Design and Development of Online Booking Clients for University Books and Materials under the Background of Big Data

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Abstract: The era of big data provides a new environment for libraries to build open data information service systems, and puts higher requirements on library service systems. Based on the overall analysis of the library open data information service under the big data environment, this paper analyzes and explains the construction elements of the service system, and proposes the construction of the library open data information service system to promote the library open data information service.

1. Introduction

Under the big data environment, the development of open data information services in Chinese libraries has become more and more rapid, and scholars at home and abroad have also conducted in-depth discussions on open data information services. By effectively utilizing the context of big data, libraries can further address issues such as open access resources and the integration of digital resources in the library. As the cultural core of the campus, university libraries are now more and more recognized and valued by everyone. All major universities have placed the cultural connotation of libraries in the core of school development. In the promotion of the library's connotation, we have made great efforts to increase financial support and increase the investment in related hardware. However, the development of the library's soft power has not been changed with the increase of such input, which greatly restricts the overall development of the library. Specifically, it is reflected in the use of digital auxiliary information in paper books, the rational use of electronic books, the collection and processing of non-book information, and the mobile library. This constraint has become more pronounced, and libraries need a set of information service systems that match their own characteristics to help libraries adapt to this changing demand.

2. System design principles and design requirements

2.1 System Design Principles

In the big data environment, in order to facilitate the effective information of college teachers and students, the design of personalized information service system of university library should follow the six principles of practicability, security, scalability, ease of operation, accuracy and resource sharing. After summarizing and summarizing, the structure diagram and additional description [1] are obtained, as shown in Figure 1. To construct a personalized information service system model for university libraries based on big data, we should take into account the needs of teachers and students in teaching and research, and realize the practicality of the system; protect the information and privacy of users; keep up with the amount of information and technology development; Users with low-tech level can quickly grasp; provide efficient and accurate information services; realize resource sharing while security protection.
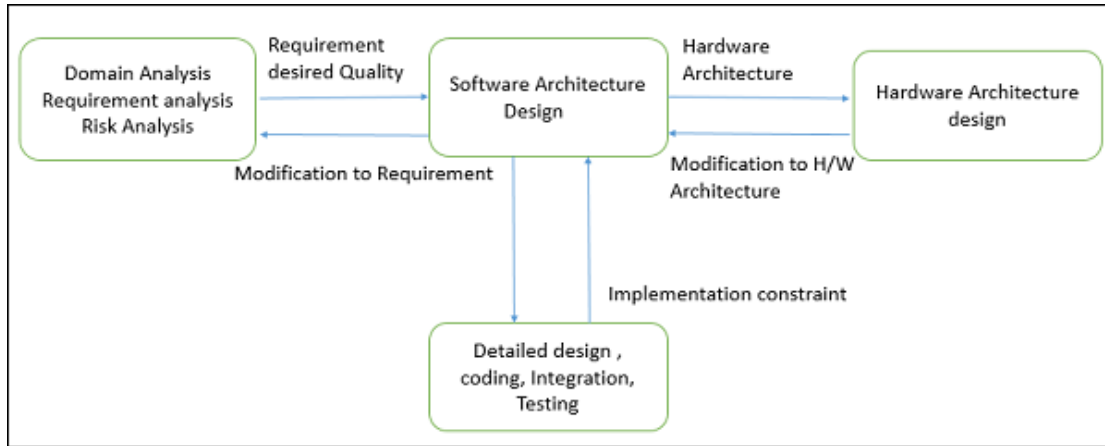
Fig.1 Library system design principle structure

2.2 System design requirements

Deciding to design a university library personalized information service system based on big data should meet various requirements: First, the personalized information system should have a good user interface. As the user and the personalized service system interface, the user interface should be simple and clear, clear and beautiful, design help tips to meet the real needs of different levels of users, express the system's various functions, help users solve the problems in use. Second, high-efficiency personalized information services should be provided. Users use the big data-based university library personalized information service system to obtain information and filter it to obtain the best information in the shortest time and improve service efficiency. Finally, provide personalized information services with different depth of service. For the user group with high service depth, high-quality personalized information service is required, and the user opinion can be customized according to the user's opinion during the development; for the user group with lower service depth, the template can be pre-established at the time of development, the user group The information can be selected through the interface prompting guide to provide flexible and personalized information services for the high and low-level user groups, so as to facilitate the convenient use of user groups at all levels [2].

