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Artificial Intelligence and Modern Library Services: Opportunities, Challenges, and Future Directions

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Abstract

In today's digital era, Artificial Intelligence (AI) has emerged as a powerful and transformative technology. The role of libraries is no longer limited to merely lending and exchanging books; instead, libraries are now being recognised as knowledge centres based on education, library services, information technology, and research (UNESCO, n.d.). This article studies how library services are being transformed with the help of artificial intelligence, which tools are proving useful, the opportunities and challenges involved, and the future directions for AI-based library services.

Keywords: AI Tools, Chatbot, Data Management, Digital Era, Virtual Library

INTRODUCTION

In the 21st century, due to the explosion of information, the nature of library services has completely changed (IFLA, 2020). Artificial Intelligence (AI) is considered a revolution in modern technology. The traditional services of libraries are now becoming digital, smart, and automated, aligning with global trends in Smart Library models (Marasinghe *et al.,* 2024). In this context, it is necessary to study the use of AI in the library field, the opportunities it provides, the challenges it faces, and the future directions it may lead to (Islam, 2025).

RESEARCH OBJECTIVES

The research objectives align with current studies and guidelines provided by IFLA, UNESCO, and recent AI-in-library research (Ali, 2025; Marasinghe *et al.,* 2024; IFLA, 2020). They include:

- To understand the application and use of AI in modern library services.
- To study the impact of AI on library services.
- To explore the role of AI in library management.
- To identify the AI tools currently being used in libraries.
- To find and examine the problems and challenges arising due to the use of AI.
- To present the concept of the future Smart Library.
- To determine the future directions for library services.
- To analyse the opportunities created in modern libraries through AI.
- To study the prospects and recommendations for empowering libraries through AI (Emerald/GKMC, 2025)

APPLICATIONS OF AI IN LIBRARY SERVICES

Applications observed globally in recent studies include automated cataloguing, intelligent retrieval systems, and AI-driven metadata generation (Marasinghe *et al.,* 2024; Islam, 2025).

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Table 1. Key application areas of Artificial Intelligence in modern library services

Application Area	AI-Based Service
Cataloguing and Classification	Automatic metadata generation and indexing
User Assistance	Chatbots and virtual assistants
Book Search	Smart search engines and voice-based search
Recommendation System	AI-based suggestions based on user behaviour
Research Support	Data analytics and research assistance
Library Management	Automated issuing, security, and space utilisation

These services are consistent with global Smart Library guidelines (IFLA, 2020; UNESCO, n.d.) as in Table 1.

Opportunities Created by Artificial Intelligence in Library Services

AI offers several new opportunities, widely documented in literature and policy guidelines (Ali, 2025; Emerald/GKMC, 2025; IFLA, 2020):

- **24×7 digital services** – AI enables round-the-clock access to library resources through digital platforms.
- **Digital libraries and e-libraries –** Availability of e-libraries, chatbots, and cloud storage enhances accessibility (UNESCO, n.d.).
- **Automated classification and cataloguing** – AI tools assist in metadata generation and automated indexing (Marasinghe *et al.,* 2024).
- **Book recommendation system** – AI recommends books based on reader preferences (Islam, 2025).
- **Research facilitation through data analytics** – AI provides relevant data and analytical tools for researchers (Marasinghe *et al.,* 2024).
- **Quick access to reliable resources** – Users can locate authentic information instantly.
- **Promotion of reading culture** – Personalised digital suggestions encourage reading habits.
- **Personalised learning** – AI tailors learning content to user needs (Ali, 2025).
- **Smart library management** – Improves security, space use, and efficiency.
- **AI-based decision making** – Planning and operations increasingly rely on AI-based models (IFLA, 2020).

Challenges of Using Artificial Intelligence in Library Services

Challenges in AI adoption have been highlighted in several studies (Marasinghe *et al.,* 2024; Emerald/GKMC, 2025):

- **Lack of technical skills** – Library staff may not possess advanced AI competencies (Ali, 2025).
- **High financial cost** – Infrastructure and AI systems require significant investment.
- **Data Security and Privacy Issues** – Protecting digital data is a major concern (IFLA, 2020).
- **Fear of reduced employment opportunities** – Automation raises concerns about job displacement.
- **Maintenance of technical equipment** – Requires consistent updates and technical expertise.
- **Poor internet connectivity in rural areas** – Limits the adoption of AI-based services.
- **Language limitations** – AI tools for regional languages like Marathi are still developing (Islam, 2025).

Future Directions of AI in Library Services

Future AI-enabled developments align with current research and international library forecasts (UNESCO, n.d.; IFLA, 2020):

- **Smart libraries and library 4.0** – Technology-integrated, fully automated library systems.
- **AI-based decision-making and management** – Enhanced planning through big data analytics (Islam, 2025).
- **Multilingual library services** – AI will support regional languages (Ali, 2025).

- **Virtual reality learning zones** – VR will enable immersive, remote learning environments.
- **AI-powered research assistance** – Instant access to scholarly content using voice-based and intelligent search tools (Marasinghe et al., 2024).
- **Training for librarians** – AI literacy for librarians will become essential (Ali, 2025).
- **Hybrid library model** – Coexistence of physical and digital libraries (Emerald/GKMC, 2025).
- **Digital preservation of rare books** – AI supports digitisation and preservation.
- **Blockchain for secure library data** – Ensures confidentiality and authenticity of records.
- **Cloud-based library networks** – Interconnected digital systems for resource sharing (UNESCO, n.d.).

CONCLUSION

Artificial Intelligence is a major revolution for the library sector. It is a transformative force reshaping structures, working methods, and user–library interactions (IFLA, 2020; UNESCO, n.d.). AI presents both challenges and opportunities for modern library services. With proper planning, training, and positive adaptation of emerging technologies, the Indian library system can lead the Smart Library revolution. Through AI, libraries will become more accessible, smarter, and more research-oriented for future generations (Ali, 2025; Marasinghe *et al.,* 2024).

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