JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

AN OVERVIEW OF ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGIES IN LIBRARY SYSTEMS

Dr. [1]Chikkamanju Mr.[2]Chikkanna K

[1]Assistant Librarian, College of Agriculture, Hanumanamatti, (UAS,Dharwad) Karnataka
[2]Library Assistant, Undergraduate Library, Maharaja's College Campus, University of Mysore, Karnataka

ABSTRACT

Artificial Intelligence (AI) has emerged as a powerful extension of human intelligence, reshaping various industries, including the library and information sector. In libraries, AI has revolutionized how information is organized, accessed, and delivered, making services more dynamic and efficient. Modern libraries are increasingly adopting AI-driven tools to enhance user experiences through personalized recommendations, automated cataloging, and virtual assistance. Librarians, always adaptive to innovation, now employ technologies such as virtual reality and intelligent systems to foster digital learning and engagement. AI's role in libraries goes beyond automation—it supports smarter decision-making and more interactive learning environments. Examples include AI-powered chatbots for reference queries, robots for managing collections, and immersive virtual spaces for user education. Rather than replacing librarians, AI complements their expertise, allowing them to focus on higher-level tasks and user interaction. Ultimately, the fusion of AI and librarianship is transforming libraries into more responsive, accessible, and future-ready knowledge centers.

KEYWORDS: Artificial Intelligence, Internet of Things, Smart Library, Big Data.

1.Introduction

Artificial Intelligence (AI) refers to the ability of machines to perform tasks that typically require human intelligence, such as reasoning, learning from experience, and problem-solving. In essence, AI represents the intelligence embedded within machines. As a subfield of computer science, it encompasses technologies like expert systems, fuzzy logic, neural networks, evolutionary algorithms, case-based reasoning, image and speech recognition, natural language processing, and robotics (Kaushal et al., 2012). In academic libraries, the adoption of AI enhances information connectivity, streamlines access to resources, and provides users with quicker, more personalized support.

The integration of Artificial Intelligence (AI) into academic libraries is set to transform how information technologies connect and operate, enhancing information access and helping users find resources more efficiently while addressing their needs in real time. According to Vijayakumar and Sheshadri (2019), AI and advanced computing will have a profound effect on the future of libraries, with outcomes differing based on the expertise applied. (Asefeh and Asemi, 2018) highlight several areas where AI can significantly improve library service delivery, including book circulation, shelving operations, and the cataloguing of library materials, among others.

AI focuses on designing computational systems capable of solving complex problems in a manner similar to human thinking. It models and simulates human cognitive processes through algorithms that computers can interpret and execute. A key component of AI, the neural network, mimics the structure and

function of the human brain by linking artificial neurons that process and transmit information to make decisions.

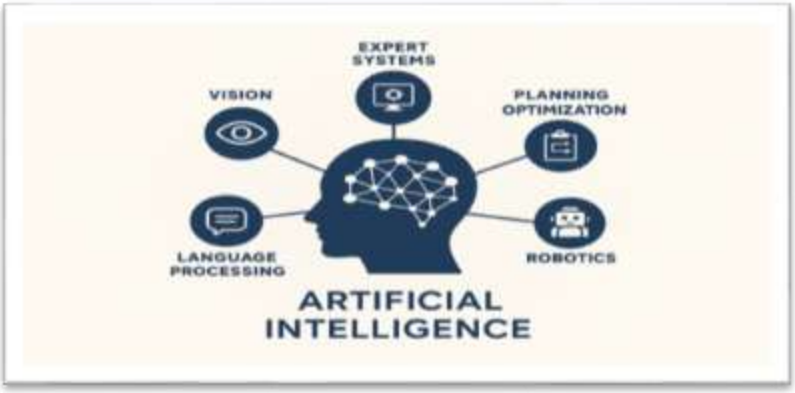
2.Grasping the Concepts of AI Technologies

Various scholars have defined artificial intelligence (AI) in different ways. Haugeland (1985) describes it as the creation of machines capable of possessing minds, while Charniak and McDermott (1985) view it as the study of mental functions through computational models. Similarly, Schalkoff (1990) defines AI as the explanation and simulation of intelligent behavior using computational processes, and John McCarthy characterizes it as the science and engineering of developing intelligent machines and computer programs. Artificial intelligence focuses on the principles and techniques of symbolic reasoning and the representation of knowledge within machines.

