Research on Digital Resource System Construction of Smart Library Based on Computer Network and Artificial Intelligence

Chunyu Wang, Zhengyu Sha*, Lin Jia

Library of Wuhan University of Technology Wuhan University of Technology, Wuhan, Hubei, China

*Corresponding author: zysha@whut.edu.cn

Abstract. With the development of science and technology, artificial intelligence has become one of the main driving forces for the development of modern society, and has also injected new vitality into the future development of libraries. Based on the high efficiency and scientific of artificial intelligence technology, the technology has been widely used in intelligent search and reasoning, machine learning and human imitation. In the "internet plus" era, the information service carried out by libraries has changed to a new intelligent information service mode. With the support of new technologies, the intelligent library has gradually become a new form of library development, showing the characteristics of digitalization, networking, intelligence and mobility. Artificial intelligence technology has changed the management mode, management content and service mechanism of libraries, and promoted the transformation of traditional libraries towards smart libraries. This paper first expounds the basic concepts of artificial intelligence and smart library, then analyses the constituent elements of smart library, and finally focuses on the construction method of digital resource system of smart library.

Keywords: Artificial intelligence, intelligent library, digital resources.

1. Introduction

With the rapid development of science and technology, artificial intelligence has entered our life and gradually become the power source of social development [1]. Generally speaking, artificial intelligence is mainly composed of complex computing, logical reasoning, knowledge acquisition, intelligent retrieval, information recognition and voice recognition, which is the product of the rapid development of Internet, computer and Internet of things technology [2]. The use of high and new technology in University Smart Library can not only solve the problems of poor service level and low work efficiency existing in traditional library, but also provide a number of extended services for teachers and students by using digital technology, intelligent technology and Internet technology [3]. With the development of basic technology, artificial intelligence has gradually begun to integrate with big data technology, blockchain technology and electronic sensor technology, further changing the way and content of technology [4]. The development of the library from the original library to the contemporary Smart Library fully confirms the correctness of Nguyen ganathan's theory. The development of the library is
influenced by the environment of the times, which is very inclusive and closely related to the politics, economy and culture of that time [5]. With the continuous change of people's needs and the continuous improvement of economic level, people's pursuit of culture is also higher and higher. The intelligent library built with artificial intelligence as the core can meet people's thirst for culture and provide people with more humanized services [6].

In the course of the library's growth, the application of new information technology provides a new opportunity for the formation of new development, new ideas and new models of the library [7]. The development and application of artificial intelligence provides conditions for the intelligent construction of the library and infuses vitality into the development of the library [8]. The construction of artificial intelligence takes the Internet of things as the technical support point, supplemented by advanced modern electronic equipment, to build an information-based modern library. It is necessary to apply artificial intelligence to Smart Library [9]. In the process of providing information service, the library gradually changes from the collection entity-based knowledge information service mode to the virtual collection-based knowledge information service mode. The construction of digital resources is an important link in the Intelligent Library's knowledge service based on virtual collection. It is an inevitable trend for the modern intelligent library to replace the traditional library in the background of the development and popularization of artificial intelligence [10]. The application of artificial intelligence in library construction is bound to subvert the traditional mode and push the modern library to a new era [11]. This paper first expounds the basic concepts of artificial intelligence and smart library, then analyzes the constituent elements of Smart Library, and finally focuses on the construction method of digital resource system of Smart Library, hoping to provide some help for the actual work.

2. Analysis on the characteristics of Smart Library

The main components of Smart Library are not only intelligent hardware devices, but also smart librarians. Smart Library is a real and perceptible concept. To build the traditional library into a real intelligent library, we should not only support our own service and management through the Internet of things technology, but also add some new concepts and technologies such as cloud computing. Smart Library is a kind of intelligent library service entity formed by applying intelligent technology to library construction. It is the organic combination and innovation of intelligent library service entity and digital library, and realizes the high-tech and efficient development of Smart Library. Smart Library provides intelligent services based on intelligent agent, machine learning and big data technology. Smart librarian is also an important element in the composition of Smart Library. The main work of smart librarian is to master the latest technology, fully learn and learn from the successful transformation of the library experience, to carry out intelligent management and intelligent services. They are intelligent executors [12]. The Smart Library pursues the concept of readers first, and provides readers with literature query and retrieval services to the maximum extent, so as to meet the personalized and diversified needs of readers. With the support of network technology, the library can break through the limitations of physical space and provide information services for readers all day.

The operation mode of smart library enables users to enjoy various library services in the virtual space attached to the network, promotes the business integration of the library, realizes resource sharing, and improves service efficiency. Smart Library is a kind of library form, which is dominated by massive Internet resources, driven by readers' needs, aimed at providing intelligent services for readers, supported by new network and information technology, and supported by high-quality smart librarians, to realize the sharing of massive resources and provide convenience for readers to share library knowledge and information. The library should also increase the cooperation with the government and the publishing department to build an intelligent platform in a cooperative way, which can not only avoid the waste of resources, but also further improve its own system structure, and promote the informatization and intellectualization of the whole region and even the whole city [13]. The digitalization of smart library management service makes the library service more reflect the human culture, personalization and intellectualization of service. The Smart Library supported by Internet and computer technology can actively perceive the needs of users and provide personalized smart services.
for them. The application of artificial intelligence technology in Smart Library can achieve the coordinated development of energy conservation and environmental protection, rational use of all kinds of natural resources, creation of cultural ecological construction and other aspects. Figure 1 shows the construction structure of digital resources under the information ecology.

