce the complexity of signal processing software, and promote the software operation convenience. At the same time, it ensures that the retransmission mechanism and protocol stack error correction can be well realized to form a variety of sensing membranes, and further expand the system functions, so as to effectively reduce the signal transmission delay and ensure the high-speed transmission of data packets[7]. Secondly, based on the application of multi-core DSP and multiprocessor, the parallel processing operation is carried out, and the problems of language Parallel restriction and serial processing constraint in technology application are solved one by one. Finally, based on the core mechanism of serial switching, the system is developed to ensure that the high-performance signal processing platform can be well constructed, promote the system efficiency and effectively reduce the system operation cost. At the same time, the application of hierarchical solution ensures that the signal processing requirements in different fields can be fully met[8].

4. Conclusion

The signal processing in the view of big data must be updated and optimized. This paper mainly analyzes the signal processing technology in the view of big data from three aspects, namely multi-sensor information fusion, high-speed digital signal processing, and intelligent sensor networking technology, hoping to provide reference for the signal processing of relevant personnel.

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