Research on Data Asset Management System of Graph Database Based on Internet of Things

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Abstract. With the development of the times and the progress of society, the popularization rate of computer network technology and information technology in China is accelerating, and the Internet of things technology also appears in people's vision, and is gradually known by people. In the context of this era of big data, it has brought great challenges to all walks of life. The development of everything must conform to the development theme of the times. In order to meet the challenge of the research and development of the data asset management system of the graph database in the new era, this paper puts forward the method of applying the Internet of things technology to the research and development of the data asset management system of the graph database. Combining with the foreign research and development plans of the data asset management system of the graph database, the data resources of the graph database are carried out from the platform system, the management structure and the organization arrangement. Based on the research and analysis of production management system, a research scheme of data asset management system of graph database which can meet the development requirements of the new era is worked out. Through long-term research and analysis, we can find that the Internet of things technology analysis method proposed in this paper can effectively provide new development ideas for the research and development of data asset management system based on graph database under the Internet of things technology.

Keywords: Computer Network, Information Technology, Internet of Things Technology, Data Asset Management

1. Introduction
The Internet of things (IOT) [1-3] technology has attracted extensive attention since its birth, and has been rapidly valued by various countries. Many developed countries even regard the development of Internet of things as a national strategic plan. With the advent of the information age, the Internet of things technology is rapidly introduced into the manufacturing industry, which provides a more powerful technical support for manufacturing informatization. Because our government attaches great importance to the active participation of Internet of things enterprises and groups, China's Internet
technology research and development and application industrialization level has been at the forefront of the whole world, and has fully grasped the whole world status and discourse power of China's mobile Internet in promoting the development of this strategic emerging industry based on the Internet of things and information technology.

Data is the basic strategic resource of the country, industry, industry and enterprise, and it is the "gold mine" with huge value. The state attaches great importance to the role of big data [4-6] in economic and social development, and emphasizes comprehensively promoting the development of big data and accelerating the construction of data power. This paper explores the social power and technical factors of digital origin and development from the strategic level, so as to actively explore and promote the construction layout of digital national grid. During the 13th Five Year Plan period, it is of great significance to identify data and carry out strategic core asset management improvement plan. It is of great significance to seize the development opportunities, promote the support and landing of big data in the pumped storage industry, improve the corporate governance ability, optimize the distribution of core resources, and promote the transformation, upgrading and innovative development of management. With the profound changes of internal and external environment, the company urgently needs to build data asset management [7-8] system to provide strong guarantee for management innovation and management reform of the company. In this paper, combined with the company's domestic and international situation and the company's development strategy, the data asset management system suitable for the company is planned.

This paper analyzes the research method of data asset management system based on graph database [9-10] under the technology of Internet of things. With the rapid development of the times, it brings great development challenges to all walks of life. In order to meet the challenges of the research and development of the data asset management system of graph database in the new era, this paper proposes to apply the Internet of things technology to the data asset management of graph database. The method of system research, combined with the research and development plan of data asset management system of graph database in foreign countries, this paper studies and analyzes the data asset management system of graph database from three aspects of platform system, management structure and organization arrangement, so as to formulate a research scheme of data asset management system of graph database which can meet the development requirements of the new era. Through long-term research and analysis, we can find that the Internet of things technology analysis method proposed in this paper can effectively provide new development ideas for the research and development of data asset management system based on graph database under the Internet of things technology.

2. Research Method of Data Asset Management System Based on Graph Database under Internet of Things Technology

2.1. Internet of Things Technology
The Internet of things refers to the information sensing equipment on the Internet platform with the help of information collection and receiving objects or activity process, so the information of various objects can be transferred to the network, so that they can realize real internal communication in the huge network. The real function of the Internet of things is to keep information exchange between things, between things and people, and between things and networks at any time, so as to identify and manage things under the network and effectively monitor the state of objects.

