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## A Study Unfolding the Scholarly Footprint of Artificial Intelligence in Academic Libraries

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**Maya Deori**

Librarian

Dhakuakhana College (Autonomous)

Email: [mayadeori94@gmail.com](mailto:mayadeori94@gmail.com)

### Abstract

*Artificial Intelligence (AI) has significantly impacted Library and Information Science (LIS), as detailed in a study employing bibliometric and altmetric methods to analyze AI research in academic libraries. Utilizing tools like Bibliometrix, Tableau, and Microsoft Excel, the study reviews publication growth, authorship, institutional productivity, and topic evolution based on Scopus data. It also incorporates altmetric data from Dimensions.ai to assess societal impact. Findings reveal that AI research in academic libraries was scarce until the mid-2010s but surged post-2017, primarily from the U.S., China, and India, with an emphasis on collaborative efforts. Foundational studies earn the most citations, while newer work is trending upwards. Despite high academic engagement and social media presence, influence on policy remains low. The study underscores the importance of AI research in academic libraries and suggests combining bibliometric and altmetric insights to guide future strategies.*

### Keywords

Artificial Intelligence (AI); Academic Libraries;  
Altmetric Attention Scores (AAS)

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## Introduction

Artificial Intelligence (AI) has emerged to be one of the most revolutionary technological advances of twenty-first century. The term artificial intelligence was first introduced way back in 1956 by John McCarthy at the “The Dartmouth Summer Research Project on Artificial Intelligence” (Sharma, 2024), marking the foundation of AI as an academic discipline. In general, artificial intelligence (AI) corresponds as the replication of human intellect but in computers that has been developed, conditioned and programmed to rationalize, comprehend, study, and draw conclusions (Stryker & Kavlakoglu, nd). AI is the umbrella term for technologies such as machine learning, robotics, natural language processing, expert systems and neural networks that allow systems to carry out activities that have historically demanded human intellect (Collins et al., 2021). AI has greatly impacted research, education, and administrative practices in academic environments by enabling cognitive data processing, automated evaluation, and heightened information retrieval systems (Khairullah et al., 2025). The utilization of AI in higher education has benefited the production and transmission of information, permitting researchers to successfully deal with massive amounts of data (Schmidt et al., 2025). Consequently, AI has surpassed the field of computer science and is now confined to interdisciplinary/multidisciplinary, encompassing the domains like library and information science, social sciences, and health sciences. This confluence reflects both the revolutionary potential of AI and the rising understanding that interdisciplinary approaches in library and information science are necessary to map information and resources in the world of information explosion. AI has radically reshaped the user engagement, resource management, and service delivery in the academic field of Library and Information Science (Amalia et al., 2024). Based on various studies, the application of AI in academic libraries have incorporated several cognitive based information retrieval systems, recommendation platforms, AI-driven chatbots, automated indexing and cataloguing, metadata compilation and optimization of collection development (Ayinde et al., 2026; Islam et al., 2025; Kumar et al., 2026). For instance, AI-powered search engines have boosted the accuracy and preciseness of user’s query by decoding the intention of the request rather than being depended solely on comparing and matching search keywords (Zhang et al., 2025; Kannaujia et al.,

2024). Similarly, chatbot technologies offer real-time, virtual assistant or consultation services, promoting accessibility fostering customer satisfaction (Idhris & Peter, 2024; Prakash & Kausalya, 2025). Also, the AI-based recommendation systems determine the user pattern to identify appropriate resources, customizing learning environments. Several investigations conducted in academic libraries, especially in developing countries illustrates equally both the benefits and challenges resulting from adoption of AI including concerns of finance, technical expertise, and legislative support (Orubebe et al., 2025). Numerous bibliometric evaluations revealed a consistent development in global research productivity on AI applications in libraries, emphasizing its evolving academic and practical significance (Mittal et al., 2026; Islam & Guangwei, 2025). These breakthroughs point out that artificial intelligence is not a replacement for traditional libraries or library professionals, but rather a complementing aid that improves professional productivity and strategic decision-making (Ahmed, 2024).

