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AI (Artificial Intelligence) as a tool for transforming library services: transition of traditional library services into AI powered library services in Academic libraries

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Abstract

Academic libraries play an important role in higher education by serving as indispensable hubs of knowledge and learning within university and college campuses. Traditional library services in academic libraries encompass a range of core functions and offerings that support the academic and research needs of students, faculty, and researchers. These services include reference assistance, where librarians provide guidance in finding information and conducting research; circulation services, facilitating the borrowing and return of library materials; interlibrary loan services that enable access to resources beyond the library's collection; catalog services to help users locate specific items; access to periodicals, journals, and academic publications etc. In place of traditional library services AI-powered library services in academic libraries revolutionize the way students and researchers access and utilize information resources. These services harness artificial intelligence and machine learning to enhance various aspects of library operations, such as search and discovery, personalized recommendations, automated cataloging, and virtual assistance. AI-driven algorithms optimize the retrieval of relevant scholarly materials, aiding users in their research endeavors. Present study analyses the transition of traditional library services into AI powered library service through a table to understand easily. The study shows that academic library services are already in the process of transition into traditional to AI powered library services and the integration of AI in library services offers numerous benefits, but there are several challenges that need to be addressed to ensure its effective and ethical use. This study addressed some of the key challenges of AI powered library services and provided some suggestions to overcome the challenges.

Keywords: Academic library services, college library services, universities library services, artificial intelligence, traditional library services

Introduction

Academic libraries play a pivotal role in higher education by serving as vital hubs for learning, research, and intellectual growth within academic institutions. These libraries provide essential resources, including vast collections of books, journals, digital databases, and multimedia materials, thereby supporting the academic and research pursuits of students, faculty, and scholars. They offer quiet study spaces, collaborative work areas, and access to technology, creating environments that foster both independent and collaborative learning. Moreover, academic libraries often serve as cultural and intellectual centers, hosting events, exhibitions, and workshops that promote a culture of inquiry and support the academic community's broader educational mission. In essence, academic libraries are essential partners in the educational process, providing the tools, resources, and expertise necessary for students and scholars to succeed in their academic pursuits.

Traditional library services encompass a range of fundamental offerings provided by libraries to their patrons, including reference services where librarians assist users in finding information, circulation services involving the borrowing and returning of materials, interlibrary loan services facilitating resource sharing among libraries, reserve services for course materials, catalog services for item location, periodical and journal access, quiet study areas, stacks and shelving for collection organization, library instruction sessions, photocopying and printing facilities, reference materials for quick factual information

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retrieval, children's services for young readers, community events to engage the local community, accessibility services for individuals with disabilities, archives and special collections preservation and access, and reader's advisory services for personalized reading recommendations. These services form the core of library operations and serve to provide users with resources, information, and spaces conducive to learning, research, and community engagement.

Methodology

This study is based on a qualitative method using content analysis techniques. An extensive review of literature on “artificial intelligence as a tool for transforming library services” was carried out to ascertain the transition of traditional library services into AI powered library services.

Aim of study

The use of AI in library services has evolved over several decades, from automating cataloguing processes to enhancing user experiences and resource discovery. AI continues to play an increasingly significant role in modern libraries, improving efficiency and accessibility for patrons while helping libraries manage their collections more effectively. The paper aims:

- To focus on the various AI tools to replace traditional library services to offer more tailored, efficient, and user-centric services, ultimately advancing the quality of education and research within institutions.
- To provide an overview on the traditional library services and AI powered library services in tabular form to revolutionize the way institutions provide educational resources and support to their students and faculty.

Traditional library services are influenced by several critical factors

Including skilled librarians who provide reference assistance, manage circulation, and curate collections, physical infrastructure for housing and organizing materials efficiently, comprehensive cataloging systems for easy item retrieval, user-friendly circulation policies, and access to various types of materials like books, periodicals, and reference resources. Additionally, quiet study spaces, community engagement through events and programs, and a

commitment to accessibility for all patrons, including those with disabilities, are vital components. Furthermore, financial resources, government support, and the incorporation of new technologies to streamline processes and improve user experiences are essential factors in delivering effective traditional library services that cater to the diverse needs of the community

Use of AI in library services

The history of AI in library services traces back several decades. In the 1960s and 1970s, early attempts were made to automate cataloging and indexing processes. The introduction of Online Public Access Catalogs (OPACs) in the 1980s marked a significant milestone, allowing users to search library collections electronically. In the 1990s, natural language processing (NLP) technology started to improve search accuracy and relevance. The use of Artificial Intelligence (AI) in library services began to gain prominence in the late 20th century and has continued to evolve since then. However, it was in the 21st century that AI truly revolutionized library services. Machine learning algorithms and recommendation systems began to personalize book recommendations for their users, similar to platforms like Amazon. Libraries began experimenting with AI chatbots and virtual assistants to provide instant answers to common user queries. These AI-driven systems offered 24/7 support and helped users navigate library resources more effectively.

Future trends of AI in libraries

AI in content creation: AI may assist in generating metadata, abstracts, and even content summaries, saving time and improving resource descriptions. AI for preservation: AI algorithms can help identify and preserve rare or deteriorating materials in archives and special collections. AI-enhanced user experiences: Libraries are likely to continue using AI to personalize user experiences, offering tailored recommendations and services.

In short, the use of AI in library services has evolved over several decades, from automating cataloguing processes to enhancing user experiences and resource discovery. AI continues to play an increasingly significant role in modern libraries, improving efficiency and accessibility for patrons while helping libraries manage their collections more effectively.

