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Research on Intelligent Services and Optimization Strategies of University Libraries under the Background of "Internet plus" and Artificial Intelligence

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***Abstract*—Internet plus and artificial intelligence are important development strategies implemented by our country in recent years. They constantly promote the development of the real economy through Internet thinking, and also have a profound impact on the construction of libraries. In this context, university libraries are faced with big data integration, user privacy and other issues, and need to take effective measures to change the service concept and actively innovate. Based on the analysis of the current situation and existing problems of the reader service of university libraries in the era of "Internet plus" and artificial intelligence, this paper expounds the intelligent service of university libraries relying on "Internet plus" and artificial intelligence technology, and puts forward optimization strategies, aiming to improve the service management level of university libraries and provide reference for the service work of university libraries.**

***Index Terms*—Internet plus, artificial intelligence, University Library, Intelligent service, Optimization strategy.**

I. INTRODUCTION

With the continuous development of information technology and knowledge innovation, the form of the Internet is also evolving, and on this basis, "Internet plus" has emerged. "Internet plus" can achieve deep integration with traditional industries and create new development patterns with the help of Internet platform and information communication technology. With the rapid development of "Internet plus", the research on intelligent engineering and Internet of Things technology is in full swing. Thanks to the influence of the new generation of information technology, enterprises and projects in China have been greatly improved, and the service work of university libraries has gradually changed to knowledge-based and intelligent direction [1].

The English name of AI is "Artificial Intelligence", which is called AI for short. Artificial intelligence is a comprehensive discipline generated by the interaction of computer science, brain science, information science and other disciplines [2]. The extensive application of artificial intelligence has profoundly affected the transformation of industrial technology and concepts in society. Artificial intelligence technology has also profoundly affected and is changing all aspects of university libraries, improving work efficiency and making people's lives more convenient. University libraries always adhere to the principle of "people-oriented", keep pace with the development of science and technology, and provide efficient and convenient services for readers and teachers and students.

In the past two decades, the application of artificial intelligence in library data and information processing, resource management, recognition and service has been accelerating. Its research and application are mainly focused on robot application services, pattern recognition, expert system consulting cataloging, machine learning semantic recognition, information retrieval, etc.

Nowadays, the application of artificial intelligence in university libraries is at the top of the sun, showing a vigorous trend. First of all, AI has profoundly changed the structure of politics, economy, science and technology, education, culture and other fields. Governments of all countries have fully recognized the fact that AI enables economic transformation, the development of innovative countries, and the sustainable development of innovation and core competitiveness in the field of national strength competition, thus sparing no effort to promote the construction of AI. Secondly, the orderly promotion of smart city and smart society construction, as well as the development of 5G, smart chip, ASRS system and other high-tech technologies, provide high-quality guarantee for people to develop intelligent technology. Third, countries are competing to establish AI colleges to strengthen the training of AI talents. Finally, the practice and application results of artificial intelligence are increasingly rich and significant. Intelligent cataloguing platforms, intelligent seat management systems, unmanned vehicle carriers (AVG), ATM machines, fine payment systems, all-weather self-service libraries, self-service photocopying, inventory and security robots have greatly improved their work efficiency and eliminated man-made errors due to the application of artificial intelligence, It has provided more

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convenience for people [3-6]. The "heat" of artificial intelligence has penetrated into the whole business process of library work, such as procurement, cataloging, information retrieval, circulation, reference consulting and intelligent services.

Under the background of "Internet plus", the service of university libraries is moving towards knowledge and intelligence. College librarians should seize the rare opportunity of development, change the service concept and innovate the service mode. Undoubtedly, the deep integration of "Internet plus" and university libraries can provide better reading services and more digital resources for teachers and students, promote the development of universities, society and enterprises, and is of great significance to enhance the comprehensive capacity of university libraries.

In the context of artificial intelligence, the development mode of all walks of life has undergone tremendous changes, gradually moving towards digitalization, industrial intelligence and rapid development. The mode of human thinking is also changing in the direction of intelligence. The university library popularizes and applies the artificial intelligence technology.