With the rapid growth of AI research in libraries, it is crucial to methodically look at emerging trends, thematic advancements, authorship patterns, and research impact (Kulkanjanapiban, 2025). Bibliometrics functions as a quantitative approach to investigate of academic scholarly publications using metrics including parameters such as productivity norms, collaboration-based networks, publication distribution, and citation analysis (Passas, 2024; Kumar et al., 2022; Ninkov et al., 2021; Mojada & Goud, 2025). By using bibliometric methods, academic researchers can monitor the development of a concept throughout the time and identify significant authors, publishers, organizations, and nations that have contributed to AI in libraries (Hassan et al., 2025; Bircan & Salah, 2022). In addition to bibliometrics, altmetrics evaluate citations on digital platforms, news media, policy papers, and social networking sites in order to measure online attention and societal impact (Yu & Chen, 2026; Sedighi, 2020). When combined these approaches, provide a thorough grasp of societal engagement and academic significance of a research publication. Therefore, mapping the intellectual structure, research dynamism, and practical impact of AI in libraries in scholarly articles calls for the integration of both bibliometric and altmetric methodologies. These research investigations support evidence-based planning and innovation for policymakers, educators,

and library professionals in addition to providing guidance and insights for upcoming research areas.

### **Scope of the study**

The scope of this investigation is confined to both the bibliometric and altmetric analysis of scholarly literature retrieved from the Scopus database within the selected research domain i.e. Artificial Intelligence (AI) in academic libraries. The study focuses on analysing publication growth, prolific sources, institutional affiliations, contributing countries, and authorship patterns, including the assessment of the Degree of Collaboration among authors. Bibliometric analyses are carried out using Biblioshiny, while the results are interpreted and visualised through Tableau and Microsoft Excel.

In addition, the study examines the online visibility and societal impact of research outputs by analysing the Altmetric Attention Scores (AAS) of the top ten most cited articles. Altmetric data are extracted and analysed using the Dimensions.ai database. The study is confined to peer-reviewed documents indexed in Scopus and does not include publications from other databases or grey literature. The findings are limited to the time span and document types covered by the selected databases.

### **Objectives**

- i. To examine growth of publications; most prolific source, affiliation & countries of scholarly articles
- ii. To find the authorship pattern; and assess the Degree of Collaboration (DC) among the authors
- iii. To determine the online attention score of the top ten cited articles through altmetrics.

### **Methodology**

This study investigates the landscape of Artificial Intelligence (AI) in Academic Libraries integrating the dual framework methodology i.e. quantitative bibliometric and altmetric evaluation approach. The dataset for the study was primarily extracted from Scopus Database on January 8<sup>th</sup> 2026 due to its extensive coverage and reliable citation indexing using a systematic and standard keyword structure (i.e., ““Artificial Intelligence,” OR “Machine Learning,”” AND ““Academic Libraries,” OR “Smart Libraries””); which was then meticulously preprocessed through deduplication to ensure data authenticity. The Bibliometrix R-package

(Biblioshiny) was used for the bibliometric phase to evaluate scientific mapping, citation impact, and authorship production distribution. Tableau and Microsoft Excel were used for further visualization through graphics and statistical data aggregations.

The study used Dimensions.ai (<https://app.dimensions.ai/discover/publication>) to conduct an altmetric analysis in order to present a comprehensive overview of research impact on society. Altmetric Attention Scores (AAS) compares the conventional academic impact with real-time digital engagement through social media mentions and policy citations. This comprehensive assessment of the scholarly publication, extents and wider public exposure of AI advances in library science.

### Data Analysis and Interpretation

#### i. Year Wise distribution of Scholarly Publications

Figure 1 illustrates the annual scientific production of AI-related research within academic libraries from base year 1989 till 2025. For nearly three decades, the field remained in its early stages with inconsistent research productivity and several years with no productivity consequently. Around 2017, there was a significant turning point that marked the beginning of an era of exponential growth of research of AI in academic libraries. This surge is particularly evident between 2023 and 2025 where the quantity of publications increased from 24 to 95 articles which was nearly a fourfold rise in just two years, and also culminating in a peak of 95 publications in 2025. This sharp rising trend indicates a move toward mainstream academic environment that reflects growing scholarly interest as well as the quick incorporation of AI technology within the field of library sciences.

