Research on University Information Management in the Era of Big Data

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Abstract. As more and more industries begin to apply big data technology, we begin to see big data frequently in our lives. McKinsey said: "data has penetrated into every industry and business function field, and become an important production factor." This paper mainly describes the current situation and some possible problems of university information management in the era of big data, and puts forward corresponding solutions. I hope that the university can make better use of big data technology in information management in the wave of rapid development of big data.

1. Research Background and Significance

Now it has entered the era of big data. With the electronic information management of all walks of life, big data technology should be applied to information management faster and better. The emergence of big data platform will lead to large-scale differentiation of data center, and infrastructure experts must deal with endless new challenges. In other words, big data will be massive fragmented data for a series of operations and analysis, to extract valuable information for the enterprise. In the information age, which is strongly impacted by big data, enterprises should also transform as soon as possible according to their needs.

The most important strategic significance of big data is to process all meaningful data. In the era of big data, the future development of information technology in schools focuses on how to achieve great value in the face of schools, enrollment, employment, education, management, etc., inherit and integrate data and management data, and use big data mining, sorting, analysis, to provide support for school development decisions.

Big data technology is conducive to the development of professional training direction in Colleges and universities. Domestic colleges and universities can establish big data major or direction to help future students better employment. Based on the application of data mining intelligent algorithm in teaching quality evaluation, finding out the internal relationship from various data can provide decision-making support information for teaching departments, provide accurate feedback information for teachers, better carry out work teaching and improve teaching quality.

We need to accept the fact that everyone has entered the era of big data from the Internet era. All the data is growing rapidly and getting bigger. Big data has brought infinite convenience to human beings, but also brought new huge challenges to human beings. How to effectively, reasonably and successfully control big data, challenges are always accompanied by surprises.

2. Big Data Related Concepts

2.1. Concept and Characteristics of Big Data

Search Baidu Encyclopedia, big data refers to the inability to use conventional software tools to capture, manage and process data within a certain period of time, which requires a new processing mode.
It has stronger decision-making ability, insight discovery and process optimization ability to adapt to the
growth and diversification of a large number of high-speed information assets.

Big data has the following four V characteristics: first, scale. The so-called scale means that the data
volume of big data is huge and it is not easy to process. Unlike ordinary data information, which is
processed in MB, big data can usually reach TB or even ZB level. The second is diversity. There are
hundreds of kinds of big data, including a small part of structured data and most of semi-structured or
even unstructured data. Then there's efficiency. In terms of data processing speed, big data follows the
"one second law", focusing on analyzing effective information in diverse and complex data. Finally,
value. It is difficult to extract effective value from big data, because the value of big data is too scattered.
It takes hours to extract two or three minutes of valuable content from a video.

2.2. Analysis Method of Big Data

Index comparative analysis. Index comparative analysis method is used to reflect the changes and
differences of things in quantity, which is obtained by comparing the relevant data indicators. This
analysis method is also called comparative analysis method, which is one of the most commonly used
analysis methods.

Group analysis. Group analysis is a statistical analysis according to objective requirements. The whole
study is divided into several parts according to one or more marks, which are sorted, observed, analyzed
and revealed the inherent relationship between them. The key problem of group analysis method is to
select the group standard value and the boundary of each partition correctly.

Time series and dynamic analysis. Time series refers to a series of values that change and develop at
the same time in time, forming a time series, also known as dynamic series. Time series can reflect the
development and change of social economy. Through the compilation and analysis of time series, we can
find out the law of dynamic change and provide the basis for predicting the future development trend.

Index analysis. Index analysis is a factor analysis method. The specific operation method is to observe
the influence of change on the total change of index system under the condition of other factors.

3. Analysis on the Information Management of Colleges and Universities in the Era of Big Data

3.1. Current Situation of Information Management in Colleges and Universities

The information system does not have the overall unified planning and lacks the analysis and decision
support function. This is mainly because each department of the school runs an independent information
system. This also causes different departments to make the stored information redundant and complex
due to environmental reasons, and can not realize the information sharing of the whole school
information management system, which also causes the phenomenon of information island.

At present, the big problem of university data is the low quality and quantity of data. In many colleges
and universities, the use of data analysis is still in the primary stage, and it is difficult to explore the value
of data, which is also reflected in the system construction and the use of data is not accurate, and the
quality problems are inconsistent. The common data table and use data explain that the context, statistical
indicators and statistical definitions are not clear, and the information is more garbage phenomenon.

The phenomenon of students' information stolen often occurs in Colleges and universities, and
occasionally someone intrudes into the school's performance management system to modify the
performance. These phenomena are all because the security system of school information system is not
perfect. In order to prevent such incidents from happening again, we should strengthen the safety factor of
the information system, and use big data technology to effectively improve the safety factor of the
information system, so that everyone can be more assured of the school's information system.
3.2. Problems in Information Management of Colleges and Universities in the Era of Big Data

3.2.1. Storage and Management of Big Data in Colleges and Universities

The phenomenon of information island will appear in the school's information management system. There is a lack of information exchange and sharing among all functional departments of the school, and the administrators are mainly responsible for the lack of communication. As soon as the phenomenon of information island appears, it means that the school information management system has the phenomenon of redundant information, more garbage information, unable to complete information exchange and so on.

With the rapid development of information technology, the amount of data generated in the information world is growing rapidly. Although the development of hardware is changing with each passing day, it is still out of its power to store big data. How to design the most reasonable hierarchical storage architecture to effectively store big data has become one of the challenges in information management.