II. The Significance of Artificial Intelligence and "Internet plus" to the Intelligent Service of University Library

2.1 "Artificial intelligence and" Internet plus "can increase the digital information resources of university libraries

The information resources of university library have the characteristics of large amount of information, strong timeliness and various kinds. University researchers can use the database resources in the library to query the research and development status at home and abroad of various research directions and representative academic achievements [4]. "Internet plus" urges university libraries to apply Internet of Things technology, big data, cloud computing and other technologies to increase their digital information resources and realize the sustainable innovative development of their services.

2.2 Artificial intelligence and "Internet plus" can improve the comprehensive quality of university library staff

Librarians are the main body providing library services and the effective connectors between libraries and readers. Whether the development of the library is smooth, whether the service of the library can satisfy the readers, and whether the library can enter the hearts of the readers, largely depends on the comprehensive quality of the librarians. On the one hand, AI puts forward more and higher requirements for librarians, on the other hand, it frees librarians from a large number of heavy, repetitive, boring and dangerous work such as shelf inversion, storage, inspection, cleaning and handling, so that they have more time, energy and opportunities to carry out robot management and maintenance, data mining and analysis, algorithm system upgrade, image recognition platform development and stability maintenance Smart learning space optimization, data literacy, intelligent training and other work with a sense of professional achievement and happiness help the transformation of the librarian team.

2.3 Artificial intelligence and "Internet plus" can improve library service efficiency

The assistance of AI to library services requires "two hands, both hands are hard". This "two hands" focus on hardware facilities, equipment, technology, as well as people's intelligent flexible thinking concept and humanized measures. First of all, the research, development and utilization of emerging technologies of artificial intelligence can enable the deep integration of limited physical space of the library with unlimited virtual network study space, network innovation and creativity space, and achieve comprehensive and undocumented face recognition and borrowing, intelligent space positioning and navigation, intelligent robots and intelligent security. Secondly, the library service under the vision of artificial intelligence is to provide humanized, customized and intelligent services under the dual guidance of artificial intelligence and human intelligence, so the entire business process can demonstrate flexible and humanized consideration and care.

III. The Present Situation and Existing Problems of Intelligent Service in University Library

In recent years, with the rapid development of mobile Internet technology, university libraries have made some achievements in management and service. However, with the arrival of the era of "Internet plus", big data and artificial intelligence, there are still some problems in individual university libraries, such as the lack of integration awareness of artificial intelligence and "Internet plus", the obvious shortage of talent resource reserves and technical support, and the lack of professional level of library staff.

3.1The implantation of AI and the concept of "Internet plus" needs to be deepened

At present, the transformation is the inevitable requirement of the development of university libraries and the general trend. The university library should change the service environment, mode and security [5]. From the actual situation of the development of university libraries, some institutions and service personnel only stay in knowing the concept of "Internet plus", which is an important development strategy of the country, but they cannot fundamentally understand the exact meaning and significance of "Internet plus". This has led some institutions and service personnel to pay insufficient attention and fail to realize the inherent advantages of Internet technology.

Solid concept implantation is an important thinking guarantee for the application of library AI. The implantation of the concept of artificial intelligence is not partial, but comprehensive, facing librarians, reader groups, government agencies, scientific and technological research enterprises, etc. Only by ensuring that the concept is embedded in an all-round and wide field, can a scientific, reasonable and open favorable

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environment be created for the development of library AI. The library should integrate and complement the advanced concepts of AI openness, collaboration, sharing and equality with the library spirit, use high-tech technologies to build an AI platform system of data interconnection, cloud interconnection and database interconnection through multiple channels, broad paths and deep connections, and give humanistic care and guidance to librarians, readers and users.

3.2 Technical risks are widespread

Under the background of "Internet plus" and artificial intelligence, technical risks are inevitable, and the decisive factor is the characteristics of the Internet itself [6]. Due to the limitation of commonweal and funds, university libraries are bound to be unbalanced and imperfect in the construction of network infrastructure, software and hardware supporting infrastructure. In the process of the integration and development of university libraries with "Internet plus", big data and artificial intelligence, once the management of network information resources or the modern network information service platform provided to users is attacked by Internet hackers or viruses, library resources and user information will be exposed or embezzled. Therefore, improving managers' understanding of "Internet plus", strengthening the significance of "Internet plus Library", increasing capital investment and infrastructure supporting construction, and standardizing relevant interfaces and interconnection technologies are of vital importance for the integrated development of university libraries.

