



An empirical study on Artificial intelligence in Chinese Library

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Abstract. Artificial intelligence has promoted the pace of intelligent transformation of Chinese libraries. In order to better grasp the development status of artificial intelligence in the Chinese library field, it provides a powerful reference for the subsequent development of the research field. This paper analyzes the research status of artificial intelligence in the field of Chinese library by using scientific metrical method and content analysis method. This paper pointed out that the research on the application of artificial intelligence and its technology in the field of Chinese library should be strengthened from the aspects of carrying out deeper theoretical and practical exploration of artificial intelligence technology and its application in the Chinese library field, expanding the width and depth of research for improving the quality of output results and enhancing the academic influence and practical ability of artificial intelligence research in the Chinese library field and forming a set of feasible schemes that are conducive to the rapid application of new artificial intelligence technology in the Chinese library field, so as to provide important support for the intelligent transformation of Chinese library.

Keywords: Artificial intelligence; Information Analysis; library; Scientometrics; Intelligent transformation.

1 Introduction

Artificial intelligence^[1] has received in-depth theoretical research and practical applications in various industries^[2-6], and libraries are no exception. Artificial intelligence, as one of the important driving technologies for the innovation, transformation and development of libraries^[7, 8], has received high attention from domestic experts and scholars in the field of libraries in recent years. They have invested a lot of manpower, material resources, and financial resources to study and practice the in-depth application of artificial intelligence in the Chinese library field, and have achieved a large number of important theoretical achievements and practical experience with reference value. Although artificial intelligence research in the Chinese library field has achieved a lot of valuable research achievements, there is no research on the anal

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ysis of these existing research achievements. In order to clarify the current research status of artificial intelligence in the Chinese library field, this study uses CNKI as the source database and academic literature related to artificial intelligence research in the Chinese library field included in CNKI as research samples. The paper uses visualization techniques to reveal the current research status and hot topics of artificial intelligence in the Chinese library field in the form of graphs, To provide valuable reference materials for the in-depth development of artificial intelligence in the field of Chinese libraries in the future.

2 Research Methods and Data Sources

The paper mainly uses visualization techniques to visually analyze literature related to artificial intelligence research in the Chinese library field included in the CNKI database from 2014 to 2023. Visualize and analyze the current research on artificial intelligence in the Chinese library field from the perspectives of academic attention, representative authors, major journals, and research hotpots, in order to reveal the inherent information and potential reference value of artificial intelligence research in the Chinese library field.

In order to retrieve almost all the journal articles related to artificial intelligence research in Chinese Library field, this study uses CNKI as the source database. Then, this paper used the search formula (TI='artificial intelligence' AND TI='Library') OR (TI='artificial intelligence' AND KY='Library') OR (KY='artificial intelligence' AND TI='Library') OR (KY='artificial intelligence' AND KY='Library') to retrieve the related journal papers. Next, extract journal articles published between 2014 and 2023 from the search results as a sample literature set for subsequent visual analysis of the search results. The retrieval time is Dec 19, 2023. After processing, 662 effective journal articles were obtained for subsequent visualization analysis. Fig. 1 describes the data retrieval process of using filtering techniques to deduct irrelevant data.

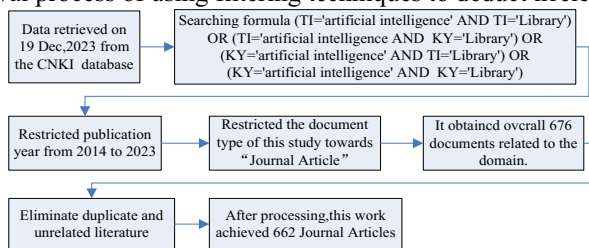


Fig. 1. Data retrieving procedure

3 Results Analysis

3.1 Academic Attention

Academic Attention that is used to measure the development scale and changes is based on the number of published journal papers in a research field^[9, 10]. Based on the

above theory, this paper uses the big data statistical method to make a mathematical analysis of the annual number of published journal papers on artificial intelligence research in the field of Chinese library. Fig. 2 shows the visual map of the results after using the big data statistics method to count the number of journal papers published each year.