2.2. Research Method of Data Asset Management System Based on Graph Database
Batch normalization is to let the activated data pass through a network before training, and then preprocess the data to make it obey the standard Gaussian distribution. In this way, the change of node distribution in the deep network can be reduced, and the training speed of the deep neural network can be accelerated. The method of batch normalization is to calculate the mean value and variance of the input Mini batch data in each dimension, and the function is shown in formula (1):
\[
\frac{k^{(k)}}{x} = \frac{x^{(k)} - E[x^{(k)}]}{\sqrt{\text{Var}[x^{(k)}]}}
\]  

(1)

Since the variance in the denominator may be 0, a small constant \(\varepsilon\) is usually added to the denominator to prevent the numerical calculation from being unstable, as shown in formula (2):

\[
\frac{k^{(k)}}{x} = \frac{x^{(k)} - E[x^{(k)}]}{\sqrt{\text{Var}[x^{(k)]} + \varepsilon}}
\]  

(2)

After normalization, the data need to be mapped to the desired range of values, which can be achieved by equation (3).

\[
y^{(k)} = \gamma^k x^\varepsilon + \beta^{(k)}
\]  

(3)

3. Experimental Background and Design

3.1. Experimental Background

The data asset management standard system consists of two parts: the industry standard of asset data management and the standard of asset management. Among them, the data asset management industry standard defines the requirements and definitions of data management asset metadata and data coding, which is also the core and foundation of enterprise data asset management. The management standard determines the process, architecture, role and specification of data asset management to ensure the effective and standardized development of management. On the basis of data security storage and management, data sharing is provided to realize the goal of data value-added.

3.2. Experimental Design

The company's data asset management system design refers to the recognized standards at home and abroad. Abroad, including DMBOK, DCAM, DMM, etc., started early, the system is relatively perfect and mature; at home, it quickly followed up and issued standards, including DCMM and practice white paper. They all start with functional activity planning and describe comprehensively "what to manage" and "how to manage" data assets. According to different application fields, emphases and scopes, the division of functional activities is slightly different. The advantages and disadvantages of domestic and foreign theoretical systems are shown in Table 1.

| Theories at home and abroad | advantage | Insufficient |
|----------------------------|-----------|--------------|
| DMBOK                      | The management and control field is comprehensive and covers a wide range | Comprehensive enterprise level data governance, landing, high difficulty |
| DCAM                      | He has rich experience in data management best practices and is an advocate and leader in the industry | There is very little emphasis on data standards |
| DMM                       | Guide companies to use key data assets to achieve business goals | Combined with the reality of domestic data development is less |
| DCMM                      | National standard, high versatility | Combined with the actual situation of the enterprise, the effect of improvement is not obvious |
| White paper on data asset management practices | There are plenty of practical cases, which can be used for reference | Emphasis on industry practice case study and risk, theoretical guidance is slightly weak |
4. Discussion

4.1. Research Status of Data Asset Management System of Graph Database Based on Internet of Things

From a global perspective, since 2015, the global big data market structure has gradually transited to a complete competition pattern, and the monopoly competition pattern no longer exists. Open source technology reduces the threshold for enterprises to enter the field of big data. With the continuous emergence of enterprises in various market segments, the degree of differentiation of products and services provided by enterprises is gradually increasing according to the characteristics of different industries and the personalized needs of users. Various application scenarios emerge in endlessly, both Internet enterprises and traditional IT manufacturers have joined the wave of big data gold mining, and the big data market competition is increasingly fierce. The market structure of China's domestic big data segmentation field in 2019 is investigated. The survey results are shown in Figure 1:

![Figure 1. Market structure of domestic big data segmentation](image)

As shown in Figure 1, according to the survey data of China Industrial and Commercial Research Institute, in 2019, the main market share of domestic big data segmentation market is hardware level market, accounting for nearly half of the overall market with 46.8%. Technology market and application market ranked second and third with 21.2% and 12% respectively. It can be seen that there are less data mining solutions and services in the front-end industry, while the main solutions for data mining and services in the front-end and back-end industries are not much more than those in China's data collection and service industries.

Many enterprises realize the value of data assets and begin to pay attention to the security of data assets. Their approach is often the same as that of protecting inherent assets, adding layers of "chains" to the data to prevent others from using it and believing that the data is safe. However, data assets have their own particularity. Even if the data is not moved, its intrinsic value will not be stolen. Data asset is a special form of asset; its value is mainly reflected in the information itself. If it is randomly accessed or tampered with, the value of information will be greatly reduced. With the emergence of big data,
information security, data leakage and other issues occur frequently. In the protection of information security, it is very important to find out the source of threat. According to the investigation and Research on the data leakage of China in 2019, the survey results are shown in Figure 2, where I represents desktop computer, II represents database, III represents payment card, IV represents cashier, V represents file, VI represents application, VII represents notebook computer, and VIII represents others.