3.3 The professional level of library staff is not high

Under the background of "Internet plus", library staff need to have professional level suitable for the integrated development model. However, from the perspective of the current situation of university libraries, the ability of department staff still remains in mastering the traditional business of book and literature resource sorting, transmission, storage, etc. The level of understanding of cross-border knowledge such as Internet and information technology, information service integration, big data development and application is very limited, it is difficult to play a subjective role in practical work, which seriously affects the process of university library integration. Therefore, the shortage of cross-border talent reserve is one of the urgent problems faced by university libraries in the process of in-depth integration and development at this stage. High quality talents have become an important demand for the development of the times. In order to meet the needs of this new environment, university libraries must increase the introduction of talents. At the same time, they must cultivate the comprehensive quality of university library staff and require them to meet the high standards under the "Internet plus" environment [6].

3.4 Readers' acceptance of new services

Under the background of "Internet plus", university libraries have also formulated mobile library services, which has greatly improved the convenience of reading. After registering, readers can access the library anytime and anywhere using mobile terminals such as mobile phones, so as to read better. However, from the actual situation, many students do not pay attention to the public WeChat of the library, and the service frequency of mobile library is low.

3.5 Big data integration and privacy protection

Under the background of "Internet plus", university libraries have also begun to develop in the direction of digitalization. Although information technology has brought profound services to university libraries, it has also brought some confusion to readers and staff. For example, when the library collection space reaches saturation, it needs to integrate massive digital resources, and then it will encounter the problem of intellectual property rights. The regular services of university libraries include mining service subjects, integrating data resources, carrying out targeted services, and setting up efficient service access portals. This process requires a lot of manpower and material resources. The application and development of artificial intelligence technology in many fields bring new opportunities and challenges to the functional transformation of libraries. Machine learning and big data technology can optimize the resource structure of the library, the advantages of deep learning and voice technology can meet the individual needs of users, and the application of robots and natural languages can improve the quality of knowledge services and carry out all-weather services. Librarians should speed up learning and improve information literacy, fully and reasonably use artificial intelligence technology to promote the development of the library cause. All aspects of library resource construction, librarian literacy, building space, service management, etc. need to integrate artificial intelligence, so that it can become a new power source to boost the future development of the library.

Under the background of "Internet plus", the application of computer technology in university libraries has brought convenience, but at the same time, it has also caused some violations of users' privacy. The privacy and data protection of users pose a challenge to the professional quality of librarians, which is also a challenge to university libraries brought by new technologies.

IV. Strategies of Intelligent Service of University Library under the Background of "Internet plus"

With the development of information technology, the service, management and reading modes of libraries in the "Internet+" era have undergone significant changes. The development of information communication technology has promoted the continuous innovation of library service modes.

4.1 Integrating modern means into library management

Under the background of artificial intelligence and "Internet plus", the key to the innovation and development of university library services lies in the consistent adherence to the user centered core service concept. In addition to display boards, school radio and network platforms, university

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libraries can also use new media such as microblog and circle of friends to promote, such as using WeChat official account, APP installation, QR code scanning and other services, which can enhance the influence of the library [4]. University libraries should build RFID intelligent management systems and intelligent access control systems to achieve self-service, efficient and simple circulation, improve book management methods, reduce labor intensity and improve work efficiency.

4.2 Creative library, providing personalized services

In the "Internet+" environment, digital libraries have become the main way for readers to read [5]. This requires the digital library to transform from the traditional knowledge base mode of using database and cloud computing technology to build a special digital book storage to a multi platform and multi database resource platform. Through personalized and humanized creative space reorganization, it is necessary to build a more flexible, comfortable and convenient reader experience complex, improve the perception of readers in the information environment, which is conducive to cultivating the information literacy of readers. The construction of big data analysis and display system effectively shows the service work and service results of the library to readers in the form of data and charts, and accepts the supervision of readers. Through analyzing the sorted platform data, we can master the library resources and achievements at a macro level, guide the resource procurement and reasonable allocation with data analysis, and optimize the collection structure. At the same time, carry out association analysis on data with similar attributes of the database, master the use status, quality and effect of library resources, realize scientific decision-making on resource development and selection, consolidate the construction of literature resources, analyze the service quality of the library, detect the problems and shortcomings in service work, summarize experiences and lessons, so as to make more effective service decisions.

