

The Application of Artificial Intelligence in Providing Intelligent Services in Libraries

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Manuscript received March 23, 2024; revised April 25, 2024; accepted May 11, 2024; published June 19, 2024

Abstract—Since the 1950s, the research of artificial intelligence has been continuously deepened and increasingly widely used in various fields of society, which is considered to be an important basis for the future human development. Library is an important part of public education. Based on how libraries use artificial intelligence to provide intelligent services, it discusses the combination of library service and artificial intelligence from three aspects of intelligent collection resource organization, automation of library management, and precision of information service. Through the introduction of artificial intelligence technology, the library can achieve a comprehensive upgrading in improving the service level, enriching the service mode and service content, enhancing the service efficiency and optimizing the user experience, so as to better meet the changes of readers' reading needs in the era of digital intelligence.

Keywords—library, artificial intelligence, intelligent services

I. INTRODUCTION

Artificial intelligence refers to the intelligent technology that can operate independently and has a certain sense of autonomy, and uses computers or corresponding bionic technology to complete tasks that should be completed manually through learning and simulation. Intelligent service can be understood as the accuracy and flexibility of the service content in the service environment, which is the organic combination of electronic information technology and service functions. As an important part of public education, library can not only improve the service level, but also enrich the service mode and connotation, enhance the service efficiency and optimize the use experience by combining with artificial. In 2017, the IFLA Trends Report pointed out that the future trend of the library services is to integrate with artificial intelligence. Therefore, from the perspective of library development, the combination of service and artificial intelligence is the key to realize intelligent service, and it is also an innovation of service mode.

II. INTELLIGENT ORGANIZATION OF COLLECTION RESOURCES

A. Intelligent Collection Classification and Arrangement

Intelligent collection classification and arrangements is a forward-looking work in library intelligence service, which makes full of use of advanced automatic classification algorithm and integrates natural language processing and machine learning technology to improve the organization efficiency and arrangement level of library collection resources. The development of this field not only brings

innovation to library management, but also provides readers with a more convenient and efficient information retrieval experience. By introducing automatic classification algorithm, intelligent collection and arrangement realize the automatic classification of library collection resources. Traditional classification work relies on manual processing by library staff, but with the development and application of natural accurately understand the subject and content of books, so as to classify more intelligently. This not only improves the efficiency of sorting, but also reduces the workload of librarians, while making the library resources more orderly and easier to management and maintenance.

Intelligent finishing can also realize space optimization, and intelligent planning of the space in the museum by using artificial intelligence technology. By analyzing the borrowing situation and reader flow in each area of the library, the system can intelligently adjust the layout of the collection of books, ensure that popular books are more easily accessible, and improve the efficiency of space utilization [1]. This intelligent spatial planning not only makes the library use the limited space resources more efficiently, but also improves the comfort and experience of readers in the library.

The development of intelligent collection classification and arrangement is not only beneficial to the library's internal management, but also directly related to the readers' search experience. Through the intelligent analysis of the subject and content of the book, the system can provide readers with more accurate and personalized search results, thus speeding up the speed of information retrieval and improving the efficiency of information acquisition. Readers can find the information resources the need more easily, and provide more convenient conditions for learning and research.

B. Intelligent Retrieval and Recommendation System

The application of intelligent collection resource organization has brought revolutionary changes to library management. Trough the integration of natural language processing and machine learning algorithms, it can not only meet the intelligent search needs of the readers, but also provide personalized book recommendations for readers, thus greatly improving the search experience and book borrowing rate of readers. Traditional retrieval system mainly relies on the keyword matching, but this method is easy to lead to information overload, and sometimes even loopholes. With the iteration of natural language processing technology, intelligent retrieval system can better understand the natural language queries entered by users, analyze the context and context, and through the application of

information language processing technology, it can more accurately understand the readers' search intentions, provide more accurate search results, help readers quickly find resources that meet their needs, and improve retrieval efficiency.