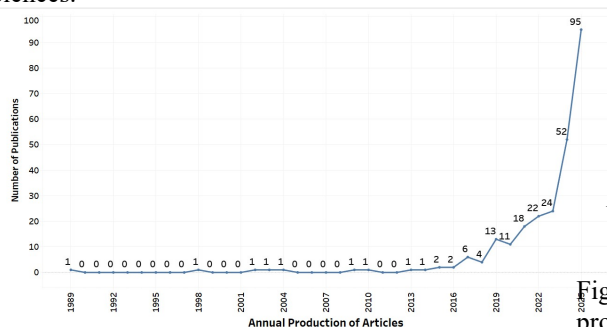


Figure 1: Year wise production of scholarly articles

#### ii. Annual Growth Rate

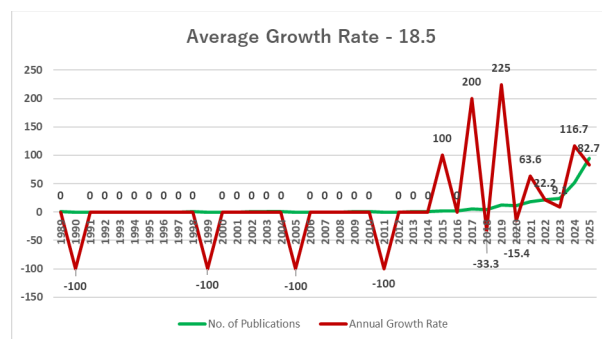


Figure 2: Annual Growth Rate of the research publication

Figure 2 reveals a highly volatile yet accelerating Annual Growth Rate (AGR) for AI research in academic libraries between 1989 and 2025. For most of the late 20th and early 21st centuries, due to irregular publishing outputs, the growth rate either stayed stable or saw severe negative variations (such as -100%). But in 2014, there was a substantial shift, and in 2019, the AGR reached an incredible peak of 225%. The growth rate stabilized into a consistent steady trajectory after a temporary contraction in 2020, reaching 116.7% in 2024 before eventually settling at 82.7% in 2025. Despite these intense fluctuations, the calculated Average Growth Rate of 18.5 signifies an intense and advancing field demonstrating a scholarly momentum despite of the extreme volatility of the publications.

#### iii. Global Distribution of Scientific Productivity

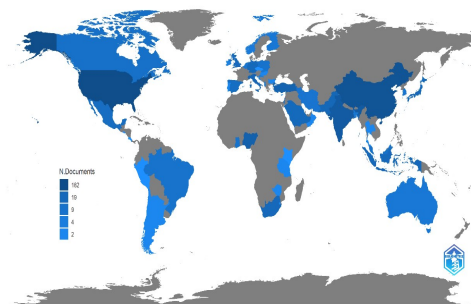


Figure 3: Distribution of Country wise scientific production

Figure 3 depicts the global distribution of scientific production based on the number of documents authored by country. The data reflects a high percentage of research productivity in a few major hubs, most notably in the United States, which leads the global production with 182 documents.

Other significant contributions include the country China and India, demonstrating a strong research presence in the Northern Hemisphere and Asia-Pacific area. In contrast, extensive regions throughout Africa, Central Asia, and portions of South America have little to no reported scientific production in this dataset, as indicated by the grey shading, while the emerging economies like Brazil and Australia exhibit moderate research activity about AI in libraries. This gap demonstrates a clear regional imbalance in the conception of global knowledge.

iv. Ranking of most productive Journal and Organization

Table 1 identifies the leading institutions and journals contributing to the research conducted on AI in

academic libraries based on the number of publications (NP). The University of California (NP=19) is the most productive institution, followed by Università Degli Studi Di Bari Aldo Moro (NP=17) and Harvard University (NP=16). The outcomes reveal a geographically diverse dominance throughout North America, Europe, Asia, and Africa. Regarding publication of articles in journal, Library Hi Tech News is the dominant source with 15 publications which is followed by Library Hi Tech (NP=8). The existence of specialized scholarly journals like the Journal of Machine Learning Research and numerous library science publications indicates an interdisciplinary approach.

