AWARENESS OF AI APPLICATIONS AMONG LIBRARIANS IN INDIA

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Abstract
Artificial Intelligence has percolated in everyday activities. It is helping the people excel with supremacy in their day-to-day chores. Having awareness and knowledge of the implications of the same is considered very much necessary for the professions. The present paper envisages the awareness of the library professionals about the implications of Artificial Intelligence in library services. The study is using the mixed methods and approach as design for the research. The researcher has employed a structured questionnaire that was circulated among 90 librarians from the higher educational institutions of Maharashtra. The findings denoted that the level of awareness is different among different professionals who were depending on some of the factors such as awareness of Artificial Intelligence, technology, educational background, professional training and access to technological resources.
Keywords: Artificial Intelligence, Machine Learning traditional software's, awareness and knowledge, library professionals.

Introduction

Artificial Intelligence (AI) is a game-changer in the rapidly developing field of technology, offering previously unheard-of levels of productivity, creativity, and flexibility across a wide range of industries. In this setting, libraries—which are typically thought of as strongholds of knowledge and information—find themselves at the nexus of history and modernity. The management, accessibility, and distribution of information could be completely transformed by the incorporation of AI technologies into library services. This study sets out to investigate an important aspect of this paradigm: Indian librarians' knowledge of AI applications. Libraries have always been dynamic institutions that have changed with the times, from the printing press to the digitization of catalogs. AI opens up new possibilities for libraries today, allowing them to improve operations, automate repetitive work, and offer more individualized services to patrons. However, as the keepers of knowledge repositories, librarians' awareness and readiness are critical to the successful integration of AI into library services.

The main objective of this study is to find out how much knowledge librarians in India now have about AI applications and what factors affect their use of this game-changing technology. In addition to the customary difficulties of organizing, preserving, and sharing knowledge, librarians also have to deal with the intricacies of integrating artificial intelligence. India offers a distinctive setting for investigating librarians' awareness of artificial intelligence (AI) because of its diverse range of languages, cultures, and socioeconomic backgrounds. The ways in which librarians view and use AI technologies may be influenced by the digital divide that exists between urban and rural locations, differences in educational infrastructure, and linguistic diversity. Through the analysis of geographical differences, this study aims to provide detailed understandings that can guide focused approaches to improving AI awareness in various settings.

The landscape of awareness is complex and influenced by many different things. Potential obstacles that should be carefully considered include lack of standardized training programs, reluctance to technological change, and resource limitations. Determining these obstacles is essential to creating focused plans to address them and enable the smooth integration of AI in libraries. Additionally, as examples of best practices, the study will highlight specific cases where AI has been successfully incorporated into library services. These examples will demonstrate AI's revolutionary potential while also providing useful advice on how to overcome obstacles and optimize the technology's advantages.

Literature Review

The awareness and integration of artificial intelligence (AI) applications within the library profession have become increasingly pertinent in the digital age. Several studies post-2018 have delved into this topic, aiming to understand the levels of awareness, challenges, and opportunities related to AI among librarians in India.

Cox.A, (2023). The author believes that Information professionals must adeptly address ethical challenges as they increasingly integrate AI into their services and advocate for its broader adoption within their organizations. While professional ethical codes offer overarching principles, they often lack the specificity required for navigating AI-related dilemmas effectively. Hence, this paper aims to explore pertinent literature and present eight distinct ethics scenarios tailored for information professionals, providing tangible examples to grasp the complexities. The discussion encompasses defining AI, relevant applications within the information profession, and an overview of ethical issues inherent in AI technology and its industry. Additionally, it reviews existing studies addressing ethical concerns specific to information professionals before introducing the open-access set of eight ethics scenarios, intended for widespread adoption and adaptation within the community.

