Research on the Application of Artificial Intelligence in Energy Science and Engineering Monitoring Software Engineering Technology under the Background of Big Data

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Abstract. Artificial intelligence belongs to the world's leading technology and technology, which can make people's work and life become more intelligent and faster. The arrival of the era of big data accelerates the development of artificial intelligence technology, and the artificial intelligence big data platform begins to appear. Through the analysis of the relationship between big data and artificial intelligence, the AI big data platform and its application are comprehensively discussed, aiming to promote the development of artificial intelligence big data platform and improve the overall level of domestic artificial intelligence. The smart grid is artificial. One of the important application areas of intelligence, the advancement and breakthrough of the new generation of artificial intelligence technology, which is mainly represented by advanced machine learning theory, big data and cloud computing, will promote the development of smart grid. Therefore, an energy science and engineering data monitoring software is needed to realize the monitoring and analysis and unified scheduling of energy science. The article details the design and implementation of data monitoring software for power and energy intelligence.

1. Introduction

The rapid development of cloud computing technology and Internet technology has promoted the emergence and development of big data technology. As an emerging technology, big data technology not only has lower cost in realizing local storage, but also has the advantages and capabilities to process large-scale data. It can also meet the functions of users to quickly retrieve data and classify different kinds of data information. The value of data information is more prominent, people become more in-depth and comprehensive in the use of data, and with the synchronous application of artificial intelligence technology, the big data technology has more intelligent advantages and characteristics, which promotes the development of human technology and Progress

2. Association between big data and artificial intelligence

The development of big data is inseparable from artificial intelligence, and artificial intelligence can be said to be the core of big data. This is also the use of artificial intelligence technology, so that big data technology is not only faster, more information processing, more intelligent, and has higher commercial value when processing information data. In the specific practical application, with the
application of this emerging technology [1], the traditional statistical methods and the way of obtaining and storing data information have been greatly innovated, and people can get the required information faster. This has improved efficiency and accuracy and made people's decision making more efficient. This advantage has also enabled this technology to be rapidly applied and developed in all walks of life. Artificial intelligence requires a large amount of information data in its use, and in turn, big data technology provides this condition. Big data technology provides massive data for the development of artificial intelligence. In the monitoring process of energy science, there is great application value [2].

Figure 1. The characteristics of big data and artificial intelligence technology

2.1. The development of big data technology and artificial intelligence technology
The primary feature of big data is that it has a large amount of data, which is usually beyond the data set of the processing power of conventional database software workers. The amount of data is more than 10TB. And has a significant 4V features, namely Volume, Variety, Value and Veracity. The most important value of big data in practical applications is that by mining this information data, some hidden data values can be obtained from it [3]. Mainly through the use of data mining technology to extract the information in the analytical data, to extract the required information, and to analyze the characteristics and trends of the data collection, to find out the application value of these data, to provide better support for industry work decisions [4].

Figure 2. The development of big data and artificial intelligence technology

The concept of artificial intelligence is very extensive artificial intelligence technology is the attempt to simulate the human brain principle with existing related technologies [5]. In order to make related technical behaviors more intelligent, and before the machine makes relevant behaviors, it is no longer just to perform the operation process entirely according to the existing procedures, But we make the machine have a "thinking" process according to the actual situation, thus autonomous. We
make the current best choices and implement the corresponding procedures to effectively improve production efficiency and reduce production risks [6].

2.2. Combination of big data technology and artificial intelligence technology
In specific applications, artificial intelligence also highlights memory characteristics. It can store these information in weights by storing memory information. When needed, it can extract these information features and make accurate analysis and judgment. To better monitor the energy and power industry, especially in the smart grid.

2.3. Improvement of big data and artificial intelligence technology
The overall design of the system In the era of big data, in order to effectively solve the monitoring problems faced by energy companies, it is very important to carry out more in-depth investigation and analysis on the existing security situational awareness system. After investigation, collation and analysis of massive data, After summarizing a series of processes, the overall design framework of the monitoring situational awareness system is finally summarized. The design concept of the model is to more effectively combine the internal domain security of the enterprise with the external Internet security data, and comprehensively conduct threat analysis and risk fatigue consolidation on the completed data content, and finally improve the monitoring during the business operation. Threatened by threats. At the same time, in order to better realize the functions of the overall design framework, it is necessary to conduct a more in-depth analysis and analysis of the system design components involved in the framework, so as to better monitor the perception of energy companies. Situational optimization plays a catalytic role.