Fig. 2 shows: (1)The research on artificial intelligence in the Chinese library field from 2014 to 2023 can be divided into three stages : the initial stage (2014-2016), the rapid development stage (2017-2019) and the exploration stage (2020-2023). The characteristics of the initial stage are that experts and scholars in the field of Chinese library have begun to pay attention to and discuss the application of artificial intelligence in the field of Chinese library, and have produced less results (1 article published in 2014,2 articles published in 2015 and 2 articles published in 2016). The characteristics of the rapid development stage are that experts and scholars in the library field not only attach great importance to and pay attention to the development of artificial intelligence in the library field, but also have achieved a lot of research results (28 published in 2017,82 published in 2018 and 130 published in 2019). The characteristics of the exploration stage are that there have been some bottlenecks after the rapid development in the early stage, and it is difficult to make new breakthroughs. Therefore, the output results at this stage are almost the same as those in the early stage (125 articles published in 2020, 116 articles published in 2021, 89 articles published in 2022 and 91 articles published in 2023). (2)From 2014 to 2023, the average annual number of journal papers on artificial intelligence in the Chinese library field was 66.6,and the years in which the annual number of published journal papers in this research field is greater than the average annual number of published journal papers are 2018, 2019, 2020, 2021, 2022 and 2023.In addition, from 2014 to 2023, the year with the largest number of journal papers published in this research field was 2019 that has published 130 articles.(3)Although the research on artificial intelligence in the field of Chinese library has made a lot of theoretical research and practical experience, it has entered the bottleneck period of development in the field of Chinese library. Therefore, on the basis of existing research and practice, we should further discuss the artificial intelligence technology and its application in the field of Chinese library in the future, so as to break through the existing development bottleneck and promote the in-depth development of artificial intelligence in the field of Chinese library.

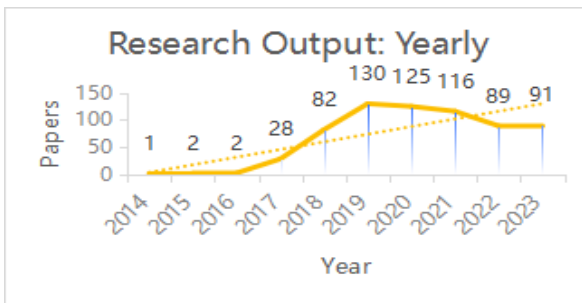


Fig. 2. Yearly Research Output (2014-2023) (Source: CNKI)

3.2 Representative Authors

The representative author analysis is based on the cumulative number of journal papers published by authors in this research field, so as to reveal the distribution of high-yield authors in this research field, the research topics that high-yield authors pay attention to, and the research institutions from which high-yield authors come, so as to promote in-depth exchanges and cooperation among authors^[11]. Based on the above theory, this study uses the big data statistical method to count the cumulative number of journal papers published by the authors of artificial intelligence research in the Chinese library field, and uses information visualization technology to show the representative authors in the research field by a visual way of word cloud image (see Fig. 3).

Fig. 3 shows: (1) The authors who published the most journal papers related to artificial intelligence in the Chinese library field were Bo Shao Professor and Wenjian Yang research librarian. Bo Shao Professor that comes from Nanjing University Library and School of Information Management of Nanjing University, mainly focuses on intelligent robot technology and its application in book inventory, book positioning, information service and so on, as well as the application of artificial intelligence in library user behavior analysis and library intelligent space construction. Wenjian Yang research librarian that comes from Chongqing University of Education, mainly focuses on the value of artificial intelligence to the development of libraries, the reshaping of library services, and the construction of library smart space. (2) The high-yield authors of artificial intelligence research in the Chinese library field are Bo Shao (published 6 journal papers), Wenjian Yang (published 6 journal papers), Tongqiang Dong (published 5 journal papers), Lijun Deng (published 5 journal papers), Shiwei Wang (published 5 journal papers) and so on. (3) Although the field of Chinese library has carried out in-depth theoretical research and practical application of artificial intelligence, the overall number of journal articles published by high-yield authors is relatively small, and the core high-yield author group has not been formed to carry out long-term research and practice. Therefore, in the future, we should further enlargement the scope of research and the depth of communication and cooperation on the basis of the previous period, so as to lay a solid foundation for the formation of the core high-yield author group in the field of Chinese library.



