Construction of Sharing Mode based on VR Technology under the Background of Big Data

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ABSTRACT
With the continuous improvement of information technology, readers' demand for information has also changed fundamentally. The function of the library as an information document center has also changed from "collection" to "use", and colleges and universities are gradually developing to the campus cultural information center. The application of various network technologies and vr virtual technology in university services has greatly improved the utilization efficiency of library information resources. This paper studies the construction of VR technology sharing mode based on big data. This paper puts forward some opinions on the construction of information service mode of University Library Based on VR technology.
Keywords: *big data; Information services; VR technology; Sharing mode*

1 INTRODUCTION

With the application of mobile electronic terminals such as iPad in all aspects of life, every innovation in the information field will bring changes in behavior patterns to people's life and work. The library, as the cultural information center of colleges and universities, is particularly obvious to these changes. Now the Internet-based Library 2.0 has effectively integrated and retrieved the text, pictures, sound, video and other information materials needed by readers, but there are still great differences between the traditional information service mode of two-dimensional space and the information acquisition environment expected by readers. Virtual reality technology is the mainstream mode nowadays. The term virtual reality (VR, the same below) technology was put forward by Jaron Lanier, founder of American VPL company in the early 1980s, also known as spiritual technology or artificial environment. It is a computer technology developed on the basis of the cross integration of computer graphics, computer simulation, sensing technology, display technology and other disciplines.

In recent years, more and more web technologies have been applied to library information services, such as RSS, blog, Wiki, SNS and so on. The service concept of university library has gradually changed from the storage of information to the utilization and service of information knowledge. With the application of VR technology in various fields of life to varying degrees. It reflects the improvement of VR technology in urban planning, exhibition display, digital hotel, museum, art museum and other scene browsing, and has more applications and improvements in information interaction and information retrieval. Although only the National Library of China has tried VR technology in the application of library, it still provides valuable experience for China to establish a virtual 3D Library in VR technology. This paper consists of the following parts. The first part introduces the relevant background and significance of this paper, the second part is the related work of this paper, and the third part is advantages and technical difficulties of virtual 3D Library. The fourth part is construction of sharing mode based on VR technology under the background of big data. The fifth part is conclusion.

2 RELATED WORK

In this paper, we aim to construction of sharing mode based on vr technology under the background of big data.

Ma r proposed big data and vr technology in university sports stadium training[1]. Vatsa v r proposed computational social science in the age of big data[2]. Qiu x proposed analysis and research on modern education technology under "internet+" and big data technology environment[3]. Sun y , et al. proposed research on computer data encryption technology under the background of big data era[4]. Ullah f et al. proposed barriers to the digitalisation and innovation of australian smart real estate: a managerial perspective on the technology non-adoption[5]. Meshram s et al. proposed conversational ai: chatbots[6]. Li g proposed web crawler technology under the background of big data[7]. Dong y proposed research on business administration information under the background of big data technology[8]. Han j et al. proposed blockchain technology in inclusive finance under the background of big data[9]. Stamatiadou m e et al. proposed semantic crowdsourcing of soundscapes heritage: a mojo model for data-driven storytelling[10].

2.1 Scientific concept of virtual reality technology

For some time, the narrow definition of virtual reality: VR technology is an advanced way of human-computer interaction. It is based on natural man-machine interface to feel the virtual world generated by computer. Some people also call it virtual environment, cyber space, spirit mirror technology, panoramic technology, etc.

The broad definition: it is a technology that uses computers to simulate the real world to form a simulated three-dimensional environment. It is a way to process and process various complex information, carry out visual operation, and interact with it through computers. Virtual reality is a simulation of the real world. On the one hand, it can realistically describe the real environment; On the other hand, it can enable people to observe the virtual environment as if they were immersive and interact with it. Therefore, it can fully simulate people's feelings and thinking, record people's tacit knowledge, and transfer these tacit knowledge to others.

