

Original Paper

The Development and Innovation of Subject Services in University Libraries under the Background of Artificial Intelligence

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Abstract

This article explores the impact and trends of artificial intelligence technology on the development of subject services in university libraries. It analyzes the current state of application of artificial intelligence technology in library subject services, including intelligent self-service applications, intelligent consultation and knowledge services, personalized services and user profile construction, as well as the construction of intelligent subject service spaces. Innovative strategies are proposed to optimize resource allocation, improve service efficiency and quality, and support teaching and research work.

Keywords

academic libraries, subject services, artificial intelligence

1. Research Background and Purpose

The rapid development of artificial intelligence technology has injected new momentum into the improvement of the quality of services in university libraries, and subject services have gradually become an important pathway for university libraries to actively connect with the construction of first-class disciplines in universities. The application of artificial intelligence technology in libraries is not limited to traditional information retrieval and consulting services, but also includes aspects such as knowledge construction, knowledge discovery, and knowledge reasoning (Huang, 2021; Luo, 2023).

Artificial intelligence technology can promote innovation in library operation models, enhance the efficiency and quality of library services. By accurately grasping user needs, artificial intelligence can provide users with personalized, high-quality services to meet the diverse needs of users.

This article deeply explores the application of artificial intelligence technology in the subject services of university libraries, aiming to optimize resource allocation and improve service efficiency and quality by analyzing how artificial intelligence technology affects the service model of libraries. The core purpose of the research is to formulate strategic plans for libraries that are in line with digital transformation, thereby enhancing their service competitiveness.

2. Current State of Research

At present, research on the application of artificial intelligence in academic library subject services mainly focuses on two aspects: technical implementation and evaluation of application effectiveness.

In terms of technical implementation, researchers are concerned with how to use artificial intelligence technologies such as natural language processing and machine learning to build efficient and intelligent library service systems. For instance, natural language processing and speech recognition technologies are utilized to provide students with more efficient and accurate book queries and borrowing services. Moreover, the application of artificial intelligence technologies like natural language processing, machine learning, and image recognition in library automation services has achieved certain results, offering more possibilities for the automation of library services.

In terms of evaluating application effectiveness, researchers use methods such as comparative experiments and surveys to assess the actual effects of artificial intelligence technology in library services, providing data support for technology optimization and promotion. For example, the Tsinghua University Library has collaborated with a major language model provider to develop AI navigation assistants and AI reading assistants (Tsinghua University Library, 2024). In addition, the reshaping of digital academic services in academic libraries based on user relationship management also emphasizes a closed-loop management mechanism of implementation, monitoring, evaluation, and feedback to comprehensively assess service effectiveness (ZHANG, CHEN, NING et al., 2024).

With the continuous development of artificial intelligence technology, researchers have begun to focus on how to use artificial intelligence technology to promote innovation in subject services of academic libraries. At the same time, researchers are also exploring how to use artificial intelligence technology to optimize the processes and management models of subject services, improving service efficiency and quality (Fudan University. Focusing on the Digital Transformation of Libraries under the Background of 'AI for Science, 2024).

3. Development Trends

3.1 Intelligent Self-service Applications

In university libraries, intelligent self-service applications are mainly reflected in areas such as intelligent service robots, self-service book borrowing and returning machines, and intelligent navigation systems. Taking the library of China University of Mining and Technology as an example, its intelligent service robots can not only interact through voice but also provide intelligent consultation,

information broadcasting, and route guidance. In addition, the ChatLibrary AI intelligent service platform integrates multiple functional modules, including the ChatAnswer intelligent Q&A system, which uses natural language processing technology to quickly understand and answer various questions from readers. Intelligent services not only save users' time but also make the library's services more personalized and efficient.

3.2 Intelligent Consultation and Knowledge Services

The application of intelligent consultation systems and knowledge service platforms in academic libraries is mainly reflected in improving the efficiency of information retrieval and meeting personalized needs. Taking the ChatLibrary AI intelligent service platform as an example, it can quickly understand the questions of readers and provide answers in natural language, bringing a more intelligent service experience to readers (Kunming University: "ChatLibrary AI Intelligent Service Platform" Trial Notice"[EB/OL], 2024).