**Table 1:** Depiction of prolific journals and affiliations

Ranking of the Top Five Organisations/Institutions			Ranking of Top five Journal/Source		
Rank	Affiliation	NP	Rank	Source	NP
1st	University of California	19	1st	Library Hi Tech News	15
2nd	Università Degli Studi Di Bari Aldo Moro	17	2nd	Library Hi Tech	8
3rd	Harvard University	16	3rd	IFLA Journal	7
4th	Universitas Airlangga	14	4th	International Information and Library Review	6
				Journal of Academic Librarianship	
				Journal of Machine Learning Research	
5th	Tsinghua University	13	5th	Information Development	5
	University of Calabar			Information Technology and Libraries	
				Journal of Library and Information Science in Agriculture	
				Library and Information Service	
				Technical Services Quarterly	

v. Authorship Pattern and Degree of Collaboration amongst the scholarly publications

Table 2 demonstrates that collaborative efforts dominate the field, with multiple-author (NP=75) and double-author (NP=69) publications collectively surpassing single-author contributions (NP=74). This trend demonstrates a shift toward collaborative competence in addressing complex research challenges. The long-term research investigation shows a considerable surge in productivity and collaboration over time. While output was irregular in the early years (1989-2014), a significant growth time frame began in 2019 and has peaked in 2025 with 95 publications. Furthermore, the DC has remained consistently elevated in recent years, with values ranging between

0.62 and 0.83 since 2019 as shown in table 3. This pattern implies that the majority of recent research is the output of collaborative efforts rather than single authors, reflecting an increasingly networked and multidisciplinary academic environment.

**Table 2:** Depiction of Authorship Pattern

Authorship Pattern	NP
No Authors	2
Single Author	74
Double Authors	69
Triple Authors	38
Multiple Authors	75
<b>Total</b>	<b>258</b>

**Table 3:** Representation of Degree of Collaboration (DC) among Authors

Year	Single Author	Multiple Authors	Total Publication	DC
1989	0	1	1	1
1998	0	1	1	1
2002	1	0	1	0
2003	0	1	1	1
2004	0	1	1	1
2009	0	1	1	1
2010	1	0	1	0
2013	0	1	1	1
2014	0	1	1	1
2015	1	1	2	0.5
2016	1	0	1	0.5
2017	4	2	6	0.33
2018	2	2	4	0.5
2019	5	7	12	0.62
2020	2	9	11	0.82
2021	3	15	18	0.83
2022	8	14	22	0.64
2023	9	14	23	0.63
2024	11	41	52	0.79
2025	25	70	95	0.74
Total	73	182	255	13.88

vi. Depiction of Top Cited Articles

Table 4 presents the top ten most notable publications in the research area which is ranked by citation impact in the Scopus and Dimensions databases. A significant concentration of citations has been observed in the early foundational studies, notably in 2019, when a survey of machine learning frameworks (695 Scopus citations) was published, and in 2020, when research on descriptors for materials science (614 Scopus citations) was published. This indicates that methodological surveys and technical libraries serve as primary references for the research area AI in academic libraries. Moreover, the data indicates a specific emphasis on incorporating AI into academic library services. The digital revolution of higher education and the changing skills of library personnel are regularly discussed mainly in the Articles A3 to A10. Recent articles from 2024 (A9 and A10) have rapidly accumulated citations, indicating a very active and growing academic interest in the linkage of AI and library science.

**Table 4:** Demonstration of top cited research articles

Sl. No	Title	Year	Scopus citation	Dimension citation
A1	Machine Learning and Deep Learning frameworks and libraries for large-scale data mining: a survey	2019	695	731
A2	DScribe: Library of descriptors for machine learning in materials science	2020	614	708
A3	The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries	2019	222	256
A4	Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education	2022	212	251
A5	Perceptions toward artificial intelligence among academic library employees and alignment with the diffusion of innovations' adopter categories	2020	107	130
A6	How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions	2023	101	122
A7	Artificial intelligence in academic libraries: An environmental scan	2020	93	124
A8	Deeptime: a Python library for machine learning dynamical models from time series data	2022	92	108
A9	Leaders, practitioners and scientists' awareness of artificial intelligence in libraries: a pilot study	2024	82	100
A10	Various Frameworks and Libraries of Machine Learning and Deep Learning: A Survey	2024	81	110

vii. Demonstration of Altmetrics Attention Score (AAS)

Table 5 represents the distribution of Altmetric Attention Scores (AAS) across various digital platforms for the top ten cited articles, as retrieved from the Dimensions.ai database. According to the analysis, Mendeley is the most prolific platform with 2,415 mentions for article A1 from overall 6,726 readers. This implies that researchers have a high degree of academic significance and practical applicability. With 621 mentions, X (previously

Twitter) leads social media dissemination, with Facebook and blogs witnessing fewer activity. Surprisingly, article A8 has the highest total AAS (182), consistent with its substantial popularity on X (295 mentions). The minimal engagement in policy documents and Wikipedia suggests that although these works are very visible in academia; however, the social visibility reveals that their direct incorporation into official policy or public comprehensive reference is yet to incept.