2.2 General development path of virtual reality technology

The United States is the birthplace of VR technology, and the research level basically represents the development level of international VR technology. Today's research in this field mainly focuses on perception, user meeting, background software and hardware. The leading Ames Laboratory of NASA has studied a lot of real-time simulation of Johnson Space Station manipulation, used a lot of cockpit simulation technology, and formed a one-stop VR training system. VR technology in China started late, and only a few universities and technical institutions have been exploring deeply, which is far from developed countries in Europe and America.

For example, the computer department of Beijing University of Aeronautics and Astronautics has developed the representation and processing of physical features of objects in virtual environment, and realized the network design of distributed virtual environment. CAD & CG of Zhejiang University has developed a real-time roaming system for front virtual building environment, which includes a new fast roaming algorithm and grid progressive fast generation method. All these high technologies are the technical guarantee for the application of VR technology to knowledge management.

2.3 Highlights of virtual reality technology

In virtual reality, people's leading role is emphasized. VR technology not only realizes the transformation from "computer as the main body" to "human as the main body", but also realizes the transformation from "computerized single-dimensional information space" to "humanized multi-dimensional information space". In the traditional one-dimensional information space, the tool or environment of information processing is computer. People connect with the computer through keyboard, two-dimensional mouse and display screen. Human past experience is stored in the database in digital form.

Purely from the perspective of computer, VR technology is different from the previous visual operation interface and graphical user interface, but provides users with intuitive, clear and convenient real-time interaction methods such as audition, contact and operation control in a more advanced man-machine interface mode. It has three main characteristics: immersion, interaction and conception, in which immersion is the feeling, interaction is the means and conception is the goal.

2.4 *Application of virtual reality technology in knowledge management*

There is a process for the dissemination, transfer and scientific management of knowledge, that is, the famous SECI knowledge transformation model. Japanese business scientist Yujiro Nonaka believes that the transformation of explicit and tacit knowledge has four states: socialization, externalization, combination and internalization. (see Figure 1) the diagram is: socialization → externalization → combination → implicit. Each cycle rise is an innovation and progress.