![Figure 1. Digital resource construction structure under the information ecology](image.png)

The application of artificial intelligence technology has laid a technical foundation for the establishment of smart library, and more artificial intelligence technology has been applied to the library, which makes the library truly develop to intelligence, and reflects the precision, individualization and initiative of smart library services. Supported by humanistic and intelligent services, the library can maximize the value of its digital resources, meet the basic reading needs of readers and make readers enjoy spiritual reading. To a certain extent, it can promote librarians to realize their personal values, enhance their work enthusiasm, reduce their job burnout and realize the benign humanistic interaction between the library and readers. Compared with the traditional library, the smart library is more efficient and convenient, and it provides resources and services for users in a green way. Smart library stresses people-oriented and provides intelligent services. Its essential feature is to sublimate knowledge services in connotation, which is of great significance to the construction of new social relations with sustainable development.

3. The necessity of digital resource service in Smart Library

3.1. Providing diversified information services

In the era of "internet plus", libraries should integrate digital resources and build a batch of high-quality, internally related and highly integrated resource systems. Smart library is a new library based on the Internet of Things and the application of various intelligent devices. Compared with the traditional library, the smart library is more intelligent, humanized and efficient in various services. Artificial intelligence technology, based on computer imitating human behavior and thinking, can replace part of manual labor through logical reasoning, relationship proof, information recognition and other functions, and combine it with library to create a high-quality intelligent information system with high service quality. In the era of reading for all, readers' cultural needs are rising day by day, and the problem of librarians' lack of ability is becoming increasingly prominent. Readers' information needs cannot be well met, thus affecting readers' satisfaction with the library. The development and application of Internet of Things and big data technology have created good conditions for information interconnection and interaction. Users can get information more conveniently and quickly and find the data they need.
colleges and universities manage libraries, if the artificial intelligence technology is organically combined with the Internet of Things, the personalized perception of literature resources, intelligent equipment, and borrowing by teachers and students can be realized to a great extent.

3.2. Increase reader satisfaction

When providing digital resources services to readers, smart libraries should pay more attention to tapping readers' needs for hidden information, which puts forward higher requirements for librarians' knowledge level, work skills and management ability, and urges librarians to continuously learn new knowledge and skills, constantly update their knowledge reserves, and provide readers with humanized services and humanistic care to the maximum extent. With the advent of the era of artificial intelligence and big data, traditional libraries have fallen into the altar. In order to change the dilemma of the decline of traditional libraries, relevant personnel must inject new technologies into the development of libraries and comprehensively promote the transformation and development of libraries. In the era of artificial intelligence, the traditional library service model can no longer meet people's needs, and the traditional library concept does not conform to the diversified development trend of the current society. To keep pace with the times, the library construction needs to incorporate more intelligent services into its own construction. Smart library integrates and optimizes the digital resources collected by using information technology, realizes intelligent one-stop retrieval of digital resources, and provides readers with convenient and fast retrieval ways and means, which can improve the comfort of readers' experience and increase their satisfaction to a certain extent. Library services are based on the specific needs of users, which can promote the development of libraries to some extent. In a sense, user needs are the driving force for the development and progress of libraries.

4. Application of artificial intelligence in Smart Library

The application of artificial intelligence technology has greatly increased the amount of library resources, and the resources of the library are more intelligent. The traditional library's main collection resources are paper resources, while the intelligent library developed under the influence of artificial intelligence technology gathers intelligent sensing, intelligent collection and intelligent management technologies. In the era of "internet plus", the smart library should integrate and classify the related resources in the database, and establish an information retrieval platform, so as to improve the utilization rate of library digital resources and provide readers with complete and convenient information retrieval services. Artificial intelligence technology has a strong data analysis function, which can not only integrate, analyze and utilize different types of information resources in a short time, but also comprehensively analyze semantics, syntax and morphology [14]. Compared with traditional network retrieval, artificial intelligence retrieval in smart library can realize matching and reasoning by extracting semantic content of information, and realize the transformation from basic document retrieval to knowledge retrieval. According to readers' retrieval behavior, it can meet readers' requirements through algorithms, and then intelligently filter and present information resources that meet readers' needs, making retrieval more convenient and accurate.