**Table 5:** Display of AAS mentions in various social networking sites

Sl. No	AAS	Blogs	Facebook	Mendeley	Patents	Policy Documents	QnA	Wikipedia	X
A1	180	-	1	2415	10	1		2	250
A2	17	1	2	920	-	-	1	-	14
A3	33	3	-	597	-	-	-	-	19
A4	5	1	-	993	-	-	-	-	-
A5	11	1	1	345	-	4	-	-	-
A6	39	3	2	400	-	-	-	-	32
A7	15	1	-	294	-	-	-	-	9
A8	182	1	1	198	-	-	-	-	295
A9	9	1	-	388	-	-	-	-	2
A10	3	-	-	176	1	-	-	-	-
<b>Total</b>		<b>12</b>	<b>7</b>	<b>6726</b>	<b>11</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>621</b>

**Conclusion**

The present study emphasizes the transformative role of Artificial Intelligence (AI) in reshaping the landscape of academic libraries and the broader field of Library and Information Science (LIS). The study offers a thorough overview of the intellectual structure, developmental progression, and societal impact of AI-related research in libraries by utilising a study of both bibliometric and altmetric approaches. The results show that AI is a fast developing field which has radically changed traditional library operations, improved service delivery, and redefining user involvement. The exponential surge in academic production, especially after 2017, suggest a paradigm change reflecting as one of the most important findings of the study. This surge is also a reflection of how AI is becoming more widely acknowledged as a vital tool for handling challenging information management concerns. Earlier decades were marked by irregular contributions; however, during the past few years have seen steady and rapid growth, indicating the field's transition from conceptual

investigation to practical application (Dwivedi et al., 2023).

This tendency is consistent with earlier research emphasizing the growing application of AI technologies such as machine learning, natural language processing, and intelligent information retrieval systems in educational organizations (Matos et al., 2025). The regional distribution of research output demonstrates a significant imbalance, with the United States, China, and India dominating in scientific productivity. Although this demonstrates these areas have a strong institutional and technical capacity, but it also highlights inequities in global knowledge generation. In order to ensure equitable involvement in AI-driven research and innovation, developing areas continue to be underrepresented, indicating a requirement for inclusive policies, international collaboration, and capacity-building programs (Chedrawi et al., 2026). Key organizations, journals, and frequently referenced books that serve as the field's intellectual foundation are further determined by using the bibliometric study. The transition from single-author to multi-author publications is indicative of the multidisciplinary

traits of AI research, resulting in the need for knowledge from domain-specific areas, computer science, and information science. In addition to improving the caliber and significance of research, this collaborative trend promotes interdisciplinary information sharing for the successful integration of AI in library systems.

The altmetric approach in the present study supplements these observations by offering more comprehensive view of the digital visibility and social reach of AI research in libraries. The growing significance of online interaction and academic communication beyond standard citation metrics is evident in the dominance of platforms like Mendeley and X (formerly Twitter) in research dissemination. There is a gap between academic research and its application into practice and policy which shows the small number of these studies in policy papers and public information platforms. In general, the combination of altmetric and bibliometric methods is quite effective in capturing the social significance and scholarly impact of research. This multifaceted evaluation has made possible by this dual-framework technique which offers insightful information to the academicians, policymakers, and library professionals. Along with mapping the current state of research, it also highlights new trends, patterns of collaboration, and areas that warrant further investigation.

In conclusion, artificial intelligence (AI) has the potential to significantly impact academic libraries in the future by acting as a catalyst for efficiency, creativity, and user-centred services. Even with significant progress, issues with infrastructure, knowledge, morality, and governmental support still need to be resolved to guarantee equitable and sustainable growth. Future studies should focus on improving multidisciplinary collaboration, overcoming geographical barriers, and translating scholarly discoveries into practical applications. By performing such research, the LIS community can fully utilize AI's assurances to build robust, savvy, and adaptable library ecosystems (Adewojo et al., 2024).

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