Kumar et.al (2023). The main focus of this investigation centered on the utilization of artificial intelligence (AI) within India's academic library infrastructure. The research objective was to explore the potential applications of AI within India's academic library framework. The study's outcomes underscore the considerable potential of AI in enriching various aspects of academic library services across India. These potential applications include employing expert systems in technical domains, streamlining indexing and acquisition processes, as well as leveraging AI's capabilities in natural language processing (NLP), pattern recognition, and the integration of robotics to optimize library functionalities. Drawing from the study's conclusions, it is recommended that academic libraries in India enthusiastically adopt AI into their operational frameworks. Moreover, it is advisable for these libraries to allocate resources for staff training to ensure competence in leveraging AI for service delivery effectively. Additionally, integrating AI should be firmly established as a standard practice across all library divisions, with budgetary considerations accommodating AI costs. The integration of AI within India's academic library system could simplify the process of accessing materials, enhancing user experiences.

Subaveerapandiyan, et.al. (2023). The objective of this research is to investigate the proficiency of AI literacy among Library and Information Science (LIS) researchers within the Association of Southeast Asian Nations (ASEAN) region. This study seeks to evaluate existing proficiency levels, pinpoint challenges and disparities, propose strategies for skill improvement, and examine how researchers stay abreast of AI advancements. The methodology involved the administration of a structured questionnaire to gather data, followed by analysis using suitable statistical techniques. The results indicated that most respondents demonstrated proficiency in various aspects of AI literacy relevant to LIS research. Nonetheless, certain areas such as comprehension of AI concepts, ethical considerations, and programming skills exhibited lower levels of proficiency. Factors affecting AI literacy encompassed limited resources for enhancement, lack of awareness, and inadequate availability of AI-related courses in LIS education.

Oladokun, et.al. (2023). As traditional physical spaces adapt to changing reading habits and shifts in how information is consumed, the concept of libraries within the metaverse raises compelling questions regarding accessibility, knowledge dissemination, and the changing role of librarians. This paper aims to investigate the role of the metaverse in virtual libraries. Through a comprehensive review of literature, the paper examines various perspectives on libraries within virtual worlds. In the dynamic landscape of information and technology, the emergence of libraries in virtual realms introduces a transformative paradigm characterized by significant advantages and complex challenges. These benefits include improved accessibility for a global

audience, interactive engagements catering to diverse learning preferences, and the unprecedented scalability offered by digital environments.

Subaveerapandiyan, et.al. **(2024).** This research delves into the viewpoints of Indian library professionals regarding the integration of artificial intelligence (AI) in library operations. Its objective is to grasp their level of understanding, awareness, and opinions concerning AI along with its associated challenges and opportunities. Employing a quantitative approach, the study utilizes a structured survey to gather insights from 386 library professionals situated in academic institutions throughout India. The survey encompasses various facets such as socio-demographic details, familiarity with AI, perspectives on its implementation in libraries, ethical considerations, and the adoption of AI tools and services. The results suggest that Indian library professionals possess a general awareness of AI and recognize its potential benefits within library contexts.

Hussain, Abid. (2023). Artificial intelligence (AI) stands out as a prominent technology in contemporary times, finding applications across various sectors such as business, defense, healthcare, and education. In the realm of library services, AI holds the potential to facilitate informed decision-making, marking a significant advancement in the age of information technology. This paper aims to underscore the significance of AI integration within library operations. While numerous studies have explored this topic, many have only scratched the surface, focusing on limited applications. By delving into the advantages and drawbacks of AI in library services, this paper seeks to shed light on its multifaceted role. Despite the strong connection between AI and libraries, questions persist regarding the extent of AI utilization and awareness within library services, a topic that this paper aims to address comprehensively.

Fakhre,et.al. (2024). This research delves into the realm of artificial intelligence (AI) literacy within academic libraries in Zambia, focusing on the perspectives and utilization of AI among librarians. The study aims to assess the level of AI literacy among Library and Information Science Professionals in Zambia, ascertain their familiarity and comprehension of AI applications within library settings, and investigate their viewpoints regarding the advantages and challenges associated with incorporating AI technologies into library services. Data were collected from 82 participants through purposive and convenience sampling methods. The results reveal a strong grasp of AI fundamentals among Zambian librarians, along with favorable attitudes towards the potential benefits of AI in enhancing library services.

These studies collectively underscore the growing recognition of AI's transformative potential within the library profession in India. They emphasize the need for librarians to enhance their awareness, skills, and readiness to effectively leverage AI technologies in optimizing information services and enhancing user experiences.