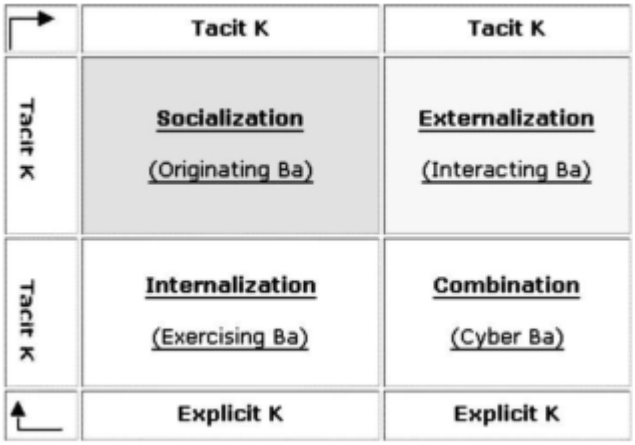

Figure 1 S-E-C-I model diagram

3 ADVANTAGES AND TECHNICAL DIFFICULTIES OF VIRTUAL 3D LIBRARY

3.1 *Advantages of virtual 3D Library*

(1) Open and innovative environment
In the environment of 3D digital virtual library, any user can log in and use as long as he downloads the client and registers his account, regardless of his major, whether he graduated from school or not, and regardless of the identity of teachers and students. After login, as long as each user has his own virtual character, he can match the clothing shape according to his own wishes. In the 3D virtual environment, you can not only complete all the actions in real life, but also carry out various actions that cannot be completed in real life: such as jumping upstairs, blinking to any place in the 3D library, flying and browsing around the library. You can also design all kinds of tables, chairs and things according to the needs of users. In this environment created by VR technology, there are only things you can't think of, nothing you can't do. Therefore, the only binding force in the virtual digital 3D library is the user's creativity.
(2) Not limited by time and region
General libraries have some control over physical space and development time. With the development of computer technology and network technology, this will greatly restrict readers' ability to obtain information. Then this 24-hour uninterrupted 3D library can well solve this problem. 3D digital library will design certain scenes and tools, but it also opens up a virtual space that can be applied for. Several people can apply for a learning space at will, and can grab the relevant information resources of the library at will in this separate space. If a teacher organizes students to carry out a subject research, the teacher can apply for a research room. In this virtual research room, the information resources prepared for students can be stored, and then the participating students can prepare the materials they find, and finally compare all resources. They can log in at any time and have a meeting and exchange, This breaks the distance between time and space and completes the utilization of information resources more efficiently.
(3) Powerful interaction function
3D virtual digital library is actually the network representation of the real world. Therefore, when we design readers to participate in 3D library, we will give corresponding tasks, points and grades. Users can carry out a variety of interactive activities. It can also organize various societies and study groups to establish their own interactive circles of interests and hobbies through these activities. Teachers can use this platform to build their learning research group, students can use this platform to build their interest teams, including companies, can use this platform to build their talent selection platform, and schools can use this platform to build student talent selection platform. Even some experiments, lectures, speeches and competitions can be designed to enrich the use of information. As long as we have enough imagination, 3D digital library can use information resources to make trusted information interaction.

3.2 *Technical difficulty of virtual 3D Library*

(1) There are high requirements for the hardware and software requirements and network bandwidth of the

server and client. As the 3D virtual digital library is a huge network system, it has high requirements for the hardware and network bandwidth of the server and client computers, such as the supported operating system; There will also be some restrictions on the network connection mode. Because 3D library has high requirements for client memory and video memory in picture processing and picture rendering, if it can not be achieved, it will greatly affect the user experience. Moreover, with the increase of access users, the expansion of concurrency will also cause a certain pressure on the load of the server. Therefore, the early investment in 3D virtual digital library will be higher than that in traditional digital library.

(2) It takes a lot of readers' time and energy

The use of any system has a process of user experience learning, and the 3D virtual environment will be easier to use than other digital systems in appearance. However, most users need a lot of time to learn various skills and interaction methods when they first enter the virtual world, and readers will invest a lot of time in this open creative environment. When the utilization rate is high, users can participate in a large number of activities and interaction, which will occupy more time and energy, and the competition will bring users grades and points, There will be more participation. The higher the dependence on 3D library, the easier it will be for users to fall into it, which is a harm to some people with poor self-control. Therefore, users must reasonably and effectively allocate their time in 3D virtual world and improve their self-control ability.

(3) It is difficult to control network information

As a new information and cultural exchange center, once users enter the 3D digital library, they have a free and completely open interactive space. Some users may take the 3D library as a place to escape the real world and vent their negative emotions in the virtual world, That will lead to all kinds of bad negative information on the interactive platform of 3D library. Even if authentication means such as real name system are adopted, such negative emotions can not be avoided. Therefore, it will be difficult to master network information. At the same time, it can be seen that 3D library is an open platform, and there is no need to be nervous about things with negative emotions, There will be more positive user ideas, and such information will be corrected in this platform. Only the development thinking can have open results.

4 CONSTRUCTION OF SHARING MODE BASED ON VR TECHNOLOGY UNDER THE BACKGROUND OF BIG DATA

The platform architecture of sharing mode based on VR technology under the background of big data is shown in Figure 2.