Artificial intelligence primarily concentrates on three key areas: perception, reasoning, and action. Among these, reasoning plays a crucial role in intelligence processing—it involves the internal mechanisms or programmed algorithms that enable computers to determine the most appropriate course of action before executing it. According to the McGraw-Hill Encyclopedia of Science and Technology (2007), artificial intelligence is a branch of computer science dedicated to understanding the essence of intelligence and developing computer systems capable of exhibiting intelligent behavior. Furthermore, it focuses largely on how knowledge is represented and on the use of heuristic techniques for reasoning, which rely on general assumptions and practical rules of thumb.

The term *artificial intelligence* often brings to mind images of talking computers or robots. In reality, artificial intelligence (AI) is a branch of computer science concerned with how computers can learn (machine learning), interpret information, and perform tasks related to vision—such as character recognition, image analysis, 3D perception, and modeling the function of the human eye. It also encompasses speech recognition and generation, natural language understanding and processing (Natural Language Processing), and expert systems, which continue to attract increasing interest. In essence, AI involves programming and designing computers to execute tasks that typically require human intelligence, including speech recognition, decision-making, visual interpretation, language translation, communication, and even expressing emotions (Irizarry-Nones, Palepu & Wallace, 2017).

The intelligence level of such machines can be evaluated through the *Turing Test*, developed by Alan Turing in the 1950s, although this method has faced several debates and criticisms. Irizarry-Nones, Palepu, and Wallace (2017) further explained that artificial intelligence can be classified as either strong **or** weak**.** A system with strong AI possesses human-like cognitive abilities—it can reason, make decisions, learn from experience, and even reprogram itself to improve performance, much like the intelligent machines portrayed in films. In contrast, weak AI systems lack true cognitive abilities; they cannot think, learn, or self-modify but are instead programmed to respond to specific tasks or conditions. According to Asemi and Asemi (2018), the field of artificial intelligence (AI) focuses on studying and creating computer systems or machines that demonstrate elements of human intelligence. These include the ability to learn new concepts and tasks, reason and draw meaningful conclusions, process natural language, and perceive or interpret visual scenes. Large number of rules and facts make up Artificial Intelligence programmes and these programmes process ideas and knowledge, not members, in several different ways.



Some of the recent computational techniques and areas that are utilized in developing fields of Artificial Intelligence are discussed below:

Machine Learning: Machine Learning (ML) is a branch of Artificial Intelligence (AI) that enables computer systems to learn and acquire new knowledge autonomously, without requiring explicit programming for every task. In ML, data is continuously supplied to the system, allowing it to determine how to process inputs and generate appropriate outputs. Machine learning models can also be iterative, meaning that a system's own output can serve as new input data, allowing it to self-refine through repeated testing and reprogramming. Moreover, ML systems can operate in collaborative or competitive pairs, In the context of library and information services, machine learning plays a pivotal role by automating data processing, improving resource discovery, and enhancing user experience. Common ML-based tools and applications within AI include Big Data analytics, Text and Data Mining (TDM), Robotics, Pattern Recognition, and Chatbots.

Deep Learning: Deep Learning (DL) is a specialized branch of Machine Learning (ML) inspired by the structure and functioning of the human brain. It utilizes artificial neural networks and advanced algorithms capable of learning from vast and complex datasets. Even when dealing with unstructured, diverse, and interconnected data, deep learning enables machines to address and solve highly complex problems autonomously. Applications of deep learning span various AI domains, including Natural Language Processing (NLP), Image Processing (IP), and Neural Networking, all of which leverage layered computational models to simulate intelligent behavior and improve decision-making accuracy.

Expert System: Expert systems are knowledge-based computer programs that serve as intelligent interfaces, providing users with access to databases and facilitating the retrieval of relevant information. These systems vary in complexity—from simple rule-based models operating on flat data structures to large-scale, integrated systems that require extensive development time and expertise. An expert system is designed to deliver specialized advice, decisions, or recommended solutions for specific problems, simulating the reasoning process of human experts. The core components of an expert system include the knowledge base, which stores domain-specific information; the inference engine, which applies logical rules to derive conclusions; and the user interface, which enables effective interaction between the system and the user.