The personalized recommendation system provides customized book recommendations for each reader by analyzing their reading history and interests. Through the analysis of reader behavior by machine learning algorithms, the system can identify readers' reading preferences, areas of concern and borrowing frequency, so as to accurately recommend the book content that meets their interests [2]. Personalized recommendations not only increase the opportunity for readers to discover new resources, but also improve the rate of book borrowing, making the library collection more relevant to the needs of readers.

The applications of intelligent retrieval and recommendation system not only makes the library service level of the library. Readers can find books they are interested in more easily and are no longer limited by traditional search methods, thus improving their satisfaction with the library. At the same time, through the recommendation system, the library can better understand the needs of readers, optimize the development direction of the collection, and further strengthen the utilization efficiency of resources in the library.

C. Digital Collection Intelligent Management

The intelligent management of digital collection plays an important role in the intelligent field of library resource organization. It realizes the intelligent management of library resources with the help of digital tags and RFID technology, and provides more efficient means of resource utilization for libraries.

The application of digital tags and RFID technology enables libraries to accurately locate, track and count their collection resources. Digital tags can effectively identify each book, and RFID technology can obtain the location information of books in real time through radio frequency identification technology. This combination enables librarians to easily obtain the real-time location of the books in the library on the computer terminal, improving the traceability and management efficiency of the books. When readers borrow books, return books or move books in the library, the system can update the location information of books in time to ensure the accuracy of collection resources.

Digital collection intelligent management system through the data analysis and prediction function, can timely detection of problems or potential threats to collection resources. Through the in-depth analysis of the data in the library, the system can find the information of borrowing hot spots, circulation trend, collection utilization rate, etc., and provide the basis for the library to make scientific decisions. The system can also predict the trend of book borrowing, and make targeted purchases of new books or adjustments to the collection, ensuring that the library resources always meet the needs of readers. The intelligent management of digital collection makes the library better adapt to the needs of the digital age. In the traditional environment, library

management relies on manual records, in which the work content is not only cumbersome, but also very prone to work errors, while the digital collection intelligent management system reduces the work burden of librarians through automation, improves the management efficiency, not only reduces the management cost, but also provides a more convenient service basis for libraries. In addition, the digital collection intelligent management system realizes the goal of intelligent management of collection resources. Through accurate positioning and real-time statistics, libraries can manage the resources in a more precise manner, thus improving the efficiency of resource utilization, allowing improving the service level of libraries.

III. LIBRARY MANAGEMENT AUTOMATION

A. Automatic Loan and Return Management System

As the core component of library management automation, automatic loan and management system improves the intelligence and convenience of library loan and return process with the help of artificial intelligence technology. By introducing face recognition and identity verification technology, the system realizes automatic reader identity verification, which not only simplifies the process of borrowing and returning, but also improves the accuracy and security of the operation. Readers only need to pass facial recognition, the system can quickly and accurately identify their identity, and realize the automatic operation of borrowing and returning books. This not only improves the speed of return, but also reduces the waiting time for readers and librarians, improving the overall level of work in the return process. At the same time, face recognition technology also enhances the security of identity verification, prevents risks such as identity fraud, and provides readers with safer and more assured services.

When the system passes identity verification, it adopts predictive maintenance technology to realize real-time monitoring and maintenance of equipment status. Through data analysis and machine learning, the system can detect equipment failures in advance, predict potential problems, and issue timely maintenance notifications [3]. The intelligent maintenance method effectively reduces the downtime caused by equipment failure and ensures the stable operation of the automation system. Predictive maintenance not only reduces the maintenance cost, but also improves the availability of automated systems and provides more reliable service guarantee for libraries. The intelligent design of automatic loan and return management system not only provides efficient loan and return service for readers, but also effectively reduces the burden of staff in the library. Librarians can be more focused on dealing with complex reader consultation, book procurement and other work, which improves the efficiency of library operation. The automatic management of the system can also monitor the loan and return situation of the library in real time, provide data support for the allocation of resources in the library, and help the library to play the development direction of the library more scientifically.

