Personalized Service for University Library Users Based on Data Tracking

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Abstract

This paper discusses the personalized service processing methods of university libraries, and proposes implementation methods, demand analysis and personalized service forms for university libraries based on data tracking technology. This paper uses big data behavior tracking and other technologies to analyze and track the user behavior information of user groups in Chinese university libraries through the Internet, find the points of interest to users, and then make point-to-point service recommendation. Through the investigation and analysis of a large number of library user demand data, personalized services are provided from the aspects of library personalized reading, book classification recommendation, personalized book evaluation technology design, etc. The construction of the reading service platform plays a positive role in demonstration and guidance.

Keywords

Personalized Service, University Library, Data Tracking

1. Introduction

Due to the prosperous development of library undertakings in recent years, the previous search methods have been difficult to meet people's increasing service needs. With the emergence of digital libraries, personalized services have entered a new era. The premise of personalized service is to understand the needs of users so as to directly perform positioning services. On the one hand, it is an era of information explosion and information is difficult to distinguish between true and false. A lot of useless information will interfere with our sight and waste a lot of time, so it is very necessary for the library to do accurate positioning to understand our needs, so as to provide users directly precise service. On the other hand, we can apply the concept of big data here. Big data tracking technology

has been widely used in the service industry, such as information recommendation, data acquisition, etc. The application of big data technology to libraries will also bring convenience. Through the integrated analysis and classification of users' search behavior in the past month, the technology obtains the user's recent demand habits. Through big data technology, it can be traced back to the user's browsing process and browsing content, and based on this, its potential needs can be found, and service requests can be provided in time so that users can get the information they want as soon as possible, so as to improve their use experience and improve the library's experience and usage efficiency.

2. Research Background and Research Significance

2.1. Research Background

The library system is the first major place for users to obtain information and data of collections online, and it provides a convenient, fast and safe information channel for network users to access the Internet (Zhan & Zhou, 2012). In order to effectively improve the overall performance of the network library information and service application system, related technology research scholars have gradually shifted the focus of their research content from the application and development of literature resources to user behavior research. With the rapid and continuous development of library undertakings in various colleges and universities, the initial establishment of the digital network resource library and the improvement of the basic hardware facilities of the website, the user groups have become more and more frequent in the retrieval and use of various library information resources. And more and more tend to retrieve the relevant information resources of digital and networked libraries; the website of university library has undoubtedly developed into the first quick window for many users to obtain information and materials on the Internet. However, in the face of the vast ocean of information, it is difficult for library users to find what they really need (Li et al., 2002). The user's subjective judgment will inevitably become the reason why the search engine cannot accurately feed back the information it needs. Therefore, it is urgent to analyze the user's needs and then make accurate recommendations, so that the computer can analyze the user's specific needs according to the user's information behavior in advance. Make precise service recommendations to improve search accuracy. Personalized information service means that users of the information system can set the source method, expression form, specific online function and other online service methods of online information in a specific network function and service mode according to their own purposes and needs. In order to achieve the purpose of obtaining the online information service content you need most quickly, it emphasizes "user-centered" to meet the needs of users as much as possible (Zhang, 2009). Personalized service is the basic feature of the modern information society, only by adapting to the different needs of different groups; it is possible to show outstanding vitality in the tide of competition (Huang, 2020).

Personalized services must recommend services of interest to users, so how to push them accurately has become an inescapable topic. We need to collect the demand information of users without their perception, and then carry out data analysis. Therefore, the network-based user tracking technology emerges, and has achieved some development achievements and is gradually accepted by people. Through reading literature and practical application investigation, it is found that the construction of the information system of the university library is in the initial stage, lacking the combination of individualization and humanization. From the perspective of the university library, according to the characteristics and advantages of users, how to choose and use the demand analysis technology is analyzed. The correct development of personalized recommendation service is a problem that university libraries must face and solve.

2.2. Research Significance

This paper enriches the application and related theory of user tracking technology, including information science and library personalized construction. Based on the analysis of user behavior portraits, according to the real user information feedback and analysis data received by the system tracking, we can analyze and speculate in advance to understand the characteristics of their usage needs and accurately judge their own behavior preferences, so as to provide various targeted usage recommendations. The analysis and service suggestions enable users to experience a variety of more convenient and fast intimate and humanized services in the university libraries, and further effectively improve the quality of the comprehensive service work of university libraries. This paper can also provide demonstration and demonstration functions for similar or similar information systems, and put forward new suggestions and implementation targets on specific system implementation issues.