Objectives of the Study
1.   To assess the level of awareness of AI applications among librarians.
2.   To identify the challenges that librarians face in implementing AI technologies in their libraries.

Hypothesis of the Study
Hypothesis 1
H0 – There is no association between the experience of the librarians and the Awareness of AI applications
H1- There is significant association between the experience of the librarians and the Awareness of AI applications

Research Methodology
The research methodology entails surveying 84 librarians from colleges in Maharashtra, India, to gauge awareness of AI applications. A structured questionnaire is administered, capturing data on awareness levels. Chi-square test is employed to assess the association between librarians' experience and AI awareness. Microsoft Excel is utilized for data analysis, including descriptive statistics to summarize findings. The study aims to comprehensively understand the awareness landscape among librarians, shedding light on their perceptions and knowledge regarding AI technologies in library services, thereby contributing to the discourse on AI integration within the Indian library profession.

Result Findings

Table 1: Demographic Composition	Category	Frequency	Percentage
Gender	Female	26	30.95
	Male	58	69.05
Age Group	Above 50	11	13.10
	41 to 50	44	52.38
	31 to 40	28	33.33
	21 to 30	1	1.19
Years of Experience	1 to 5 years	5	5.95
	6 to 10 years	15	17.86
	11 to 15 years	25	29.76
	More than 15 years	39	46.43
College Status	Affiliated	65	77.38
	Autonomous	15	17.86
	State University	1	1.19
	University	1	1.19
	Private Engineering College	1	1.19
	school library	1	1.19

Table 2: Familiarity with term Artificial Intelligence	Frequency	Percentage
Not familiar at all	1	1.19
Not very familiar	3	3.57
Neutral	8	9.52
Somewhat familiar	39	46.43
Very familiar	33	39.29

The data in table 2 reveals varying degrees of familiarity with the term "Artificial Intelligence" among respondents. While a significant portion (46.43%) described themselves as "Somewhat familiar," a considerable percentage (39.29%) claimed to be "Very familiar." Only a small fraction (1.19%) admitted to being "Not familiar at all."

Table 3: Factors that have influenced your awareness of AI in libraries.	Frequency	Percentage
Library conferences	23	27.38
Online resources and webinars	72	85.71
Social media	50	59.52
Training and workshops	41	48.81
Professional literature and journals	35	41.67
Colleagues and peers	35	41.67

The data in table 3 suggests that various factors contribute to awareness of AI in libraries. Online resources and webinars stand out prominently, influencing 85.71% of respondents. Social media and library conferences also play significant roles, with 59.52% and 27.38% respectively. Training, professional literature, and colleagues contribute substantially to awareness, each around 40-50%.

Table 4: Impact of AI on Library Profession	Frequency	Percentage
Yes	71	84.52
No	3	3.57
I am not sure	10	11.90

The data in table 3 indicates a notable impact of AI on the library profession, with 84.52% of respondents acknowledging its influence. A smaller portion, 3.57%, reported no discernible impact, while 11.90% expressed

uncertainty. These figures underscore the growing recognition of AI's role in libraries, reflecting a majority who perceive its significance. However, a minority remain uncertain, suggesting a need for further understanding and exploration of AI's implications within the profession.

Table 5: Used AI Application in Library	Frequency	Percentage
Yes	40	47.62
No	44	52.38

The data in table 5 illustrates that 47.62% of respondents have used AI applications in library settings, while 52.38% have not. This suggests a moderate adoption rate of AI technologies within libraries, with nearly half of the respondents having utilized such applications. However, the fact that slightly over half of the respondents have not yet used AI applications indicates potential for further integration and exploration of AI technologies in library services to enhance efficiency and user experiences.

Table 6: Type of AI Application	Frequency	Percentage
Chatbot	23	27.38
Virtual reference assistant	19	22.62
Recommendation engine	9	10.71
ChatGPT	2	2.38
Opac	1	1.19
Progress	1	1.19
NA	3	3.57
Not yet used	3	3.57

The data in table 6 reveals that among respondents who have used AI applications in libraries, the most common types are Chatbots (27.38%) and Virtual reference assistants (22.62%). Recommendation engines are also notable, accounting for 10.71% of usage. Other applications like ChatGPT, Opac, and Progress are less prevalent. Moreover, a small portion (3.57%) indicated they have not yet used any AI applications. This highlights a diverse landscape of AI tools being utilized to enhance library services.