Fig. 3. Distribution cloud map of high-yield authors (Number of publications ≥ 3 ; Source: CNKI)

3.3 Major Journals

The analysis of major journals is based on the cumulative number of articles published in journals to reveal journals that have made important contributions to the dissemination of academic research results in the field, and to provide important information sources for researchers in related research fields. Based on the above theory, the paper uses the statistical method to count the journals that have published artificial intelligence research papers in the Chinese library field, and sorts out the highly published journals that are important for the dissemination of artificial intelligence research practice in the Chinese library field by the cumulative number of journal paper published (see Fig.4).

Fig. 4 shows: (1)The journal that has published the most artificial intelligence research papers in the Chinese library field is *The Library Journal of Henan*(39 papers). It shows that *The Library Journal of Henan* has played a very important supporting role in the publication and dissemination of artificial intelligence achievements in the Chinese library field from 2014 to 2023, and is an important carrier of information source and achievement publishing that cannot be ignored in the research field.And the follows major journals includes *Journal of Library Science*(34 papers), *Inner Mongolia Science Technology & Economy*(27 papers), *Library & Information*(24 papers), *Jiangsu Science and Technology Information*(19 papers), *Research on Library Science*(18 papers), *Library Work and Study*(17 papers), *Library Theory and Practice*(16 papers), *New Century Library*(16 papers), *Journal of Academic Library and Information*(16 papers), and so on. (2)Further analysis shows that the major journals are mainly library & information journals, but the core journals of library & information account for a relatively small proportion. It shows that although the research on artificial intelligence in Chinese library field has produced a large number of valuable research results, there are relatively few high-quality academic achievements, which is not conducive to the in-depth development of the research on artificial intelligence in Chinese library field. Therefore, in the future, the depth of research on artificial intelligence in Chinese library field should be further improved to produce more high-quality academic results for enhancing the academic influence and attention of the research on artificial intelligence in Chinese library field.(3)The research on artificial intelligence in the field of Chinese library has formed a core journal group that are *The Library Journal of Henan*(39), *Journal of Library Science*(34), *Inner Mongolia Science Technology & Economy*(27), *Library & Information*(24), *Jiangsu Science and Technology Information*(19), *Research on Library Science*(18), *Library Work and Study*(17), *Library Theory and Practice*(16), *New Century Library*(16) and *Journal of Academic Library and Information*(16).Their cumulative number of published journal articles is 226 articles, accounting for 34.14% of the total number of published articles.

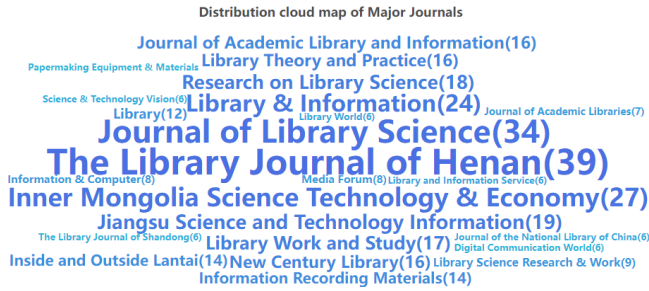


Fig. 4. Distribution cloud map of C. Major Journals (Number of articles published ≥ 6 ; Source: CNKI)

3.4 Research Hotspots

The analysis of research hotspots is based on the cumulative occurrence of keywords to reveal the distribution of hotspots and key research topics in this research field. Based on the above theory, the paper uses the big data statistical method to count the keywords of the research journal papers related to artificial intelligence in the Chinese library field, and sorts and displays them in a visual way by the cumulative count from large to small (see Fig.5).