The advantage of these systems lies in their fast information retrieval capabilities and the depth of personalized services. The application of artificial intelligence technology enables libraries to provide intelligent push, personalized agency, and customized services, which greatly enriches the connotation of services and improves service quality. Intelligent consultation systems can also provide customized recommendations and services according to users' search history and preferences, thus better meeting the personalized needs of readers.

3.3 Personalized Services and User Profiling

Academic libraries implement personalized services and the construction of user profiles through big data analysis technology. This includes collecting data on users' borrowing history, search behavior, and browsing habits. By employing Artificial Intelligence Generated Content (AIGC) technology, these data are deeply analyzed to accurately depict users' behavioral patterns and preference characteristics. By building user profiles, academic libraries can better understand users' needs and interests, thereby providing more personalized services and products (LIANG, 2024). This not only enhances user satisfaction but also increases user engagement.

3.4 Construction of Smart Subject Service Spaces

Driven by the "Double First-Class" policy, the construction of smart subject service spaces adopts a multi-level framework design, covering various levels such as information management and smart services. For instance, an academic library has conducted an empirical investigation, thoroughly analyzing the current state of subject services in 42 "Double First-Class" university libraries, and based on this, proposed principles and an overall architecture for building smart subject service platforms (Chu & Wang, 2018).

It has driven innovation in library subject services by providing professional data analysis and decision-making references. In addition, the intelligent subject service platform can also provide a variety of library consultations and subject construction services for researchers, teaching staff, and student readers.

4. Innovative Strategies

4.1 Build an Intelligent Q&A System to Enhance Consultation Efficiency

With the support of artificial intelligence technology, academic libraries can build an intelligent Q&A system that uses natural language processing technology to automatically understand and quickly answer user inquiries. This system can provide continuous, around-the-clock consultation services, greatly improving service efficiency and user satisfaction. At the same time, the intelligent Q&A system can also make personalized service recommendations based on the user's inquiry history and behavioral data, further enhancing the user experience.

4.2 Utilize Big Data Analysis to Implement Personalized Recommendation Services

By analyzing data such as users' borrowing history, search records, and browsing behavior, academic libraries can understand users' academic interests and needs, and use artificial intelligence technology to implement personalized book recommendation services. This service can not only improve user satisfaction but also help users discover more valuable academic resources, promoting academic exchange and cooperation.

4.3 Introduce an Intelligent Navigation System to Optimize Spatial Layout and Resource Utilization

Academic libraries typically have large collections and complex spatial structures, and users often feel lost when looking for books and using other resources. To address this issue, libraries can introduce an intelligent navigation system that uses artificial intelligence technology to achieve indoor positioning and navigation guidance functions. This system can help users quickly locate the books and resources they need, improving search efficiency and resource utilization.

4.4 Strengthen Interdisciplinary Cooperation to Expand the Scope of Subject Services

Artificial intelligence technology has promoted the intersection and integration between different disciplines, providing strong support for the expansion of subject services in academic libraries. Libraries can strengthen cooperation and communication with other disciplinary fields to jointly carry out interdisciplinary research projects and service activities. This can not only enrich the library's academic resources and service content but also enhance the library's influence and competitiveness in the academic community.

4.5 Focus on User Experience and Build a Smart Library Environment

Under the background of artificial intelligence, academic libraries need to pay more attention to user experience and service quality. Libraries can build a smart library environment, using artificial intelligence technology to achieve intelligent monitoring and management of the library environment, equipment, resources, etc. At the same time, libraries can also carry out a variety of cultural activities and service projects, such as academic lectures, exhibitions, training, etc., to attract more users to the library for academic exchange and interaction.

5. Conclusion

Under the impetus of artificial intelligence technology, the future development of subject services in university libraries will focus on deepening intelligent and personalized services, strengthening interdisciplinary cooperation and knowledge innovation, accelerating digital transformation and open sharing, as well as valuing talent cultivation and team building. Libraries will leverage AI technology to provide users with more accurate and personalized academic resource recommendations and consulting services, while also enhancing collaboration with other disciplines to promote knowledge discovery and innovation.

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