3.2.2. Lack of Big Data Professionals

At present, there is not only a lack of professional big data talents in university information management, but also in all walks of life. McKinsey released a detailed report, which said: it is expected that by 2018, the demand for data related staff in the big data industry will reach a high number, including 140000 to 190000 big data scientists. The demand for big data analysts who understand big data related work, answer data analysis and management personnel related to big data will be as large as 1.5 million.

Big data learning has a high starting point, great difficulty and is not easy to learn. It is difficult for people who have not systematically studied big data to do well in the related work of big data. A data analyst with 3 to 5 years of working experience will be quite popular, and his annual salary will reach 500000 yuan. However, it is very difficult to recruit more than 3 years of experienced data talents in the market.

4. Solutions to the Problems of University Information Management System in the Era of Big Data

4.1. Storage Management of Big Data in Colleges and Universities

Large data storage problem is a persistent problem in every industry related to big data. University information management is inevitable, how to solve this problem, university information management big data more smoothly, this is what we must do.

The storage of big data is to collect data of different structures through preprocessing, improve data quality, store data and establish appropriate database for management. The existing data storage technology is only for some type of data storage, which has certain limitations. It is difficult to deal with the data with complex data types, usually structured, semi-structured and unstructured data. The requirement of big data for storage is that all types of data can be stored at the same time. In this way, cloud storage is the most appropriate choice for big data storage.

Cloud storage is a conceptual extension derived from cloud computing. Cloud computing is a kind of distributed processing, parallel processing and parallel computing development. Through the network, huge computing programs are automatically decomposed into many smaller subprograms. Through the calculation and analysis of processing results, a huge system of user payment is composed of multiple servers. Through cloud computing, web service providers can process thousands or even billions of messages in a few seconds, realizing the same powerful network services as supercomputers.

In the face of the phenomenon of "information island" among all departments in Colleges and universities, it is necessary to establish a unified data sharing platform in the university information management system. Data storage and information coding should use unified standards for all
departments. Information managers can integrate various information data into the shared data center through the data sharing platform. This is the basic requirement to realize information sharing, to solve the problem of information island in Colleges and universities, to complete data sharing, data conversion, data migration and data replication.

4.2. Training Big Data Professionals

Ji Hong, Dean of the Institute of data and statistics, Capital University of economics and trade, believes that in the face of the current scarcity of big data talents, we should let the best enterprises, governments, industries and academics join hands to achieve innovation. Knowledge, experience and ability can be spread more in a more professional way so that China's big data business can be more brilliant. Big data industry needs highly qualified personnel, who are proficient in book order, data analysis, statistics, machine learning and other aspects of comprehensive talents. But at present, there are very few universities and other training institutions specialized in training big data talents.

In my opinion, each school should set up big data related majors according to its own situation. In this way, big data talents can be attracted to work in the University and more big data talents can be cultivated. In the face of the lack of big data talents in a few years, the employment problem of graduates can also be solved, and the employment rate of the school will rise to a higher level. With Beijing University of Aeronautics and Astronautics as a representative, there are many universities in China that have opened big data related majors. Beijing University of Aeronautics and Astronautics is the first university in China to set up big data related majors. Master of software engineering in "big data science and application".

The government and universities can effectively solve this problem by strengthening cooperation in scientific research, training and personnel training. This measure fills in the gap of domestic data analysis, training and certification departments, and will provide standards for large-scale data practitioners in China, which should be supported by the government, enterprises and all sectors of society.

4.3. Strengthening Information Security in Colleges and Universities

Tag data. Large amounts of data directly lead to lower density values. Filtering out valuable data from massive data can not only ensure the security, but also realize the rapid operation of big data. Data can be filtered by using data classification and identification method.

Set user permissions. The distributed system architecture can set user access rights, which is suitable for applications with large data sets. Firstly, users are divided and given different access rights for different users. Set different access permissions for each user group, and then set specific permissions for specific users in each user group to achieve a finer division, and do not allow any user to exceed the maximum permissions set for them.

Enhanced encryption system. In order to ensure the security of big data transmission, it is necessary to encrypt the data. Both encrypted data and downloaded data must pass the data stream uploaded by the encryption system, and be decrypted by the corresponding decryption system. Therefore, it is necessary to set up a unified file encryption/decryption system for clients and servers to process data. At the same time, decryption and encrypted data should be kept separately, which can enhance security. Referring to the function of shadow file in Linux system, the separation of password information and account information is realized. The password field in the account information base is only marked with an X, and password information is no longer stored.

Identify potential data connections. The information security of big data pays more attention to the security technology than the protection of data itself. At present, there are data security measures, and these technical big data can also be used, but need to be verified. Big data has different characteristics from other general data, which requires some improvements to the existing technology to adapt to these characteristics of big data. However, there is no obvious correlation between big data. It is difficult to find the potential correlation between these data.
5. Summary and Prospect

China's big data industry starts from scratch, with the rapid development of national data, the industry application has been rapidly improved, and the market growth is obvious. China initially developed from Internet company and traditional IT manufacturer to large data company. The world is constantly developing and the society is constantly improving. If we are backward, we will be beaten. Only by mastering advanced technology and constantly innovating and developing can we stand in an invincible position and stand proudly in the forest of the world. In the era of vigorous development of big data technology, of course, we cannot lag behind. Therefore, the study of university information management in the era of big data is a very meaningful and necessary research direction.

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