Natural Language Processing: One of the long-standing objectives of computer science is to enable computers to comprehend and interpret human language. The ultimate advancement in computer language development is represented by natural language. Researchers in artificial intelligence (AI) have made significant progress in creating natural language interfaces, though most systems still operate within restricted vocabularies and syntactic structures. Natural Language Processing (NLP) enables computers to grasp the essential linguistic elements of human communication, allowing them to interpret questions and generate appropriate responses. According to Kumar (2004), the primary aim of NLP is to design and develop computer systems capable of analyzing, understanding, and producing language that humans use naturally. The major components of NLP include speech synthesis, speech recognition, machine translation, linguistic analysis, information retrieval, and information extraction.

Pattern Recognition: Pattern recognition refers to the process of identifying a correspondence between new stimuli and previously stored patterns. This cognitive and computational process occurs continuously throughout the lifespan of all living organisms. The study of pattern recognition spans multiple disciplines, including psychology, ethology, cognitive science, and computer science. The foundation of pattern recognition lies in either pre-existing (a priori) knowledge or statistical information derived from observed patterns. Typically, the patterns being classified consist of sets of measurements or observations that represent points within a suitable multidimensional space. The main components of pattern recognition include data acquisition, pre-processing, feature extraction, model selection and training, and evaluation.

Robotics: Robotics is widely recognized as a branch of artificial intelligence (AI) dedicated to developing machines capable of executing perceptual and motor functions. A robot can be defined as an automated mechanism designed to perform specific tasks either under human supervision or based on pre-programmed instructions. Advancements in technology have profoundly reshaped library operations, with robots increasingly utilized to handle repetitive, labor-intensive, or potentially hazardous duties. For example, the robot Bobbie assists in distributing materials such as newspapers, magazines, and brochures, while also offering user support by welcoming and guiding visitors to various sections of the library. Additionally, modern robots are being designed to address frequently asked questions (FAQs) posed by library patrons. Despite these impressive developments, robotic systems still fall short of human intelligence. While they

operate using AI-driven algorithms, robots lack the emotional awareness, creativity, and contextual understanding that characterize human cognition, and therefore continue to depend on human guidance for optimal performance.

Chatbots: Chatbots, also known as intelligent agents, digital assistants, or virtual agents, are software systems designed to engage in intelligent conversations using speech, text, or even embodied expressions. These systems are built to simulate human dialogue, enabling natural and interactive communication between humans and machines—a concept inspired by the Turing Test in artificial intelligence. Examples of contemporary chatbots widely used in daily life include Amazon's Alexa, Google Assistant, and Apple's Siri.

3. Artificial Intelligence and its Applications in Libraries

Libraries are increasingly developing new operational models to remain relevant in a rapidly evolving digital environment. To ensure long-term sustainability and improved user satisfaction, it is essential for libraries to adopt emerging tools and technologies. Since the core functions of a library revolve around information resources and services, there must be a strong emphasis on innovation to not only meet but exceed user expectations. The integration of Artificial Intelligence (AI) into the domain of library and information science is both inevitable and transformative. AI technologies offer vast potential to enhance efficiency, accessibility, and user engagement.

AI in acquisition: AI technologies can be employed to automate decision-making processes related to the use of MARC (Machine-Readable Cataloging) fields, helping cataloguers comply with cataloguing rules and standards more effectively. By integrating Artificial Intelligence (AI) and Machine Learning (ML) into cataloguing workflows, libraries can simplify the discovery and access of materials within their collections. This allows staff to devote more time to complex, value-added tasks, while patrons benefit from faster and more accurate access to information. However, to maintain effectiveness, it is crucial that AI systems are regularly updated and refined in line with evolving cataloguing standards and technological advancements. It can optimize the acquisition process, support more informed and efficient purchasing decisions, and help reduce costs. Some of the key ways AI can be applied in acquisitions are outlined below:

AI can assist in vendor selection and negotiation by analyzing factors such as vendor performance, purchasing history, and market trends. Through this analysis, it can identify the most reliable suppliers based on criteria like pricing, delivery efficiency, and overall dependability. AI can support budget planning and resource allocation by examining past expenditure patterns and forecasting future requirements. Using AI-powered predictive analytics, libraries can anticipate future resource needs by studying usage patterns, circulation data, and collection gaps. AI can recommend new materials for acquisition by analyzing user preferences, borrowing histories, and the library's collection development policies. It can also assist with content licensing, helping libraries maintain an appropriate balance between physical and digital materials while avoiding issues of overstocking or understocking.

Finally, AI can perform cost analysis and cost-benefit evaluations, enabling libraries to make informed purchasing decisions that align with their financial constraints and strategic goals. This ensures that every acquisition contributes effectively to both user satisfaction and overall collection quality.AI systems can be employed to enhance the management of subscriptions for databases, journals, and other electronic resources. These systems can track usage patterns, monitor subscription expiration dates, and recommend cost-effective adjustments that align with user needs and library budgets.

Additionally, AI can continuously scan and analyze the marketplace to keep libraries informed about new and emerging resources, as well as changes in pricing, licensing models, or competitive offerings. Through workflow automation, AI can streamline various acquisition processes—such as generating purchase orders, processing invoices, and updating inventory records—thereby reducing manual effort and minimizing errors.

AI for Cataloguing: AI cataloguing applications have transformed the way libraries manage and organize their collections. With the help of Artificial Intelligence, metadata for library materials can be generated automatically by extracting key details such as title, author, publication date, and content from various sources. Using Natural Language Processing (NLP) techniques, AI can analyze and interpret text to classify

materials and assign suitable subject headings and classification codes based on context and content. AI also supports authority control by recommending standardized forms of author names, subject headings, and corporate names, while identifying and correcting inconsistencies or variations. It can conduct quality control checks on catalogue records to detect errors, omissions, or inconsistencies, thereby ensuring accuracy and reliability in the library's database. In multilingual cataloguing, AI facilitates translation and transliteration of metadata, making collections accessible to users across different languages. It can also identify duplicate records and merge them, resulting in a more organized and efficient catalogue.

Additionally, AI can enrich metadata with semantic information—such as related terms, synonyms, and conceptual links—to help users discover relevant materials more effectively. It also enables the integration of linked data concepts, connecting library records with external datasets like authority files or linked open data for broader information access. Through pattern recognition, AI can automatically group related items, identify works within a series, and generate concise summaries of lengthy materials to assist users in assessing a resource's relevance. By leveraging Machine Learning, cataloguing processes become more accurate, efficient, and capable of offering personalized recommendations and insights to users, ultimately enhancing the library's overall information organization and discovery systems.

AI for Circulation (OPAC): AI is increasingly being integrated into circulation services in libraries to streamline operations, improve user experience, and enhance resource management. Key applications of AI in this area include automated checkout and renewal, exemplary management, inventory tracking, queue management, and user behavior analysis. AI can help libraries handle holds and reservations more efficiently by prioritizing user requests and optimizing the allocation of available materials. It can also automate the sorting of returned items, thereby reducing the workload of library staff. When combined with RFID technology, AI further enhances sorting accuracy and real-time inventory tracking.

Moreover, AI can predict user behavior, such as estimating when borrowed materials are likely to be returned or forecasting periods of high demand for specific resources. This predictive capability helps libraries make data-driven decisions about resource sharing, loan management, and collection planning. AI can also improve user engagement by sending automated notifications regarding due dates, hold availability, and new acquisitions. Additionally, libraries can integrate AI-powered chatbots into mobile apps to assist users with circulation-related inquiries, offering convenient, round-the-clock support. Overall, AI enables libraries to optimize circulation processes, improve efficiency, and deliver more responsive services. However, it remains essential to balance automation with human interaction to ensure that technology-driven services remain personalized, user-friendly, and aligned with patrons' needs.