Table 7: Formal Training on AI Applications	Frequency	Percentage
Yes	18	21.43
No	66	78.57

The data in table 7 indicates that a significant majority (78.57%) of respondents have not received formal training on AI applications in the context of library science. Conversely, a smaller portion (21.43%) reported having undergone such training. This suggests a potential gap in the integration of AI education within library science programs or professional development initiatives. Bridging this gap could empower library professionals with the skills necessary to leverage AI effectively in their work and services.

Table 8: Level of Awareness of Automated cataloging systems	Frequency	Percentage
1	23	27.38
2	10	11.90
3	16	19.05
4	18	21.43
5	17	20.24

The data in table 8 illustrates varying levels of awareness among respondents regarding automated cataloging systems. While a substantial portion (27.38%) indicated a minimal awareness (level 1), others displayed a more nuanced understanding, with 20.24% exhibiting a high level of awareness (level 5). Interestingly, a considerable number fell within levels 3 and 4 (19.05% and 21.43%, respectively), indicating moderate to advanced levels of familiarity with automated cataloging systems among library professionals.

Table 9: Level of Awareness of AI-driven recommendation systems for library resources	Frequency	Percentage
1	20	23.81
2	14	16.67
3	17	20.24
4	20	23.81
5	13	15.48

The data in table 9 showcases a diverse range of awareness levels concerning AI-driven recommendation systems for library resources. A notable portion (23.81%) demonstrated minimal awareness (level 1), while others displayed varying degrees of familiarity. Level 4 (23.81%) and level 3 (20.24%) received similar frequencies, suggesting a considerable understanding among respondents. Meanwhile, levels 2 and 5 received relatively lower percentages, indicating fewer respondents with either limited or extensive familiarity with AI-driven recommendation systems in library services.

Table 10: Level of Awareness of Natural Language Processing (NLP) for information retrieval	Frequency	Percentage
1	18	21.43
2	20	23.81
3	13	15.48
4	18	21.43
5	15	17.86

The data in table 10 on awareness levels of Natural Language Processing (NLP) for information retrieval demonstrates a varied distribution among respondents. While a substantial proportion displayed moderate awareness (levels 2, 3, and 4), levels 1 and 5 also garnered significant representation. Level 2 had the highest frequency (23.81%), closely followed by levels 1 and 4 (21.43%). Levels 3 and 5 received relatively lower but still notable percentages, indicating diverse awareness levels across respondents.

Table 11: Level of Awareness of AI-based virtual assistants for user queries	Frequency	Percentage
1	23	27.38
2	8	9.52
3	18	21.43
4	23	27.38
5	12	14.29

The data in table 11 reveals varying levels of awareness regarding AI-based virtual assistants for user queries among respondents. A notable portion exhibited a basic understanding (level 1) or a moderate awareness (levels 3 and 4), with each garnering similar frequencies around 27%. Levels 2 and 5 represented lower percentages, indicating limited awareness or expertise. This distribution suggests a need for further education and exposure to enhance familiarity and utilization of AI-based virtual assistants in libraries.

Table 12: Challenges faced by libriains in implementing AI	Frequency	Percentage
Lack of awareness and understanding	82	97.62
Budget constraint	59	70.24
Technical expertise	76	90.48
Resistance to change	30	35.71
Data privacy concerns	42	50.00
Lack of awareness and understanding, Budget constraint, Resistance to change, Data privacy concerns, Technical expertise	13	15.48
No idea	1	1.19