Libraries can protect paper literature resources through artificial intelligence technology, realize the integration of intelligent monitoring and artificial intelligence, set up corresponding fingerprint recognition and face recognition equipment, and avoid people without relevant authority from entering stacks and other fields. No matter paper materials or digital resources, the storage methods of literature materials in university libraries are centralized, so the security protection of library literature resources should be divided into physical data security protection and digital resources security protection. Due to the restriction of data acquisition and analysis ability, the traditional library uses data sampling or sampling to process data. Through a small amount of sample data, mathematical or statistical models are used to describe the characteristics or laws between variables approximately, and the trend is extrapolated to the overall characteristics. Intelligent library can not only provide users with more abundant collection resources, but also analyze user data through intelligent information collection system, and better understand users' needs and habits through data analysis, so as to further integrate

4
and reshape library resources. Table 1 gives the accuracy results of data sets under different feature dimensions. The trend of accuracy under different feature dimensions is shown in Figure 2.

| Feature dimension | 20    | 40    | 60    | 80    | 100   |
|-------------------|-------|-------|-------|-------|-------|
| Accuracy (%)      | 79.18 | 75.31 | 78.59 | 82.17 | 71.76 |

**Figure 2.** The changing trend of informatization construction pattern under different characteristic dimensions

University libraries can use artificial intelligence identification technology and intelligent monitoring technology to improve the security level of data, among which intelligent identification technology can adopt face recognition and fingerprint recognition, and intelligent monitoring technology can be applied to access control. The former is convenient and quick to find people who destroy data, while the latter can avoid data loss. The integration of digital resources in the smart library refers to the comprehensive use of various technologies, methods and means to optimize the independent digital resources of the library, and then combine them into a new organic whole to form a digital resource system with better efficiency and higher efficiency. Smart library can integrate digital resources deeply by using artificial intelligence technology. In terms of basic service items, artificial intelligence has an impact on library service items in terms of intelligent identification, processing and service. At present, the library mainly develops a series of intelligent applications with the help of Internet of Things technology, mobile network and big data technology.

5. Conclusion

Smart library is the ultimate trend of library transformation and upgrading under the background of artificial intelligence, and it is the inevitable direction of future library development. Smart library will surely get the support of users because of its interconnection, convenience and high efficiency. Artificial intelligence technology is still breaking through and upgrading, and the integration of artificial intelligence technology and library management has become an inevitable trend of the times. Therefore, it is necessary to discuss the construction of smart library in the era of artificial intelligence from the theoretical level, and explore new ideas for the construction of smart library. Today, with the rapid development of economy and society, urban public libraries are facing huge and urgent transformation pressure. Actively promoting the construction of smart libraries is not only the need of their own transformation and upgrading, but also an important measure to promote the prosperity of urban culture and the overall progress of society. The application of artificial intelligence in the intelligent library can play a great role in the construction of resource information and personnel reorganization, which is a very good choice. The construction and development of smart library is a long-term and arduous task. In the process of integration of artificial intelligence, the functions of library and the duties of librarians will not change, only the service methods and means will change.
References
[1] Qu Caixia. Application analysis of artificial intelligence in the construction of smart libraries [J]. Information Recording Materials, 2020, 21 (08): 156 - 158.
[2] Fu Yunxia. Research on the Application of Artificial Intelligence in the Construction of Smart Library [J]. Library Work and Research, 2018, 271 (09): 49 - 53+81.
[3] Liu Hang. Discussion on the application of artificial intelligence in the construction of smart libraries [J]. Information Recording Materials, 2019, 20 (11): 70 - 71.
[4] Yan Xiangyuan. The concept, elements and development path of smart library in the era of artificial intelligence [J]. Library Science, 2019, 288 (03): 9 - 12.
[5] Xu Taotao. Research on the construction of smart library under artificial intelligence environment [J]. Publishing Wide Angle, 2020, 362 (08): 78 - 80.
[6] Chang Qing, Yang Wujian, Gong Jingxing. Misunderstandings and Construction Strategies of Smart Library Construction [J]. Library and Information Service, 2018, 062 (019): 13 - 18.
[7] Zeng Ziming, Sun Shouqiang. Intelligent Library Artificial Intelligence Risk Analysis and Prevention and Control [J]. Journal of Library Science Research, 2020, 484 (17): 17+30 - 36.
[8] Chu Jingli, Duan Meizhen. From Smart Library to Smart Library[J]. Journal of the National Library of China, 2019, 028 (001): 3 - 9.
[9] Huang Shifang. The effective application of artificial intelligence technology in the construction of university smart libraries[J]. Think Tank Times, 2019, 182 (14): 5+7.
[10] Li Jianwei. Research on Intelligent Information Service System of Smart Library Based on Deep Learning [J]. Library Science, 2019, 41 (01): 120 - 125+142.
[11] Li Jianwei. Smart Library Intelligent Information Service System Based on Deep Learning [J]. Library Science, 2018, 040 (012): 117 - 122.
[12] Gong Chunjian. The construction and challenges of smart libraries in the era of artificial intelligence[J]. Digital Technology and Application, 2019, 37 (6): 227 - 228+230.
[13] Cheng Yinzong. Research on the development of smart library industry driven by artificial intelligence [J]. Library Science, 2018, 283 (10): 121 - 124.
[14] Ge Wenjin. The application and trend of intelligent technology in the construction of smart libraries [J]. Information Recording Materials, 2019, 20 (3): 81 - 82.