3. Research Status at Home and Abroad

Foreign society put forward new requirements for the development of digital libraries for various data personalized information applications and services. The research began in the late 1990s in the United States, and the main problems are still concentrated in the current problems existing in various university library organizations in the United States. At the level of various data personalization and demand system of digital information resources and services, and in practice, it has gradually extended to various fields successfully until it has evolved to the entire American digital public library. Foreign personalized service system technology is relatively mature and advanced, and its operation and development speed is relatively rapid and stable. Some typical representative system applications such as Cornell University's Gateway, Washington University's My Library, Rochester University Library Course and resources system, etc. (Guo, 2009). Various digital personalized and value-added service contents provided by foreign digital libraries all require specific target user object needs as the core,

service organization form and content system are comprehensive and rich, service coverage is in-depth and extensive, and service knowledge-based strong characteristics.

The theoretical research work on digital libraries and personalized document services in my country started around the millennium. The first research was the National Social Science Foundation Research Fund Project, which came from Peking University's "web-based" project under the auspices of the Department of Information Management of Peking University. The subject of "customized service of digital library" has officially opened the theoretical research process of the basic theory of domestic digital library and personalized library service. Due to the late start of research in my country, it is still in the stage of in-depth exploration and has certain limitations. The relevant research and content of Chinese scholars on the personalized library services provided by digital libraries mainly include the following aspects:

1) Research on the theoretical model of service provision of digital library information personalization. Zhao Jihai and Lu Gongping firstly discussed and defined the connotation, method and content of the personalized service information provided by the digital library from the service theoretical framework, and put forward the general characteristics of the current digital library providing personalized service methods, and the research involved. Three key frontier issues and key new trends for future research (Zhao, 2001; Lu, 2002).

2) Some research on the mode of providing personalized service in digital library. For example, Wang Xin, Geng Lixiao and Hua Xiuling and others have proposed four different modes of personalized service delivery for digital libraries, but they also include personalized customized services and personalized recommendations, services and personalized retrieval services, etc. (Wang et al., 2019; Geng et al., 2018; Hua, 2018).

3) Carry out research on the application of network intelligent network technology in the design of personalized library information and service support system in digital library operation. Jiang Ling proposed and improved the information resource service technology that is helpful to realize the personalization of digital library, including intelligent information push and service technology, intelligent library agent and service technology, intelligent search service technology, etc. (Jiang & Jiang, 2009). Luo Ying and Li Gewei use the deep mining technology based on network data space to quickly discover users and discover their hidden objects from the existing thematic databases, data warehouse systems and other various network information space environment systems in the network digital library area. From the relevant thematic information in the network data, we can obtain the user-specific data access and behavior patterns, realize the clustering function of the relevant thematic users, and automatically establish a good user interaction and relationship mode among the users of the thematic data (Luo, 2009; Li, 2007).

4) Use a structured user model to describe the customer's user interest prob-

lem. Zhang Yunkun uses the information results submitted by enterprise users to directly describe the words of interest of enterprise users with the subject word vector method (Zhang, 2010). Song Lizhe also aimed at the shortcomings of the keyword-based user interest information representation method in the process of personalized customization services compared with the above, and combined with the relatively rich and diverse characteristics of ontology semantic information, they proposed an ontology-based method, the representation method of the user model (Song et al., 2008). Sun Yusheng jointly proposed a personalized content recommendation for digital library content based on semantic grid technology (Sun & Dong, 2009).

4. Analysis of User Behavior in University Libraries

University library users are divided into user users and management users. Different types of users will produce different user behaviors accordingly. We can better personalize users by identifying and recording the behaviors between users and understanding the needs of users through behavior analysis.

4.1. Library Management User Behavior

The manager of the library manages various data in the library system, which can be simply divided into three points, namely, the management of book data, the management of user data and the data association management with other horizontal auxiliary systems. Including library users' operations on books (lending, returning), importing and modifying library bibliographic journal data, adding, deleting, and modifying related book data, logging in user behavior tracking data, and user rights management.

4.2. Library Use User Behavior

The basic function of the library service center is to provide external retrieval and browsing services and free lending services for library information and Chinese and foreign periodicals and magazines.

5. Tracking Collection of Library User Data

User tracking technology is one of the most important technologies in the construction of personal information systems in network applications. It is a computer application technology that combines tracking methods such as cookies and sessions. Through scripts, users can record and analyze access paths, access content and other information. The main purpose of user usage tracking in university digital libraries is to improve the system's sensitivity to each visit, provide a certain degree of user demand knowledge with more and more interactions, and incorporate personalized services into subsequent responses.