B. Intelligent Book Procurement and Inventory Management

Intelligent book purchasing and inventory management is an important part of library management automation, which introduces artificial intelligence technology and realizes accurate prediction and flexible management of library collection resources through data analysis and intelligent system, thus improving management efficiency and resource utilization.

Intelligent book purchasing through the introduction of artificial intelligence technology for book demand data analysis, to help libraries more accurately predict the interests and needs of readers. The systems can analyze the data of readers' borrowing history, reading preferences, popular topics, etc., so as to provide accurate book purchasing suggestions for libraries. Personalized predictive capabilities allow libraries to buy more targeted books that readers are interested in, Avoid excessive or insufficient procurement, optimize the composition of the collection structure, Improve the utilization of resources.

The intelligent inventory management system ensures that the books in the library are always at the most suitable level through real-time monitoring and automatic adjustment. Through RFID technology, sensors and other devices, the system can monitor the borrowing and returning of books, circulation speed and space utilization in the library in real time [4]. When the demand for a particular book or topic is on the rise, the system can automatically trigger the purchase process to ensure that the library has sufficient resources to meet the needs of readers. On the contrary, for books that have not been borrowed for a long time, the system can be adjusted, placed in a suitable location or relevant promotion, to ensure that the library collection is always maintained efficient utilization.

Intelligent book purchasing and inventory management not only improve the management efficiency, but also make the library more adaptable. With the development and changes of society, technology and culture, readers' interests and needs are constantly changing, and traditional book purchasing and inventory management methods are difficult to adopt to the changing environment. Through continuous learning and adjustment, intelligent system can adapt to changes more flexibly and provide more scientific and intelligent management and service strategies for libraries.

C. Intelligent Personnel Management System

Intelligent management system is a key part of library management automation, and the introduction of artificial intelligence technology provides a more efficient and intelligent means of human resource management for libraries. The system includes intelligent recruitment and evaluation, human resource planning and other which simplifies the recruitment process of the library, makes the personnel management of the library more forward-looking, and provides support for the management and service work in the library.

Intelligent recruitment and evaluation is an important function of intelligent personnel management system. Through the introduction of algorithm matching, the system

can automatically analyze the recruitment demand and the ability and experience of job seekers, so as to achieve more accurate job matching. This not only improves the efficiency of recruitment, but also reduces the burden of recruitment. Through intelligent evaluation, the system can also assess the comprehensive quality of employees more objectively and fairly, provide scientific basis for recruitment decisions, and ensure that the recruitment process is more fair and accurate.

Through the function of human resource planning, the system can also realize the rational allocation of library human resources. Through data analysis and prediction, the system can better understand the service demands of the library in different periods, so as to plan a more scientific human resource allocation plan [5]. Forward-looking planning not only ensures sufficient human resource investment in the peak period, but also avoids over-allocation of manpower in the trough period. While improving service continuity and stability, it reduces the library's operation the management cost of human resources and management costs can maximize the potential value of human resources in libraries. The application of intelligent personnel management system will inevitably make the library management work more convenient, the system can automatically manage the staff attendance, leave and other matters, change the traditional manual operation of the work mode, and further improve the management efficiency. The centralized management of staff information and the quick query function also make the personnel management of the library more convenient. In addition, the system can also conduct staff training and performance evaluation, provide more scientific and targeted support for the career development of employees, stimulate the work potential of employees, and cultivate high-quality staff for the continuous development of library intelligent service work.

IV. ARTIFICIAL INTELLIGENCE ENABLES ACCURATE INFORMATION SERVICES

A. Personalized Information Push

Personalized information push system, as the core link of library intelligent service, introduces artificial intelligence technology, establishes personalized model and intelligent recommendation engine through in-depth analysis and judgment of readers' needs, and realizes personalized information for readers accurate forecasting of demand. The application of this system not only improve the satisfaction of readers, but also strengthens the interaction between libraries and readers, and further promotes the development of libraries in the field of information services. Through in-depth behavior analysis and interest mining, personalized information push system accurately captures readers' interest points and information needs through comprehensive analysis of readers' reading history, borrowing records, retrieval habits, etc. [6] and can build a personalized model for readers. The in-depth behavior analysis not only provides a more comprehensive reader portrait for the library, but also lays a foundation for the subsequent recommendation algorithm modeling. The system can accurately predict the topics, fields or specific books that readers are interested in,

improving the accuracy and pertinence of information push.