The data in table 13 highlights several challenges faced by librarians in implementing AI applications. The most prevalent challenges include a lack of awareness and understanding, with a significant majority of respondents (97.62%) acknowledging this issue. Following closely are budget constraints (70.24%) and the need for technical expertise (90.48%), indicating resource and skill limitations. Additionally, resistance to change (35.71%) and concerns regarding data privacy (50.00%) emerge as significant barriers. A notable subset of respondents (15.48%) identified a combination of challenges encompassing lack of awareness, budget constraints, resistance to change, data privacy concerns, and technical expertise. These findings underscore the multifaceted nature of challenges faced by librarians, suggesting a need for comprehensive strategies addressing education, resource allocation, skill development, and policy frameworks to effectively integrate AI technologies while mitigating associated obstacles. The presence of respondents expressing "no idea" (1.19%) also emphasizes the importance of education and awareness campaigns to equip librarians with knowledge and understanding of AI implementation challenges.

Table 13: Perception on AI as having increasingly important role in libraries in the future	Frequency	Percentage
Yes	74	88.10
I am not sure	10	11.90

The data in table 13 highlights that the majority of respondents (88.10%) perceive AI as having an increasingly important role in libraries in the future. This indicates a widespread recognition of AI's potential to transform library services and meet evolving user needs. However, a notable minority (11.90%) remains uncertain about AI's future role, suggesting a need for further exploration and understanding of AI's implications in library settings. Overall, the data reflects optimism and anticipation regarding AI's impact on the future of libraries.

Table 14: Hopes for the future of AI in libraries	Frequency	Percentage
Improved user engagement	47	55.95
Increased innovation	44	52.38
Improved user engagement, Increased innovation	26	30.95
No idea	1	1.19

The data in table 14 indicates that librarians harbor optimistic expectations for the future of AI in libraries. A majority hope for improved user engagement (55.95%) and increased innovation (52.38%), highlighting a desire for more dynamic and interactive library experiences. Additionally, a significant portion (30.95%) express hopes for both improved user engagement and increased innovation. These aspirations underscore the belief that AI technologies have the potential to enhance library services and foster greater user satisfaction and exploration.

Hypothesis testing
Hypothesis 1
To test the association between the experience of the librarians and their awareness related to the AI applications, the researcher have conducted the chi-square test.

The values of the chi-square test are presented in the below table with regards the awareness of all the set of AI applications.

Table 15: Hypothesis testing

AI Technology	df	T value	x^2	Hypothesis Result
Automated cataloging systems]	83	101.879	2.074	Null hypothesis accepted
AI-driven recommendation systems for library resources	83	101.879	0.963	Null hypothesis accepted
Natural Language Processing (NLP) for information retrieval	83	101.879	0.985	Null hypothesis accepted
AI-based virtual assistants for user queries	83	101.879	0.972	Null hypothesis accepted

Based on the results provided:
For Automated cataloging systems, AI-driven recommendation systems for library resources, Natural Language Processing (NLP) for information retrieval, and AI-based virtual assistants for user queries:
Degrees of freedom (df) = 83
Test statistic (T value) = 101.879
Chi-square (χ^2) value = 2.074, 0.963, 0.985, 0.972 respectively
Hypothesis Result: Null hypothesis accepted for all cases.
Interpretation:
The null hypothesis (H0) states that there is no association between the experience of the librarians and the awareness of AI applications.
The alternative hypothesis (H1) suggests that there is a significant association between the experience of the librarians and the awareness of AI applications.
Since the null hypothesis is accepted for all AI technologies tested (Automated cataloging systems, AI-driven recommendation systems, NLP for information retrieval, and AI-based virtual assistants), it implies that there is no significant association between the experience of librarians and their awareness of these AI applications.
This suggests that the level of experience among librarians does not significantly influence their awareness of AI applications in the library profession, at least based on the data analyzed in these tests.

Discussion and Suggestions

Awareness of AI applications among librarians in India is pivotal as libraries evolve to meet the demands of the digital age. The varying levels of awareness observed in the data indicate the need for targeted interventions and support mechanisms. While some librarians exhibit a high level of familiarity with AI tools, others display limited understanding, potentially hindering the integration of these technologies into library services. To address this disparity, comprehensive training programs tailored to the needs of librarians across different regions and institutions should be implemented. These programs could cover various aspects of AI, including its applications in cataloging, recommendation systems, and virtual assistants. Moreover, workshops and seminars led by experts can provide hands-on experience and practical insights, fostering a deeper understanding of AI technologies. Additionally, collaborative platforms and professional networks can facilitate knowledge-sharing among librarians. Peer-to-peer learning initiatives, online forums, and community groups can serve as valuable resources for sharing best practices, discussing challenges, and exchanging ideas related to AI implementation in libraries.