1) User explicit needs

User explicit request refers to the main goal that the user expects. From the perspective of the complexity of system requirements, it generally has a certain

range of subjective uncertainty and the structure of user demand expression tends to be simplified. According to the characteristics of system user demand information, the information system can also be used in electronic forms, such as search box, which can be more convenient and effective for writing and quantitative collection of system user demand information. However, the real and actual needs of users are inferred from their explicit demand information, which is not comprehensive. The standardized construction of personal information and service systems requires more effective feedback information and more accurate and effective guessing out the specific real needs of users.

2) Implicit needs of users

Implicit user needs are needs that cannot be expressed. In addition to the direct needs of system users, implicit needs may not be used temporarily or may not be used in the future. Implicit needs have two main characteristics: concealment and value. Therefore, implicit needs may be more valuable and important to explore in the future than explicit needs, and we can only discover them after we dig. Therefore, constructing a personalized service system needs to use user tracking technology to extract user needs, especially hidden needs, in the library information system.

6. Personalized Data Analysis Based on Tracking Information

This paper starts with the preliminary judgment of user needs, and begins with the historical method and observation method, and proposes several methods for judging user needs using specific tracking data.

1) Judgment of browsing page content

Based on the tracking page displayed by the user, record the theme and content of the page, then set the weight, and finally judge the user's needs through statistics. Among them, the commonly used judgment methods are as follows: page title analysis method; page content weight analysis method; favorites analysis method.

2) Access path judgment

On the basis of classifying and sorting the content of each page, the user's demand analysis is determined by registering the user's access path to each page and service in the system, as well as the relationship between each page or service. Analysis methods based on path data can be divided into two categories: internal and external analysis. In this paper, in the analysis of user access path system, under the premise of mastering the theme of each page, the purpose and demand of users are determined by analyzing the relationship between each page. Usually, the same topic does not only appear on the same page, if the user displays pages representing the same topic in sequence, the user can be interested in the topic to a certain extent, so by using scripts to track the relationship between user data and pages, it is possible to effectively Determine the user's hotspots of interest.

3) Judgment of residence time

On the premise of recording the time spent by each user on a specific page, combined with the statistics of the page content, the possible trend of user interest is determined by the amount of time users stay on each page, and then the user needs are judged. You can use the analysis of the dwell time of the webpage, or the comprehensive analysis of the website landing time.

4) Comprehensive judgment of data accumulation

Using the methods described above can be used to determine the needs and interests of users. However, if it is necessary to quickly identify the repeated needs and potential needs of users, it still takes a long time to track the accumulation of data, which can only be achieved through effective methods. First of all, matching analysis can be carried out through the accumulation of browsing data. Although users may mistakenly enter a page that does not express their true thoughts, browsing the same or the same type of pages many times over a period of time may indicate that the other side of the problem is the user. There was no such requirement at the beginning, but as time progressed, the user appeared again. Therefore, it is very necessary for users to browse the accumulated data. When the user requests again, matching the accumulated data can make the accuracy much higher than the first identification. Secondly, it can be analyzed according to the future trend of the accumulated data, and the demand can be calculated according to the accumulated data. In addition, by analyzing the types of needs generated by users, a reasonable prediction can be made for the next needs of users, so as to understand new demand points.

7. Conclusion

The book recommendation service is the core service system of the personalized construction of the university library, and the personalized service can be divided into two categories: book recommendation and new book recommendation according to the time period. After understanding the user's keywords, the book information corresponding to the user's keywords is accurately recommended to the user through the comparison of the database, that is, recommendation by matching the database. This recommendation method is similar to the user's independent retrieval and is easy to be accepted by the user. Faster implementation is the most basic form of book information recommendation; new book recommendation service refers to a service that can record and identify keywords, automatically detect and compare new books when they enter the library, and recommend book information that meets the needs of relevant users. The service time of this recommendation form can be extended, and new book information can be continuously recommended to readers for a long period of time, thus becoming an indispensable part of the personalized service of university libraries. In order to maximize the efficiency of personalized book recommendation service, recommending books in similar fields to users is also a more practical function. Based on multi-index keyword classification, recommenda-

tion service can be divided into horizontal extension recommendation and vertical extension recommendation. Horizontal recommendation refers to finding other keywords belonging to the same type with keywords as the center in the field of book information; vertical recommendation refers to recommending that the keywords of users who serve book information are at a higher level or a lower level in the relevant field, or come from a similar level, making user recommendations.

After determining the recommended content and the recommended object, the next step will be to consider which method should be adopted in the book information recommendation service. By consulting relevant documents in the field of e-commerce, university digital libraries can carry out a variety of effective library information recommendation services. For example, home page login recommendation, random recommendation service on the site, recommendation service for offline user information sending, recommendation service based on the characteristics of university libraries, etc. can be used.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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