Fig. 5 shows: (1) In addition to the standard words self(library, artificial intelligence), the related research of artificial intelligence in the field of Chinese library mainly focuses on “Smart Library(164)”, “University libraries (67)”, “Big data(50)”, “Smart services(46)”, “artificial intelligence technology(45)”, “public library(41)”, “library services(32)”, “digital library(23)”, “application(23)”, and so on. (2) Further analysis of the content of journal paper where the keywords are located shows that the research topics related to artificial intelligence in the Chinese library field mainly focus on the following aspects : 'Smart Library mainly focus on the talent team construction, literature resource management and service, subject service innovation, risk analysis and control, intelligent positioning and navigation, intelligent space construction, ancient book digitization, regional alliance construction, ethical crisis and control, book intelligent positioning, service remodeling and model innovation, data mining and precision service of smart library, and so on', 'University libraries mainly focus on VR service, intelligent academic service platform, information promotion service innovation, intelligent service mode, intelligent retrieval and precision service, intelligent transformation, intelligent interview, maker space innovation and change, self-service and so on.', 'Big data mainly focuses on intelligent knowledge platform system, intelligent service, knowledge service innovation, new generation of intelligent library system, user behavior analysis, file management, literature resource construction, subject service innovation and intelligent ecosystem, etc.', and so on.

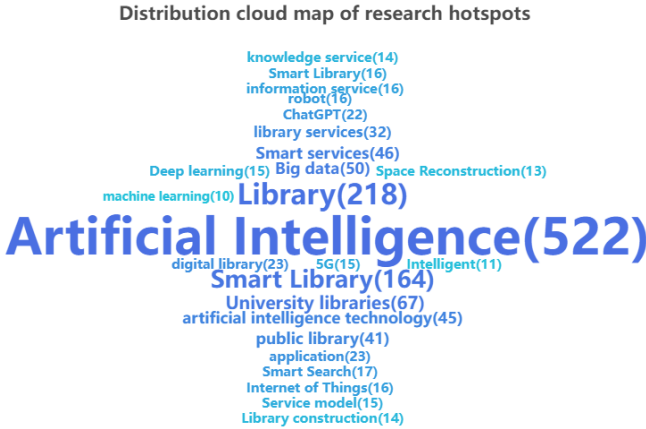


Fig. 5. Distribution cloud map of research hotspots (Frequency of occurrence≥10; Source: CNKI)

4 Conclusion

Although the research on artificial intelligence in the Chinese library field has made important progress from 2014 to 2023, there are still the following problems that related researchers need to do more in-depth discussion in the future:

(1) At present, there are research bottlenecks in the research of artificial intelligence in the Chinese library field, and it is urgent to carry out deeper theoretical and practical exploration of artificial intelligence technology and its application in the Chinese library field, so as to break through the existing bottlenecks as soon as possible for promoting new breakthroughs in the research and practice of artificial intelligence in the Chinese library field.

(2) At present, the research on artificial intelligence in the Chinese library field has achieved a lot of valuable results, but the overall quality is low. Therefore, in the future, based on the existing research, we should expand the width and depth of research for improving the quality of output results and enhancing the academic influence and practical ability of artificial intelligence research in the Chinese library field.

(3) Although researchers in the Chinese library field have carried out various research practices on artificial intelligence technology and its application, with the continuous emergence of new artificial intelligence technologies, how to quickly and effectively apply new artificial intelligence to the Chinese library field has not yet formed a set of relatively mature solutions, which is detrimental to the rapid application of new artificial intelligence technologies in Chinese libraries, is detrimental to the Chinese library 's active absorption of new artificial intelligence technologies either. Therefore, on the basis of the existing research practice, researchers should form a set of feasible schemes that are conducive to the rapid application of new artificial intelligence technology in the Chinese library field as soon as possible, in order to accelerate the new breakthrough in the application of artificial intelligence technology in the Chinese library field.

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