2.3 Functional Design Requirements

Business needs analysis is an analysis of the overall business of the library served by the system. Introduce the main business of the library from the aspects of information service, reservation service, reader service and book literature service. Describes the goals that the system needs to accomplish and achieve. The main parts of the system are as follows:

(1) The release and management of library related information. Through the system to facilitate the inquiry of library related information, the use of information review management methods. Better management information is released and used. Make information release institutionalized and standardized.

(2) Access support for mobile media. With the increasing popularity of mobile terminals, many users are now more likely to use the terminals such as mobile phone tablets to complete related queries when visiting websites and querying information. The system needs to optimize the access of mobile media. The functions and modules frequently used by the readers should be optimized and displayed according to the display characteristics of the devices on the mobile platform services, and the development of the mobile features is targeted. Sexual service features.

(3) Establish a library book donation management system. Through this system, various channels donate books for network information review and physical book on-site audit. To ensure that each donated book is managed and reused to the maximum extent possible.

(4) Using the reader service center platform to establish a new service model for reader self-management and independent services. For many years, the library's service model has been a

one-on-one service for librarians. This model makes library services less efficient. Through the system, many original services such as reader information establishment, reader binding card, readers untied card, reader binding mobile phone number add score card, reader label and permission query are integrated into the self-service platform.

3. System model construction

3.1 System Model Overall Architecture

Combining with the status quo of information service of university libraries in China, this paper attempts to design the overall architecture of the personalized information service system model of university library based on big data, mainly involving user interface module, data integration module, information retrieval module and information analysis module (mobile information analysis module, Structured data analysis module and Internet log analysis module), information push module, demand analysis module, user use evaluation, information filtering module and user module, etc. [3], as shown in Figure 2.
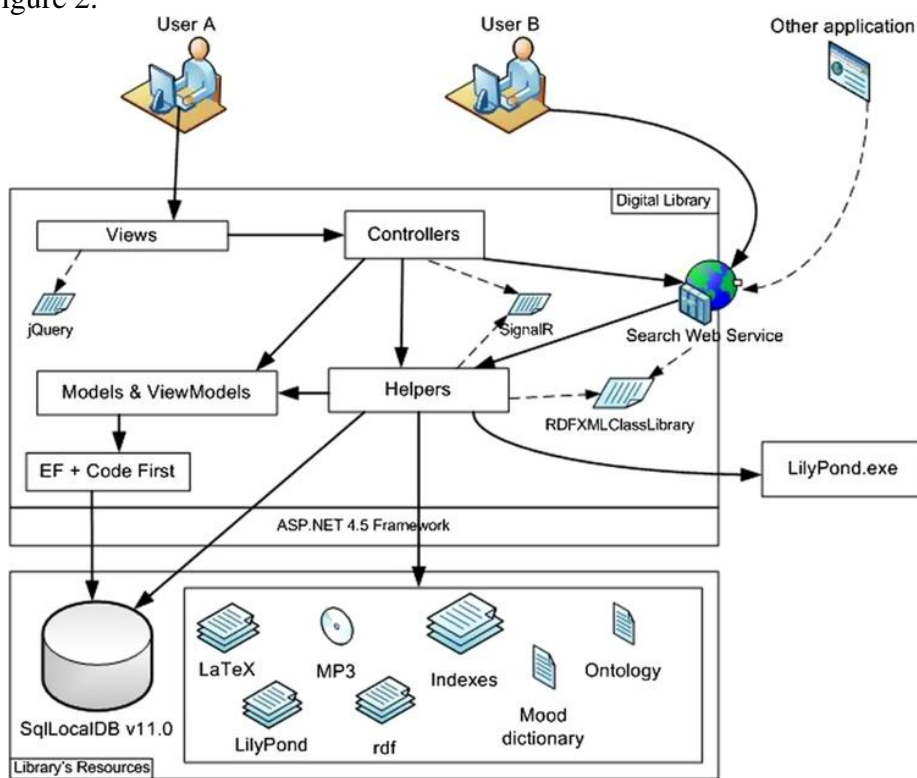

Fig. 2 System model overall architecture

3.2 System function analysis

User Interface Module: This module is mainly used to connect users to the system. In this module, the user can open the system for registration, input relevant information to the data integration module, and transmit the information retrieval module, the information analysis module, the information push module and the demand analysis module according to the user requirements, and finally push the feedback information to the user.

Data Integration Module: This module is mainly used to record and connect the data information transmitted by the user interface module, such as the subject information database, library information library, electronic resource usage library and system log database, etc. Information is consolidated by logical classification to provide data support for the system.

Information Retrieval Module: This module is mainly used for user groups to search for keywords and extend to collection books. The information retrieval module receives the retrieved search

request and matches the collection database resource, and if it matches, outputs the retrieval information; otherwise, it is invalid, prompting to connect to the Internet query.