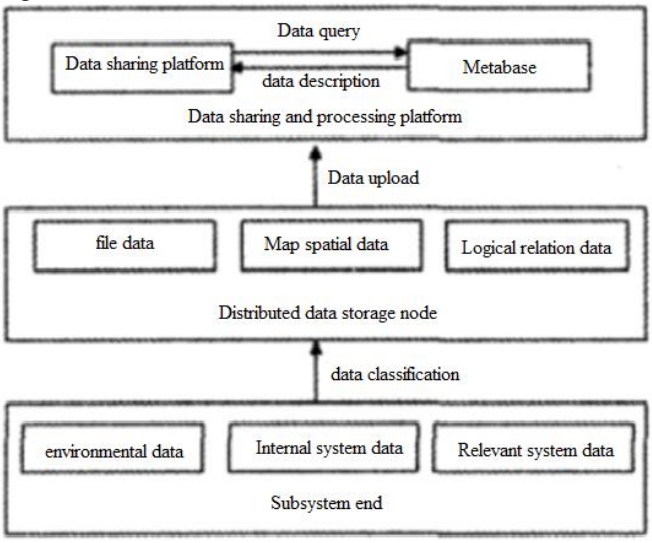

Figure 2 Architecture diagram of data sharing platform

4.1 System architecture design

According to the characteristics of distributed and heterogeneous data in water conservancy industry, the data sharing platform adopts B / S three-tier structure to concentrate the core functions of the system on the server to the greatest extent, so as to simplify the development and maintenance of the platform. The overall structure design of the system is shown in Figure 1. Among them, the data sharing platform provides the interface between users and the system. Users can query, browse and download data according to their needs through the platform. Metabase is mainly responsible for adding information description to all heterogeneous data. It is not only a bridge for users to obtain data, but also an interface for the platform to access data. In the distributed data storage node, the data uploaded by each subsystem is divided into three different types and stored in three different servers. Such as document data such as files and pictures, map information and spatial data provided by ArcGIS Server, other files and relational data, etc. The system can directly access the corresponding server according to the

file type, which improves the processing ability of the system in the case of concurrent access to massive data. The platform has a clear structure and clear division of labor among functions, which can effectively realize the distributed storage and centralized management of system data, and provide technical support for data sharing.

4.2 Metabase design

Metabase is the core of data sharing platform and the key to realize distributed heterogeneous data sharing. Metadata adds information description to heterogeneous data to facilitate users to access relevant data. How to accurately describe the data is the focus of metabase design. Therefore, the meta database design of this platform includes metadata identification, data user information, data description information, person in charge information, data type information, maintenance information and other subset information. Metadata identifier is the unique identifier of metadata in the database, which ensures the uniqueness of data. Data user information mainly includes the metadata Collector's name, company, contact information, collection date, etc. Data description includes data type, data description, industry, recording system time, data resource content, etc. it is the main information part of database design. The person in charge information includes the basic information of the object resource owner and the permission of data resource access. Data type information includes data type, file format, resource size and other information. Maintenance information includes maintenance reasons, maintenance time, maintenance contents, etc. of data resources. Thus, it ensures the correct description and data sharing of massive heterogeneous data in many aspects.

4.3 Function and module design

According to the demand analysis, technical characteristics and system architecture design of the data sharing platform, the overall functional modules of the system can be divided into user management module, shared data query module, data online preview module, data download module, data management module and other functional modules. Among them, user management mainly includes user registration, authority allocation, password management, etc. The shared data query module can provide corresponding data query services according to the needs of users. The online preview function of shared data is provided according to the query results, so that users can obtain more data information. The data download module can provide file data download services. The data management module mainly provides data recording, data description modification, data update and other functions for data managers.

5 CONCLUSION

Virtual reality technology is a developing three-dimensional simulation technology. It reproduces or restores scenes in different fields through computer hardware, software and imaging functions, which can be historical reproduction, human structure or memory or experience hidden in the human brain. This is completely in line with the characteristics that human tacit knowledge is difficult to encode. According to the specific virtual reality system, we can accurately reconstruct the hidden knowledge and landscape, and will be able to effectively record and manage knowledge. In today's global village, it is necessary to systematically build and maintain the virtual knowledge community. In the virtual knowledge community, learning, training, charging and drilling... This will be a new progress in knowledge management.

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