Furthermore, policymakers and library associations should prioritize funding and resources to support AI literacy initiatives in the library profession. By investing in training programs, providing access to learning materials, and encouraging participation in relevant conferences and events, stakeholders can empower librarians to harness the full potential of AI in enriching library services and enhancing user experiences. Enhancing awareness of AI applications among librarians in India requires concerted efforts from various stakeholders. By offering targeted training, fostering collaboration, and advocating for supportive policies, the library community can effectively navigate the complexities of AI integration and leverage these technologies to propel libraries into the future.

Conclusion

In conclusion, awareness of AI applications among librarians in India is crucial for the advancement of library services in the digital era. While the data reflects varying levels of familiarity with AI tools, it underscores the need for targeted training programs and collaborative initiatives to bridge knowledge gaps and promote effective integration of AI technologies. By prioritizing education, fostering collaboration, and advocating for supportive policies, the library community can harness the transformative potential of AI to enhance information access, improve user experiences, and advance the mission of libraries in serving diverse communities across India.

References

i.   Cox, A. M. (2022). The Ethics of AI for Information Professionals: Eight Scenarios. Journal of the Australian Library and Information Association, 71(2), 1-14. DOI: 10.1080/24750158.2022.2084885

ii. Kumar, Ankit & Yadav, Neelam. (2023). Empowering Library System with AI: A Roadmap of AI in Indian Academic Libraries System. 8. 702.

iii. A., Subaveerapandiyan & Mitra Paladhi, Monali & Maruthaveeran, Vijayalatchumy. (2023). Evaluating AI literacy proficiency among LIS researchers in ASEAN. Library Hi Tech News. 10.1108/LHTN-07-2023-0121.

iv. Oladokun, Bolaji & Yahaya, Dauda & Enakrire, Rexwhite. (2023). Moving into the metaverse: libraries in virtual worlds. Library Hi Tech News. 40. 10.1108/LHTN-08-2023-0147.

v.   A., Subaveerapandiyan & Gozali, Alfian. (2024). AI in Indian Libraries Prospects and Perceptions from Library Professionals. Open Information Science. 8. 10.1515/opis-2022-0164.

vi. Hussain, Abid. (2023). Use of artificial intelligence in the library services: prospects and challenges. Library Hi Tech News. 40. 10.1108/LHTN-11-2022-0125.

vii. Fakhre Alam, Abid & A., Subaveerapandiyan & Mvula, Dalitso & Tiwary, Neelam. (2024). AI Literacy and Zambian Librarians: A Study of Perceptions and Applications. Open Information Science. 8. 20220166. 10.1515/opis-2022-0166.

viii. Ajakaye, Jesubukade. (2021). Applications-of-Artificial-Intelligence-(AI)-in-Libraries. 10.4018/978-1-7998-9094-2.ch006.

ix. Bisht, Sapna & Nautiyal, Ajay & Sharma, Setu & Sati, Manish & Bathla, Neha & Singh, Pardeep. (2023). The role of Artificial Intelligence in shaping Library Management and its Utilization. 467-472. 10.1109/ICDT57929.2023.10150520.

x.   Naikar, Satishkumar & Hatti, Shashikumar & Paul, Megha & Swamy, Rani K. (2024). Artificial Intelligence (AI) in Academic Libraries: A Theoretical Study. 10.4018/979-8-3693-2841-5.ch005.

xi. Mali, Tanaji & Deshmukh, Rahul. (2021). Applications of Artificial Intelligence in Library.

xii. Mali, Tanaji & Deshmukh, Rahul. (1944). Applications of Artificial Intelligence in Library. 70. 2021. 10.17762/msea.v70i2.2567.

xiii. Mayandi, Jayalakshmi. (2021). Library Services Using Artificial Intelligence: A Study.