Application of Artificial Intelligence in the Library Automation

Dr. Hemraj D Chopkar

Librarian, NKSPT'S Arts, Science & Commerce College, Badnapur, Dist. Jalna

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ABSTRACT: Artificial intelligence (AI) is one of the emerging technologies of this time. It has been associated with several trades like business, defense, health and education, but its role in library services will foster intelligent decisions. AI is a widely used technology in library services that can transform the best services in the age of information technology. This paper highlights the applications of AI in Library Automation

INTRODUCTION: Artificial Intelligence (AI) is transforming libraries around the world, modernizing the way information is managed, accessed, and delivered. Libraries, traditionally known as repositories of books and information, are now evolving into smart information hubs powered by intelligent technologies. The integration of AI enhances efficiency, personalization, and user experience; ensuring libraries remain relevant in the digital age. AI technologies such as machine learning, natural language processing (NLP), robotics, and data analytics are being applied to various library functions. These include automated cataloging, advanced search and recommendation systems, chatbot-based reference services, and predictive analytics for collection development and user behavior analysis. For example, AI can help classify and index new materials more accurately and faster than manual methods, while also enabling voice-activated search and digital assistants to guide users. In addition to improving internal workflows, AI enables libraries to better meet the needs of their users. Personalized content suggestions, automated responses to common queries, and improved access to digital archives are just a few ways AI is creating a more dynamic and user-centered library experience.

As libraries continue to embrace digital transformation, AI serves as a powerful tool for innovation, enabling libraries to offer smarter services, manage resources more effectively, and stay aligned with evolving user expectations. Artificial intelligence (AI) is one of the emerging technologies of this time. It has been associated with several trades like business, defense, health and education, but its role in library services will foster intelligent decisions. AI is a widely used technology in library services that can transform the best services in the age of information technology. This paper aims to highlight the use of AI in library operations. Librarians are change agents of modern and advanced technologies and have long been responding to current technologies that improve their services. Initially, library automation and digitization were just two components that expanded its workflows and library services **(Hussain, 2022a, 2022b).**

ARTIFICIAL INTELLIGENCE IN LIBRARY AUTOMATION:

Library automation has undergone a revolution thanks to artificial intelligence (AI), which has taken a diverse approach to converting static libraries into technologically advanced information Centre's. AI technology integration has greatly improved several elements of library operations, including resource management, user services, cataloguing, and categorization. The following are AI's functions in library automation:

1.   Cataloguing and Classification:

Automated Metadata Generation: AI can analyze the content of books, articles, or multimedia and automatically generate metadata such as title, subject, author, keywords, etc

Natural Language Processing (NLP): Helps in understanding and categorizing materials in different languages or formats.

Machine Learning for Classification: AI can learn classification patterns from existing data and apply consistent cataloging rules.

AI algorithms automate the process of cataloguing and classifying library materials based on metadata extraction from texts. This automation reduces manual labour, speeds up cataloguing processes, and improves the consistency of metadata.

2.   Information Retrieval and Discovery:

Smart Search Engines: AI-powered search systems provide more accurate and relevant search results by understanding context, synonyms, and user intent.

   Recommendation Systems: Like those used by Netflix or Amazon, AI suggests books and resources based on user behavior, preferences, and borrowing history. AI-driven search engines utilize advanced algorithms to improve information retrieval accuracy and relevance. These systems analyze user queries, understand context, and deliver precise search results.

3.   Virtual Assistants and Chatbot's:

24/7 Reference Services: AI-powered chatbots assist users with queries, such as finding resources, understanding citations, or accessing databases.

User Guidance: AI can guide users through library systems or help with locating materials.

Libraries employ AI-powered virtual assistants and Chabot's to provide instant support and guidance to patrons. These systems can answer queries, assist with research tasks, and provide information about library services and resources.

4. Data Analysis and Decision Support:

User Analytics: AI analyzes user data to provide insights into service improvement, space usage, and inventory management.

Predictive Analysis: Helps librarians make informed decisions about budgeting, staffing, and resource allocation.

5. Digital Archive Management:

Intelligent Digitization: AI can scan, read, and organize physical documents and rare collections efficiently.

Optical Character Recognition (OCR): Translates printed or handwritten text into machine-readable data for searchable digital archives.

AI technologies facilitate the digitization and preservation of physical materials, such as rare books, manuscripts, and archival documents. Optical Character Recognition (OCR) and image processing algorithms convert scanned images into searchable digital formats. Machine learning models enhance preservation efforts by detecting and correcting image defects, improving readability, and preserving digital copies for long-term access and archival purposes

6. Collection Development

Demand Prediction: AI can analyze usage trends and predict what books or resources will be in demand.

Automated Acquisition: Systems can automatically suggest or place orders for new materials based on analysis of gaps and user needs.

7. Security and Access Control

Facial Recognition & Biometric Systems: Used for secure access to library facilities or restricted materials.

Plagiarism Detection: AI tools check submitted documents for originality and detect copied content. AI-powered fraud detection systems can identify plagiarism, unauthorized content distribution, and other intellectual property violations, helping libraries protect their collections and uphold copyright policies

8. Automation of Routine Tasks:

Email and Notification Automation: Sends reminders, due-date alerts, and new arrival updates.

Inventory Management: AI tracks and manages stock levels, usage, and lost or overdue items.

AI in library services will provide access to accurate information in the age of information explosion and be a helpful tool for the organic integration of readers and libraries. Using AI in library services will give library practitioners and patrons momentum. Readers will interact on the same platform and gain access to humanized services at a reduced cost.

BENEFITS AND CHALLENGES OF AI in LIBRARY AUTOMATION

Librarians and their patrons can get benefit from improving the accuracy and efficiency of library data, enhancing the significance and diversity of resources and services, increasing information accessibility, and fostering creativity and education are all critical. For librarians, artificial intelligence may help with manual and repetitive activities reduce data mistakes and inconsistencies, offer custom recommendations to patrons, allowed access to the library anywhere and at any time, and enable the search for new knowledge. Integrating artificial intelligence (AI) into library systems raises major difficulties, even though it has great potential for enhancing user experiences and the effectiveness of operations.

• There is a technical knowledge deficit among library staff professionals when it comes to applying and operating artificial intelligence systems.

• Cost is one of the major barriers to the implication of AI in the information sector. The library may not have sufficient funds to create or acquire artificial intelligence systems.

• Artificial intelligence systems in libraries have irregular power supplies, particularly in areas with limited development.

• Designing artificial intelligence systems within libraries requires a high level of effort and technical know-how, requiring experienced experts with expensive development tools or technologies to create a modern, shrewd system.

• The number of artificial intelligence professionals working for library automation firms is limited. Long before the development of conventional library automation systems, the complex field of artificial intelligence necessitated specialized knowledge (Patra, 2025).

CONCLUSION:

Implementing AI will make the library work easier to reach the current and retrospective patrons in their time of need. Libraries in developed and developing countries are not yet fully aware of this technology. Although there is extensive literature on AI in libraries, most cover limited library applications. AI is clearly one of the emerging applications that maximize library services at low cost once implemented. Libraries are vital agents of innovative technologies. Librarians can delineate various challenges associated with AI in library operations. Training and conferences about AI should be organized for librarians to learn new skills. A proper policy should be formulated that addresses both the strength and weaknesses of AI in library services. AI is still an emerging technology growing with alarming speed in different organizations. In both developed and developing countries, few popular services like RFID, GIS technologies, chatbot and virtual references are associated with library operations; however, most librarians are unaware of these applications.

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