3. Application of big data and artificial intelligence technology in monitoring situational awareness system

3.1. Application of data acquisition technology for engineering monitoring software
In the process of monitoring and management of energy science and power energy enterprises, the data content that the sensing system needs to collect mainly includes network traffic mirroring data, log data and supporting data. Specifically, when data acquisition technology is applied, because the energy science power enterprise has a relatively large operation scale, the corresponding data acquisition probe must have good fault tolerance and scalability to maximize the existing data collection capability. On the other hand, when the monitoring and sensing system processes the original mirrored traffic, it can analyze and restore the massive data by means of the multi-core parallelization processing scheme of the technology itself, and sort and analyze the restored results. Finally, the analysis will be analyzed. The results are uploaded to the enterprise big data platform in the form of a log report and saved.

3.2. Application of data monitoring technology for engineering monitoring software
In the research of this paper, the monitoring data processing technology used is based on the Stream framework. Therefore, during the application, the data preprocessing technology can classify and process different data according to the pre-defined data processing flow. This improves the accuracy of the various data divisions. The structure of the Stream framework is distributed, and it has strong support for horizontal expansion, and can optimize the disease processing capability of the data cluster by increasing the cluster nodes in a short time, and the framework comes with a fault tolerance mechanism. The operation of this mechanism can automatically contact some information transmission security problems with process exceptions, network exceptions, and machine device exceptions. When the disk cannot read the data to be processed, the Stream framework stores the data in different nodes' memory. Then, through the preset event processing topology, a temporary processing flow is built for the disk read and write problem. Ultimately meet the needs of corporate information.
3.3. Detection analysis and application of processing technology
After the normalization and pre-processing of various types of log data and network traffic data is completed, comprehensive deep-seated mining and correlation analysis for big data content is required, so that the enterprise information can be actively and quickly The existing security risks are identified. Specifically, they mainly include the following situations:

3.3.1. The application of artificial intelligence detection malicious code technology in the monitoring of situational awareness of energy enterprises. Based on the construction of artificial search engines, based on a large number of normal and malware samples, data mining techniques are used to find out the different information data characteristics of samples. Then, with the help of the construction of the machine learning model, a security scan of the unknown program is performed.

3.3.2. The application of artificial intelligence killing virus technology in energy enterprise monitoring situational awareness. In recent years, there have been more and more types of computer virus infections, and they are more superb in camouflage. At this time, in order to improve the perception of virus information, enterprises can adopt "output function offset" and "import function offset". Different virus location methods. At the same time, the method of "normal matching" and "fuzzy matching" can be used to optimize the existing virus feature search efficiency, thereby improving the accuracy of virus detection and killing, and let the monitoring software achieve an intelligent level and can be in the system. The virus performs certain killing functions.

4. Energy science power enterprise monitoring software to achieve working principle

4.1. Monitoring Software Variable Point Table System
The monitoring software system is an important part of the second development of ventilation and air conditioning monitoring system and its production affects the progress of software design. The variable is an important part of the point table. The upper computer, the lower computer, and the actuator all transmit information through the address of the variable. Designers often use manual method of entering variables when developing small systems, which is inefficient and error-prone. For the ventilation and air conditioning monitoring system, the configuration of the variable point table is used to introduce the configuration king, which can improve the design efficiency. When making a point table, you should pay attention to the following issues:

4.2. Monitoring software system point table naming and security settings
The naming and security setting rules of the point table, if there is a standardized template, the standardized final setting is used; if not, you can manually enter several variables in the configuration king, and then export the point table to edit other variables. The point table contains all the
information of the variable. Special characters cannot appear in the naming specification, otherwise
the import may not be successful. In terms of security settings, click "Tools", "Macro", "Security" in
the excel form, set the security level to low, and save. The monitoring software system IO points are
generally more than a few hundred, the designer usually divides the PLC into several sub-station
controls, generally a PLC sub-station makes a point table, for example: "PLC01 address table",
"PLC02 address table", "PLC03 address table" and so on. The PLC address table has strict format
requirements. The point table contains all the information of the variable. For example, PLC01
includes: serial number, interface terminal, variable name, description, type, address, and remark; HIS
includes: tag name, description, type, and connection address, connected devices, read and write
attributes, low limit, high limit, lower alarm limit, upper alarm limit, unit, alarm, proportional, alarm
type. Invalid numbers or symbols, such as spaces, slashes, etc., cannot appear in the cells of the table.
If you do not follow the format specified in the form, there may be an error in generating data or an
inability to generate an import point table.