![Graph showing data leakage investigation in 2019](image)

**Figure 2.** Statistical chart of data leakage investigation in 2019

As shown in Figure 2, the top three causes of data leakage are desktop computer, database and payment card, accounting for 21%, 19% and 14% respectively. According to the survey report, 19% of the information is leaked due to database reasons. In fact, there are many information leaks that are either under investigation cannot be confirmed or cannot be disclosed. In the final analysis, data asset management also needs to pay attention to security issues, protect the data assets of package enterprises in the increasingly complex environment, avoid the economic losses caused by data leakage, and create good conditions for the correct use of data assets.

4.2. *Suggestions on the Research and Development of Data Asset Management System Based on Graph Database under the Technology of Internet of Things*

Data assets are resources that can be used by different users. Like tangible assets and intangible assets, data assets are first of all a kind of resource, which can create value through reasonable use. But different from the first two types of assets, the application scope of data assets is wider, not only limited to a certain specialty within the enterprise, but also not limited to the enterprise itself. Enterprises can generate revenue by leasing and selling their own data assets. At present, some telecom operators sell user behavior data (excluding personal privacy information such as name and address) to Internet precision advertising service companies, while Internet precision advertising service companies realize accurate advertising delivery by mining and analyzing these data.

The acquisition cost of data assets is difficult to determine and measure, and it is also affected by technical differences, rapid change speed, large volume, numerous analysis dimensions and
uncertainty, which makes it difficult for traditional value analysis methods to objectively reflect the value of data assets. Through deep learning technology, we can avoid the strong subjectivity of evaluation results due to different industries, positions and personal subjective understanding of evaluation subjects in the process of manually determining evaluation indicators. Based on the characteristics of data assets, deep learning technology can objectively and accurately reflect the value of data assets from the dimensions of type, complexity, relevance, application scope and scale.

Traditional methods need to extract indicators manually, but due to the large scale of data assets and heavy workload, manual processing is difficult. The model based on deep learning is more suitable for processing massive raw data. With the continuous improvement of computing power, it can also analyze the value of data assets more quickly.

Asset management is one of the more complex tasks of various schools. It's not only manageable, but also manageable. However, due to the large scale of the school and the rapid change of personnel, the receiver and location of assets change very frequently. In addition, with the increase in asset purchases, the relative number of retirements is also increasing. How to manage and manage such a huge asset is a problem that asset management system will continue to study in the future. The development of information technology has greatly improved the passive situation of single machine management and asset management, allowing more people to participate in the management, so that the assets of the state-owned assets management office, financial department and various departments can ensure the consistency of accounts and affairs, and the change of assets can be implemented to people. Through asset information sharing, avoid repeated purchase and lease, so as to improve the efficiency of asset use.

According to the data standards, data quality and safety of functional requirements, the company can solve the nodes and links of the company's key business data generation, and finally form a data standard and data control system that conforms to the company's characteristics and meets the company's data management needs, so as to provide a standardized data management process for the company and solve the problems existing in the company's data management. Improve the company's data management level, improve the quality and value of data, provide strong guarantee for the company's management innovation and management reform, lay a solid foundation for the internal and external operation of big data, and expand and upgrade the traditional data management.

5. Conclusions
This paper mainly introduces the research of data asset management system based on graph database under the technology of Internet of things. In this era of big data, the development of all walks of life has been greatly impacted. In order to meet the challenge of the research and development of the data asset management system of the graph database in the new era, this paper puts forward the method of applying the Internet of things technology to the research and development of the data asset management system of the graph database. Combining with the foreign research and development plans of the data asset management system of the graph database, the data resources of the graph database are carried out from the platform system, the management structure and the organization arrangement. Based on the research and analysis of production management system, a research scheme of data asset management system of graph database which can meet the development requirements of the new era is worked out.

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