Building intelligent recommendation engine is the core of personalized information push system. Through the labeling and classification management of books, articles and other information, the system can provide customized recommendations according to the interests and needs of readers. The intelligent recommendation engine uses machine learning algorithms to continuously learn and optimize recommendation strategies to adapt to changes in readers' recognition of library services, but also increase readers' interest in acquiring new knowledge and information. The application of personalized information push system not only improves reader satisfaction, but also enhance the utilization efficiency of library collection resources. Through personalized recommendation, readers are more likely to find and borrow books that meet their interests, thus improving the circulation rate of collection resources. Accurate information service means enhance the stickiness of users, and then continuously promote the innovation of library intelligent service.

B. Intelligent Question Answering

Intelligent question answering system is the key point of accurate library information service. With the help of natural language processing and knowledge graph technology, the system can better understand readers' question and provide readers with more accurate answers through data learning. Its core features include data pattern recognition and real-time update and feedback, so that the intelligent question and answer system can provide instant and accurate answers in different fields, and answer system can provide instant and accurate answers in different fields, and boring more convenient and efficient information query ways for library services.

The system can understand the reader's needs more accurately by analyzing the reader's question mode and question type. Pattern recognition involves not only understanding the language of the question, but also analyzing the intention behind the question. Through deep learning and natural language processing techniques, the system is able to maintain a high degree of accuracy when dealing with complex problems. The intelligent question-and-answer mechanism make it easier for readers to get the information they need, and also reduces the burden of library staff's daily question-and-answer work.

Real-time update and feedback are the outstanding features of intelligent question answering system. Through continuous learning and updating, the system maintains real-time adaptability to new knowledge and information. The system can obtain the latest information at any time and update the database in a timely manner to ensure that the answers provide are the most accurate and up-to-date. At the same time, through the actual feedback of readers, the system can continuously optimize its own performance and improve the quality of service. The real-time feedback mechanism enables the intelligent question of service. The real-time feedback mechanism enables the intelligent question answering system to evolve in the long run and better adapt to the needs of users.

The application of intelligent question answering system is of great significance in library. It provides readers with immediate and accurate answers to some routine questions, readers can quickly get answers through the question and answer system without waiting for the intervention of library staff, which saves time [7]. The intelligent question-answering system reduces the workload of library staff, allowing staff to focus more on other issues, and sharing the workload in a way that helps improve the overall level of service. Most importantly, through real-time updates and feedback, the intelligent question answering system maintains a high degree of availability, making it available in different fields to adapt to the needs of readers and provide more support for library information services[8, 9].

C. Data Mining and Information Analysis

Data mining and information analysis are the key links of the precision of library information services. Through the introduction of artificial intelligence technology, the system deeply mines the data in the library, aiming at improving the pertinence and quality of information services. Core functions include data pattern recognition and trend analysis and prediction, which enable libraries to better understand the needs of readers, adjust service strategies in advance, and provide decision support for scientific collection planning and resource allocation [10, 11].

Data mining and information analysis nit only enable libraries to better understand the needs of readers, but also provide scientific collection planning and resource allocation suggestions for libraries. By digging deeper into the data, libraries can better understand the changing trends of readers' interests and needs. This kind of in-depth analysis helps the library to optimize the collection and improve the utilization efficiency of resources. At the same time, the system can also find potential hot topics and fields, help the library to purchase new books, maintain the novelty and attractiveness of the collection, and provide more possibilities for the innovation and strengthening of library intelligent services while improving the quality of library services.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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