4.3. Monitoring software system numerical information content
The digital quantity includes PLC01 including: serial number, interface terminal, variable name,
description, type, address, and remark; HIS includes: tag name, description, type, connection address,
connected device, read/write attribute, alarm, alarm type; analog quantity includes PLC01 includes:
serial number, interface terminal, variable name, description, type, address, and remark; the
information event type that does not make an alarm is "F", the alarm is "T", and the IO variable type is
"IO". If the set value is to be history, the alarm group is "Set", the event is generated as "yes",
otherwise it is "no", and the attribute of the value is "read-write". The alarm group for communication
failure is "System", the alarm group for equipment failure is "Fault", the alarm group for status change
is "State", and the alarm group for operation control is "Operate". The record type is divided into three
types: on and off. When it is on, the comment is filled with the corresponding value. When it is off, the
comment is filled with the corresponding value. When it is changed, the comment of the comment 0
should be written accordingly. The table name in the point table should be consistent with the
PLC address name and the connected device name. Before importing the data, configure the PLC and
other devices. Only when the configuration is successful, the communication can be established.

Figure 4. A new generation of big data industrial intelligent monitoring system

4.4. Monitoring software system alarm display
When developing monitoring software, it is often encountered that the monitoring software has no
alarm display. This problem should be returned to the initial development of Kingview. The
configuration king has the open mode and the running mode. The designer should enter the
development mode to find the alarm interface, double-click the alarm window configuration property
page, click the condition attribute, and check whether the "alarm group" is "alarm", and the priority of
the alarm is "1". ", "alarm" and "1" are the right choices. When an alarm occurs, the variable will
trigger an alarm to be displayed on the alarm interface. If the above settings are correct or there is no alarm display, check whether the alarm variable is in the "alarm" group, and the priority of the alarm variable is greater than the priority set by the alarm window. In Kingview, "1" is the highest alarm priority, and "999" is the lowest alarm priority. Therefore, care should be taken not to reverse the priority when setting the priority. If there is still no alarm display, you should check whether the variable setting is correct. The address of the variable is on the PLC and the point table. Only the variable name and address are paired, and the database will be triggered to display the alarm interface. The bit stream length calculation formula is as follows:

In the formula, databit represents the number of bits, counterbit represents the number of character count indicator digits, and inputdata represents the number of input data characters.

\[
R = \begin{cases} 
0 & \text{InputdataMODA} = 0 \\
0 & \text{InputdataMODB} = 1 \\
0 & \text{InputdataMODC} = 2 
\end{cases} \tag{1}
\]

The information collected by the acquisition system is sent to the intelligent monitoring system data under the big data for analysis, wherein the number of 0, 1, and 2 numbers is further comprehensively judged.

\[
y_i = \sum_{i} f(x) \ast R \tag{2}
\]

To solve the stability of \(f(x)\).

\[
L = \sum_{i} y_i \ast R_{\text{max}} \tag{3}
\]

We can find the best L understanding to verify the accuracy and stability of the combination of big data and artificial intelligence.

**5. Application of artificial intelligence in power monitoring software system**

The application of artificial intelligence in the power monitoring software monitoring and dispatching system is mainly manifested in the following two aspects:

**5.1. Monitoring software expert system application**

By collecting the existing expert knowledge and experience, the system builds a huge knowledge database with the help of information technology, and forms a complete control system based on certain rules, and uses the knowledge in artificial intelligence. Representation and knowledge reasoning technology to simulate the process of solving problems by experts in the professional field, and finally realize the effective solution of professional problems. In the composition of the expert system, one of the main core parts is the database system, which is also a problem that the expert system must solve in the power monitoring software monitoring and dispatching system. Since the content of the database is composed of expert knowledge, and the source of expert knowledge is more extensive, it is necessary to continuously improve the richness and hierarchy of expert knowledge, so that the value of the professional system can be further promoted.
5.2. Application of monitoring software visualization technology

Under the application of the technology, the data information can be displayed in the form of pictures, which effectively reduces the workload of the monitoring software monitoring and dispatching personnel, and has a positive impact on the efficiency of the monitoring and scheduling of the power monitoring software. By applying two-dimensional visualization and three-dimensional visualization technology, a more intuitive image of power information data is drawn, and complex data information is presented in the form of pictures, images, etc., thereby monitoring the software monitoring and dispatching personnel to understand relevant information in an intuitive manner. Find out the monitoring short board, and reasonably develop the targeted monitoring and scheduling strategy to improve the quality of power monitoring software monitoring and dispatching work.

6. Conclusion

Artificial intelligence has always been the world's cutting-edge technology. With the development of information technology, big data came into being, infiltrating big data thinking into artificial intelligence, expanding its storage space, enhancing its analysis and identification functions, and using cloud computing technology. Scientific and effective calculation of various types of data, improve the ability of artificial intelligence recognition, enable artificial intelligence to meet people's needs, and then realize the penetration value of big data thinking in artificial intelligence robots. With the popularization of artificial intelligence technology and big data technology, and strengthening energy engineering technology, we should pay attention to the application of big data and industrial intelligence technology, and actively apply big data technology and artificial intelligence technology to improve the quality and level of monitoring system work.

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