4.3 Protection of innovative copyright

Under the background of "Internet plus", the network information services of university libraries need to protect the copyright of information resources and formulate corresponding protection measures. "Internet plus" should achieve innovative integration with university libraries, constantly improve the use, sharing, transmission and exchange effects of library network information, but ensure the security of copyright.

The security protection of information resource copyright plays an important role in the service innovation and development of university libraries. University libraries need to understand the relevant laws, regulations and policies, design practical copyright protection programs, and use the network platform to formulate some restrictions; Strictly regulate reading methods and access to literature; Limiting the dissemination space and region of literature and data; In the process of using information resources, set the corresponding alert authority to urge users to consciously regulate their own network behavior. During the dissemination of library information resources, once copyright protection is involved, the use of the information resources will be strictly monitored immediately, and copying or plagiarism is prohibited to avoid adverse effects on the original works. [7] examined the development and refinement of possible mathematical models for the intellectual system of career guidance. Mathematical modeling of knowledge expression in the career guidance system, Combined method of eliminating uncertainties, Chris-Naylor method in the expert information system of career guidance, Shortliff and Buchanan model in the expert information system of career guidance and DempsterSchafer in the expert information system of career guidance method has been studied. The algorithms of the above methods have been developed. The set of hypotheses in the expert system is the basic structure of the system that determines the set of possible decisions of the expert system. This set, which is crucial in decision-making, should be sufficiently complete to describe all the possible consequences of situations that arise in the subject area. Therefore, it is important to improve the mathematical models of the intellectual system of career guidance. [8] discussed that according to the observations in this paper, an existing mathematical model of banking capital dynamics should be tweaked. First-order ordinary differential equations with a "predator-pray" structure make up the model, and the indicators are competitive. Numerical realisations of the model are required to account for three distinct sets of initial parameter values. It is demonstrated that a wide range of banking capital dynamics can be produced by altering the starting parameters. One of the three options is selected, and the other two are eliminated. The model is generalized taking into account fractional derivatives of the bank indicators for time, reflecting the rate of their change. Based on numerical calculations, it is established that reduction of the order of derivatives from units leads to a delay of banking capital dynamics. It is shown, that the less the order of derivatives from the unit, the more delay of dynamics of indicators. In all analyzed variants indicators at large times reach their equilibrium values.

4.4 Standardize the use of AI

The use of AI in the library has caused problems such as readers' privacy information disclosure, ethics, and law. Libraries need to standardize the application of AI. On the one hand, we should establish a system to standardize the use of artificial intelligence. University libraries should abide by these laws and regulations, use and develop artificial intelligence according to the national governance concept, and also establish a system for the use of artificial intelligence in libraries that conforms to the actual situation in China. On the other hand, strictly abide by the use system of artificial intelligence. Librarians should improve their awareness of the safe and standardized use of various data in the library, and provide services in strict accordance with the use system. Design reasonable service process ideas and confidentiality

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technology, effectively protect the legitimate rights and interests of readers and improve the quality of library services.

4.5 Organic integration of library and artificial intelligence to realize service transformation

University libraries need to introduce modern science and technology to provide convenient information services. In recent years, AI has developed rapidly. Some universities have introduced or applied AI related topics to libraries. However, it is rare to truly apply AI technology to library related services. Apply artificial intelligence technology to libraries and transform relevant businesses and services.

V. CONCLUSION

The development and application of artificial intelligence technology point out a new direction for the development of university libraries, provide readers with self-service and intelligent service methods, meet the information needs of different types of subjects, and break the space-time restrictions of traditional business work. In a word, it is necessary for the construction and development of the library to keep pace with the times, overcome the backward infrastructure of the library, insufficient human resource allocation, lagging development planning and other constraints, improve the level of software and hardware with artificial intelligence technology, build an intelligent service system, optimize the service management of university libraries, and provide readers with faster, more accurate, safer and more intelligent services.

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