APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGY IN LIBRARY SERVICES

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Abstract

Artificial Intelligence (AI) has emerged as a transformative force across various sectors, including education and information services. Libraries, as centres of knowledge dissemination and information management, are integrating AI technologies to improve operations, enhance user experiences, and maintain relevance in the digital era. This articleexamines the applications of AI in libraries, with a focus on intelligent search, automation, personalised services, and predictive analytics. It also addresses the challenges and ethical considerations of AI adoption in library environments.

Keywords: *AI Technologies, AI in Library Services, Robots in Libraries, Intelligent Libraries, Smart Libraries*

INTRODUCTION

Libraries have long been the backbone of Educational and Research institutions, serving as repositories of information and gateways to knowledge. With the rapid evolution of digital technologies, libraries are embracing Artificial Intelligence (AI) to meet the growing demands of users and manage vast volumes of information more efficiently. AI offers libraries tools for automation, data analysis, user engagement, and resource optimization. AI technology is being increasingly applied in libraries to enhance services, streamline operations, and improve user experiences.

REVIEW OF RELATED LITERATURE

Vasishta, Dhingra, and Vasishta (2025) investigated the current state of research on the application of Artificial Intelligence (AI) in libraries by examining document type, publication year, keywords, and research methods. The primary objective is to enhance the existing knowledge of AI-powered libraries by identifying prevailing research gaps, providing direction for future research, and deepening the understanding required for effective policy development.

David Winster, et al. (2025)*explore the applications, benefits, and challenges of AI in modern library services. The study highlights the potential of AI to enhance efficiency, personalize user experiences, and innovate library services.*

Santosa (2025) aims to map AI-related research in libraries, identifying opportunities and discussing future directions. The study utilizes textual analysis of data from Scopus, employing the burst detection algorithm to analysearticle titles and scatter text and lemmatization for abstracts.

Aminu (2024)*attempts to provide a guideline for interested libraries on how to*

improve their services by integrating AI technologies. The research will assist libraries in staying current with technological advancements and exploring new ways of delivering library operations.

Sutherland (2024) explores the benefits and challenges of using AI in academic libraries. AI has the potential to make library operations more efficient and assist students with writing, but it can also wreak havoc in the academic library setting, leading to plagiarism and the spread of misinformation.

Subaveerapandiyan (2023) presents a literature review on the application of Artificial Intelligence (AI) in libraries and its impact on library operations. This study aims to provide researchers with a comprehensive understanding of AI in the library context.

Chen and Zhang (2021) assessed the knowledge and perception of librarians on the use of AI in library services provision at public universities in Ghana. The study revealed that the librarians were knowledgeable of the emergence of AI and sources their information on AI mainly from research articles. Academic libraries are encouraged to invest in AI tools and applications to leverage their advantages.

O'Neill's (2020) study explores AI's potential in library management, including its current and future applications, its effects on library operations, and the challenges libraries face when implementing these technologies.

APPLICATIONS OF AI IN LIBRARIES

Smart Search and Information Retrieval

- AI-driven search engines utilize Natural Language Processing (NLP) and Machine Learning algorithms to deliver more accurate and context-aware search results. Unlike traditional keyword-based searches, AI systems can interpret user intent and provide semantically relevant information.
- AI can provide personalized search results based on user behaviour and preferences, and Semantic search helps understand the intent behind queries rather than just keyword matching.

AUTOMATED CATALOGUING& CLASSIFICATION AND METADATA GENERATION

- Machine learning models are employed to classify resources, generate metadata, and update library catalogues with minimal human intervention. This increases accuracy and reduces the time required for catalogue maintenance.
- AI can automatically classify and tag books, articles, and digital resources using machine learning.
- Metadata extraction tools help process large volumes of content quickly and accurately.

Virtual Assistants and Chatbots's

- AI-powered virtual assistants can provide 24/7 support for users,

answering queries, guiding users to resources, and assisting in reference services.

- AI-powered library Chabots can answer FAQs, guide users to resources, help with account management, or assist in navigating databases.

Personalised Learning and Recommendation Systems

- AI algorithms can analyse user behaviour and borrowing history to recommend books, articles, or media tailored to individual interests. This feature enhances user engagement and promotes resource discovery, and Supports personalized learning paths for students and researchers.

Predictive Analytics for Resource Management

- AI can analyse borrowing patterns and trends to help libraries decide which books or resources to acquire or remove.
- Helps optimize inventory and space management, and Predictive models help optimize budgets and collection development.

DIGITAL PRESERVATION AND OPTICAL CHARACTER RECOGNITION (OCR)

AI is used to digitise and preserve physical documents using OCR technology, ensuring long-term access to historical and rare materials. AI also assists in detecting document degradation over time.

Plagiarism Detection and Content Integrity

- AI tools can check for plagiarism in academic submissions and helpto maintain the integrity of research and educational content.

Automation of Routine Tasks

- AI can assist with automated check-in/check-out systems, inventory management, and reminder notifications and reduce manual workload for staff.

Knowledge Graphs and Data Linking

- AI can create knowledge graphs that show relationships between people, topics, and publications.It also enhances research discovery and academic networking.

Challenges of AI Adoption in Libraries

Data Privacy and Ethics

The collection and use of user data for AI personalisation raise ethical concerns regarding privacy and informed consent.

Technological and Financial Barriers

Implementing AI systems requires substantial investment in infrastructure, training, and maintenance, which may not be feasible for all libraries.

Algorithmic Bias

AI systems may inadvertently reinforce existing biases present in training data, leading to discriminatory outcomes in search or recommendation systems.

Future Prospects

The future of AI in libraries lies in further integration with the Internet of Things (IoT), advanced robotics for physical automation, and the use of Large Language Models (LLMs) for enhanced reference services. Libraries are expected to become smarter, more interactive, and deeply integrated with institutional learning ecosystems.

CONCLUSION

AI technology holds great promise for modernising libraries and enhancing their services. AI offers transformative potential for libraries in areas such as improved search and discovery, personalised recommendations, automated cataloguing, and data-driven decision-making. Its adoption requires a proactive and considerate approach to address significant ethical and practical challenges. Libraries must prioritise ethical frameworks, invest in staff training, ensure data privacy, and uphold their core values of intellectual freedom, accessibility, and human-centric service. With responsible implementation, AI can greatly strengthen the role of libraries in the information age.

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