AI for Reference Services: AI is transforming reference services in libraries by reshaping how users access information and receive support. Several key applications of AI in this area include: AI-powered virtual assistants and chatbots are now widely used to assist library users in real time. These intelligent tools can respond to frequently asked questions, help locate resources, and guide users to the appropriate library services or materials. Natural Language Processing (NLP) technologies enhance libraries' ability to provide more advanced search features and enable more conversational interactions with users. NLP is also used to develop chatbots, support voice-activated searches, and analyze the tone and intent behind user queries and responses.

Additionally, AI-based recommendation systems analyze users' preferences, search behavior, and reading habits to offer personalized suggestions for books, articles, and other resources—making it easier for users to discover relevant materials quickly and efficiently. AI has the potential to greatly enhance library reference services by making information retrieval more accurate, personalized, and user-friendly. It can improve search functionality by interpreting user intent and delivering contextually relevant results, thereby increasing both precision and recall during information searches. AI systems can also generate concise summaries of lengthy documents or articles, allowing users to grasp key points without reading the entire text. Additionally, AI can automatically create citations and bibliographies in various citation styles, saving time and ensuring accuracy. Through multilingual support, AI enables libraries to serve diverse user populations more effectively. By analyzing user behavior and interactions with library systems, AI can identify user preferences and information needs, which helps in collection development, service improvement, and efficient resource allocation. AI technologies can also provide alternative text formats, such as audio versions, and enhance accessibility features to support users with disabilities. Furthermore, AI-driven data analytics allows libraries to monitor usage patterns, assess user experience, and track performance metrics to refine services and optimize resource utilization. For library staff, AI can offer

professional development insights, suggest relevant publications, and highlight emerging trends in librarianship.

Overall, AI-driven tools empower libraries to deliver more efficient, personalized, and accessible reference services, improving the overall user experience. However, these technologies should complement—not replace—human expertise to ensure a well-rounded, user-centered reference experience.

AI for Collection Development: AI tools can be applied to the selection of vendors or book dealers for library acquisitions. An intelligent system can be developed to identify suitable suppliers based on data from past successful transactions involving specific types of publications. Such systems are particularly valuable for acquiring non-routine materials, including conference proceedings, foreign-language or international publications, and specialized technical reports. Research has also shown that AI systems are increasingly being implemented in librarianship to aid the selection process. One notable example is the *Monograph Selection Advisor*, which represents an innovative application of AI in developing library collections. This system replicates the decision-making process of subject bibliographers when selecting monographic materials. For optimal performance, the AI system requires a comprehensive knowledge base and a user-friendly interface to ensure that libraries can effectively achieve their selection goals.

AI for Indexing: AI can play a major role in improving indexing by automating and streamlining the process, making it faster and more efficient. Indexing is essential for organizing and retrieving information from vast datasets, including digital libraries, search engines, online repositories, and content management systems. Key applications of AI in indexing include automated document indexing, content classification, and entity recognition, among others. AI can also enhance image and multimedia indexing by enabling automatic tagging and metadata generation, helping users locate information more easily. Additionally, AI can analyze user behavior to improve search engine rankings and develop personalized indexes based on users' search histories and content interactions. Cross-language indexing further allows content to be accessible to a global audience.

While AI is a powerful tool for indexing, human oversight remains vital to ensure accuracy and relevance. For instance, AI can generate summaries and highlights that help users quickly grasp a document's key points, making it easier to decide which materials to explore further. It can also identify and manage duplicate or near-duplicate items to display only original records in search results. Moreover, AI supports temporal indexing, allowing users to find information based on specific time periods—such as historical events or recent publications. As AI-driven indexing systems continuously learn and adapt, they become increasingly efficient, precise, and responsive to evolving information needs.

4. Information Services

4.1.Recommendations as per Reading Habits: Libraries can develop Artificial Intelligence (AI) systems capable of analyzing users' reading habits and preferences to recommend relevant resources such as books, journal articles, patents, standards, and other documents. By studying user behavior, borrowing patterns, and search histories, these intelligent systems can personalize recommendations, helping users discover materials that align with their interests and research needs. This enhances user experience, promotes resource utilization, and supports more efficient information discovery within the library.