Information Analysis Module: This module is aimed at user group information needs, and is solved by three methods: mobile information analysis module, structured data analysis module and Internet log analysis module [4]. Among them, the mobile information analysis module mainly uses the virtual interpersonal relationship for information seeking; the structured data analysis module mainly processes the content and feedback information usually consulted by the user and the data warehouse through technical means; the internet log module is mainly used by the user. In the process, leaving traces of use, the information of the user's network information can be effectively analyzed.
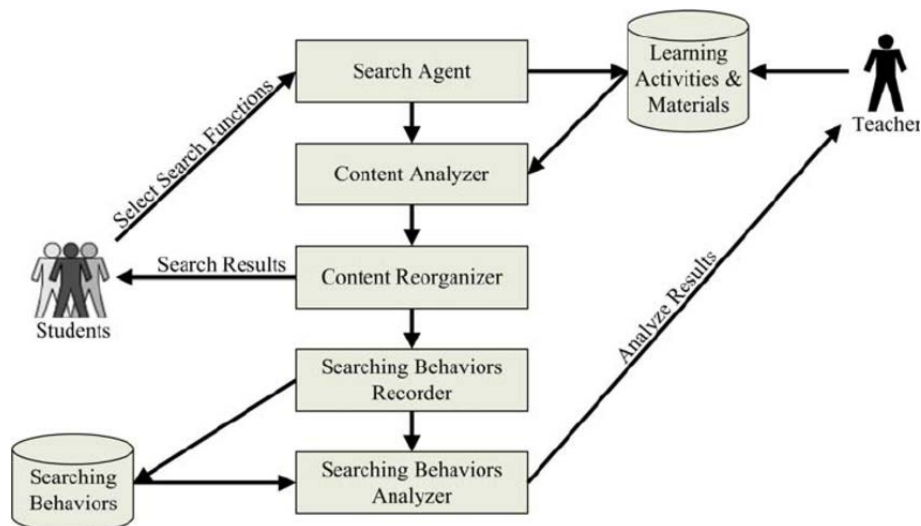

Fig.3 System interface overall architecture

Information Push Module: This module mainly applies customized information according to the user group, and borrows the collected books or electronic resource library to push the filtered information to the user interface module. It can also be used to push relevant prompts and subscription information when the user uses the collection resource information service. To realize the active information service of university libraries in the big data environment.

Demand Analysis Module: This module is mainly based on the information transmitted by the user interface, and is filtered, modified and analyzed through user registration information, system logs, recorded evaluation results, user search and browsing history and other related demand information.

Information filtering module: This module is mainly used for filtering and processing of incoming information. According to the feature extraction and description of the information, the filtering process forms the long-term interest and demand information of the user, and can appropriately push relevant information to the user according to the retrieval result, to facilitate the user to use. And evaluation [5].

User Module: This module mainly tracks and analyzes the user's information needs according to the user's long-term information needs. When receiving the user information request, it responds quickly.

4. University books and materials online reservation big data processing

4.1 Build the library IR to achieve open access resource integration

Libraries are often considered the storage of knowledge and are responsible for the preservation of documents and data. In a big data environment, libraries have the responsibility and obligation to collect and store digital information and create an open data environment. At present, Stanford University's LOCKSS system and the UK University Library Consortium's CEDRAS are all

successful IR precedents. The big data-based library open data information service IR model construction divides the whole process into four levels: resource layer, metadata management layer, data warehouse construction layer and application layer (see Figure 4). The resource layer mainly refers to various types of access digital resources in an open network environment, including OA journal resources, OA institutional knowledge base, OA subject knowledge base, pre-printed and other forms of open resources, and metadata management The role is to use the metadata extraction transformation protocol to extract metadata from the OA resources in the resource layer and standardize them to achieve the uniformity and standard of metadata and data management. At the same time, the management of the metadata transforms different types of data information and metadata to complete related effective operations. The role of the data warehousing construction layer is to store unified standard metadata and data, and to form various types of databases according to metadata and data content to provide data support for the application layer. The IR system mainly implements the query and retrieval functions at the application layer. This system not only provides user services, but also provides metadata for other systems. In the open data information service system model in the context of big data, the library is both a data provider and a data server.

4.2 Architecture SOA model to achieve user service resource integration

The open data information service system based on big data should also be guided by user service, that is, the use of intermediate technology to realize the organic organization and integration of distributed subsystems, and finally achieve the purpose of effectively integrating complex data information, and its construction guiding ideology It is supported by information technology and is centered on user services. First, the user is objectively and comprehensively analyzed, and provides an efficient value-added service model that meets the needs of the readers [6]. This model is also called the SOA model. The introduction of SOA into the construction of the library open data information service system is conducive to solving the problem of existing database heterogeneity, etc., because the SOA architecture defines three roles: service provider, service registry and service requester. It can realize the integration of user service resources and truly build the library open data information service system into an open service system integrating knowledge resources and services.
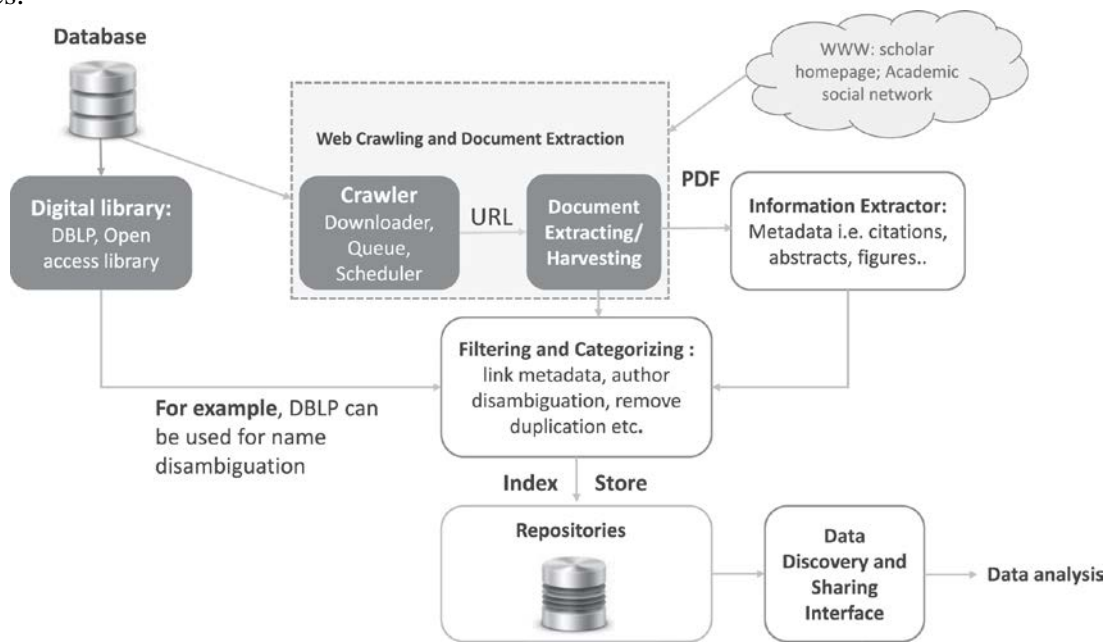

Fig. 4 Application of big data in the library

4.3 Build an OA resource navigation system to achieve a unified search platform

The library OA resource information navigation system is a platform that integrates the retrieval portals of different information resources and provides information integration services. It is a

platform for classifying electronic resource data in different databases according to the type, order, and discipline. The basic functions of the OA resource navigation system help users to quickly locate data information through resource classification and keywords in an open data network environment. In terms of the construction of the OA resource navigation system, the library has made some breakthroughs. A special OA resource window is set up on the homepage of the library as a unified retrieval platform for the library open data information service system in the big data environment. The school OA resource library provides 30 open databases and classifies them according to different types and sources. At the same time, it supports the self-service retrieval of reader users, so that the readers of the whole school can truly enjoy the convenience of the library to construct open data information services under the background of big data.

5. Conclusion

The meaning or role of big data is, in the final analysis, through data support and making decision-making. Using big data analysis, we can sum up experience, discover rules, and predict trends. These data can provide auxiliary services for our decision-making through corresponding data prediction models. The more data information is mastered, the more accurate the calculation model is, and the resulting prediction results can be more scientific, accurate and reasonable. On the other hand, although the data itself has its meaning and expression, the data itself does not produce value. Big data must be combined with other specific fields and industries to have value. In many areas, big data can be used to improve management and decision-making. The rapid development of big data affects all walks of life. In order to realize the sustainable development of libraries, we will further improve the quality of library big data services and provide readers with efficient, personalized and convenient services. The design of big data analysis system for college readers' demand information was discussed and its main process was elaborated. Utilize big data technology to analyze the intrinsic potential value from massive data, predict the reader's needs, build an active service platform for readers, improve the service quality of libraries, and transform and upgrade from traditional libraries to smart libraries.

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