4.2.Recommendation Regarding Highly Read Books: Artificial Intelligence can use data mining techniques to identify the most frequently read books within a particular subject area and suggest them to readers who have an interest in that field.

4.3.Conversational Artificial Intelligence: Conversational Artificial Intelligence involves the use of messaging applications, voice assistants, and chatbots—computer programs that engage in dialogue through text or speech—to automate communication and deliver personalized user experiences on a large scale. In libraries, chatbots can be implemented to respond to user queries, thereby enhancing the quality and efficiency of reference services. For example, Microsoft has developed AI technology capable of reading documents and answering questions in a human-like manner. Similarly, the Stanford Question Answering Dataset (SQuAD) is a machine reading comprehension dataset consisting of questions based on a collection of Wikipedia articles, designed to train and evaluate such intelligent systems.

4.4.Image Recognition : Image recognition systems can also play a significant role in library services. For instance, in a library focused on defense science and technology, a researcher might present an image of a weapon and request information such as its specifications, technical reports, or applications. In such cases, image recognition–based Artificial Intelligence can analyze and identify the weapon, providing detailed information about its model, development history, specifications, and related data.

4.5.Text Detection: There are Artificial Intelligence systems capable of processing images or documents and converting the embedded text into speech, regardless of the text's length. These systems, which combine optical character recognition (OCR) and text-to-speech (TTS) technologies, enable users to listen to written content, thereby enhancing accessibility for visually impaired individuals and supporting multitasking or hands-free information consumption.

4.6.Location Detection: There are Artificial Intelligence systems designed to track the precise location of print resources within a library. These systems can also establish connections between physical materials and their corresponding electronic or online versions, enabling users to seamlessly access related digital content and improving the overall efficiency of resource management and retrieval in the library.

4.7.Enhanced Understanding: Humans have limited ability to read quickly and process the vast amounts of textual data available in libraries. However, advanced Artificial Intelligence systems capable of reading and analyzing large volumes of articles can assist researchers by identifying and recommending highly relevant information for innovation. For instance, a scientist working in defense research could use insights and recommendations generated by such AI systems to develop new weapon technologies or improve existing systems.

4.8.Summarizing Text: For textual documents, Artificial Intelligence can not only comprehend the content but also generate concise summaries—an essential task traditionally performed by librarians. This capability can greatly assist librarians by enabling them to provide users with brief summaries of extensive documents in advance. If users find the summary relevant or interesting, the librarian can then offer access to the complete text, thereby saving time and improving information service efficiency.

4.9.Service for Visually Challenged People: Microsoft's *Seeing AI* app is a valuable tool designed for individuals with visual impairments. It functions as a smartphone-based narrator that can describe the user's surroundings—for example, helping someone identify items in a pantry or read a child's homework questions. The app incorporates multiple Artificial Intelligence features, including facial recognition and object identification. In a library context, visually impaired users can use the app to point their mobile devices toward signage and receive audio descriptions of areas such as entrances and exits, book sections, periodicals, reference materials, circulation counters, washrooms, silence zones, and cafeterias, thereby enhancing accessibility and independent navigation within the library.

5.Benefits of Artificial Intelligence Application in Libraries

- AI Improves Operational Effectiveness and Efficiency
- Opportunity to Engage Larger Audiences
- Helps Library Staff Achieve Their New Goals
- Establish Libraries at the Centre of the New Scholarly Information Landscape

6.Challenges of Artificial Intelligence Application in Libraries

- Financial Uncertainty
- Openness to Change
- Technical Knowhow and Slow Learning Curves among Library Staff
- Users' Privacy
- Linguistic Capabilities
- Understanding of Users' Emotions

Conclusion

The use of Artificial Intelligence (AI) in librarianship is an emerging and evolving development. AI holds great potential to enhance the accessibility, processing, utilization, and security of information

resources in libraries. Collaboration between Library and Information Science (LIS) researchers and AI experts is essential to address instructional and research challenges related to AI applications in library settings. Such collaboration can create new opportunities in librarianship and lead to more effective and efficient delivery of information resources and services to library users. Although AI has been introduced in several areas of library operations, many of these applications remain largely theoretical and have yet to be fully implemented. This limitation is primarily due to inadequate investment in AI hardware and research, challenges in big data collection and data mining, a shortage of skilled AI professionals in libraries, and a general lack of AI-oriented thinking within the library sector—particularly in developing regions such as the Global South, including Nigeria. Librarians should not fear that intelligent systems will replace them; instead, they should focus on enhancing their knowledge and skills to effectively work alongside these technologies and boost their professional productivity.

REFERENCES:

[1] Afolayan, J. O., Ogundokun, R. O., Afolabi, A. G., & Adegun, A. A. (2020). Artificial intelligence, cloud librarianship, and infopreneurship initiatives for Inclusiveness. In *Managing and Adapting Library Information Services for Future Users. IGI Global.* 5225-9034

[2] Allison D. Chatbots in the library: is it time? *Libr Hi Tech* , vol 30(1), pp 95–107,2012

[3] Asemi, A. & Asemi, A. (2018). Artificial Intelligence (AI) application in Library Systems in Iran: A taxonomy study. *Library Philosophy and Practice.*

[4] Esubukade Ajakaye(2021). Applications-of-Artificial-Intelligence-(AI)-in-Libraries. *https://www.researchgate.net/publication/370202124*

[5] Hasan N, Saifullah M, Hashmi AH. Application of Artificial Intelligence in Libraries: Benefits and Drawbacks. *Journal of Data Science, Informetrics, and Citation Studies.* 2024;3(2):98-105.

[6] In *Encyclopedia of Science and Technology* (10th ed.; Vol. 2, pp. 228–230). New
Irizarry-Nones, A., Palepu, A., & Wallace, M. (2017). *Artificial intelligence (AI).*

[7] Isaiah Michael Omame & Juliet C. Alex-Nmecha (2020). Artificial Intelligence in Libraries. *https://www.researchgate.net/publication/338337072*

[8] Isiaka, Abdullahi Olayinka, "Application and Use of Artificial Intelligence (AI) for Library Services Delivery in Academic Libraries in Kwara State, Nigeria" (2023). *Library Philosophy and Practice (e-journal).* 7998. https://digitalcommons.unl.edu/libphilprac/7998

[9] Jyoti, Kumar P. (2024). Reshaping the library landscape: Exploring the integration of artificial intelligence in libraries. *IP Indian J Libr Sci Inf Technol.,* 9(1):29-36.

[10] Kaushal, K.; Sarma P.; Rana S.V.; Medhi B. & Naithani, M. (2020). Emerging role of artificial intelligence in therapeutics for COVID-19: A systematic review. *J. Biomol. Struct. Dyn.* doi: 10.1080/07391102.2020.1855250.

[11] Kumar, P.S.G. (2004) Information Technology: Applications. New Delhi: BRPC, 401-425

[12] Liu, J., Liu, J., & Chen, Y. (2022). Application of artificial intelligence technology in
information retrieval of university library. Innovative Computing, *Springer Nature Singapore.*791, 221–228.

[13] Manjunatha K (2023). Study on Impact of Artificial Intelligence (AI) on Library Services. *International Journal of Research in Library Science (IJRLS),* 9(4), 189-199.

[14] Massis, B. (2018). Artificial intelligence arrives in the library. Information and Learning
Science, 119(7/8), 456–459.

[15] McGraw-Hill Encyclopedia of Science and Technology. (2007). Artificial Intelligence.

[16] Mogali, S. S. (2014). *Artificial Intelligence and its applications in Libraries*. Academic Press.
Nil's, J.Nilson. Artificial Intelligence. New Delhi: Harcourt ,1998,,pp 280-281.

Retrieved from: www.bu.edu

[17] Vijayakumar, S. & Sheshadri, K. (2019). Applications of Artificial Intelligence in Academic Libraries. *International journal of Computer Science and Engineering (e-journal),* Available at: DOI: 10.26438/ijcse/v7si16.136140.

[18] Yu, K., Gong, R., Sun, L., & Jiang, C. (2019). The application of artificial intelligence in smart library. *International Conference of Organizational Innovation (ICOI 2019). Advances in Economics, Business and Management Research, 100,* 708-713.