The table describing how artificial intelligence is being transit in traditional library services

Library services	Traditional Library Services	AI-Powered Library Services
Reference Services	Librarians provide assistance to users in finding information, answering questions, and conducting research. This may include one-on-one consultations, help with locating resources, and guidance on search strategies.	AI chatbots and virtual assistants provide instant answers to common queries and assist users in navigating digital resources efficiently. Natural Language Processing (NLP) enables these AI systems to understand and respond to user inquiries.
Circulation Services	This involves the borrowing and returning of library materials, including books, magazines, DVDs, and other physical items. Librarians manage circulation policies, issue library cards, and oversee overdue fines and renewals.	AI systems manage automated check-in and check-out processes, monitor due dates, and send reminders to users. RFID technology is often used for efficient inventory management.
Interlibrary Loan (ILL)	Libraries collaborate to borrow or lend materials that are not available in their own collections. Users can request items from other libraries, extending the range of available resources.	AI algorithms assist in recommending alternative resources or suggest libraries that may have the required materials, enhancing the efficiency of the ILL process.
Reserve Services	Faculty can place course materials, such as textbooks and readings, on reserve for students to borrow for a limited time, ensuring equitable access to essential resources.	AI systems can optimize the distribution of reserve materials based on demand and usage patterns, ensuring availability when needed.
Catalog Services	Libraries maintain catalog systems, both physical card	AI-driven search engines enhance the catalog search

	catalogs and digital catalogs, to help users locate specific items in the collection. This includes searching for books, journals, and other materials by author, title, or subject.	experience by providing relevant suggestions, correcting spelling errors, and offering personalized recommendations based on user preferences and past searches.
Periodicals and Journals	Libraries subscribe to and provide access to a variety of newspapers, magazines, and academic journals. Users can read these publications in the library or, in some cases, borrow them.	AI-driven content recommendation systems help users discover relevant articles and research papers based on their interests and previous reading habits.
Quiet Study Areas	Libraries offer quiet spaces for users to read, study, and concentrate. These areas are conducive to focused work and research.	AI-powered noise monitoring systems can ensure that quiet areas remain undisturbed by alerting staff when noise levels exceed acceptable limits.
Stacks and Shelving	Libraries organize and maintain physical collections, arranging books and materials on shelves for easy access. The Dewey Decimal System and Library of Congress Classification are commonly used for this purpose.	AI robots equipped with computer vision can assist in the sorting and shelving of materials, streamlining the process and reducing manual labour.
Library Instruction	Librarians conduct workshops and instructional sessions to teach users how to effectively search for information, use library resources, and evaluate sources for research projects.	AI-powered tutorials and online courses can complement librarian-led instruction, providing users with on-demand learning resources tailored to their needs.
Photocopying and Printing	Libraries often provide photocopying and printing services for a fee, allowing users to make copies of materials or print documents from computers.	AI-driven print management systems can optimize printing resources, track usage, and reduce paper wastage.
Reference Materials	Libraries house reference collections that include dictionaries, encyclopedias, atlases, and other specialized resources for quick access to factual information.	AI-powered reference tools provide instant access to digital dictionaries, encyclopedias, and reference materials, enhancing the speed and convenience of research.
Children's Services	Many libraries offer services tailored to children, including storytelling sessions, reading programs, and access to age-appropriate books and educational materials.	AI-driven educational games and interactive storytelling applications can engage and educate children, promoting literacy and learning.
Community Events	Libraries may host events such as author talks, book clubs, workshops, and cultural activities to engage the local community and promote reading and learning.	AI systems can assist in event planning, marketing, and audience engagement, helping libraries reach a wider audience and tailor events to community interests.
Accessibility Services	Libraries strive to make their services accessible to individuals with disabilities by offering assistive technologies, braille materials, and other accommodations.	AI-powered accessibility tools, such as screen readers and text-to-speech software, enhance accessibility services for users with disabilities, ensuring equal access to library resources.
Archives and Special Collections	Some libraries maintain historical archives and special collections, which may include rare books, manuscripts, and unique documents of cultural or historical significance. Access to these materials may be restricted, and users often need special permissions.	AI systems can assist in digitizing and cataloging archival materials, making them more accessible to researchers and preserving valuable cultural heritage.
Reader's Advisory	Librarians recommend books and other reading materials based on users' interests and preferences. This service helps users discover new authors and genres.	AI-driven recommendation engines analyze user reading history and preferences to suggest books, authors, and genres, facilitating personalized reading recommendations.

The integration of AI-powered library services enhances the efficiency, accessibility, and user experience in modern libraries, complementing traditional library services and expanding the capabilities of these institutions.

Challenges of AI-powered library services

The implementation of AI in library services, while promising, presents several challenges. One significant challenge is ensuring data privacy and security, as AI systems require access to vast amounts of user data. Libraries must carefully manage and protect this data to prevent breaches and unauthorized access. Another hurdle is the potential for bias in AI algorithms, which can result in skewed recommendations and perpetuate existing inequalities in access to information. Libraries must actively address bias in their AI systems to ensure fairness and inclusivity. Additionally, the cost of acquiring and maintaining AI technology can strain limited library budgets. Librarians may require additional training to effectively utilize AI tools, and some patrons may be resistant to AI-driven services due to concerns about job displacement or the loss of the human touch in library interactions. Balancing the benefits of AI with these challenges is a complex task for libraries aiming to harness the power of artificial intelligence while upholding their core values and responsibilities to their communities.

The integration of AI in library services offers numerous benefits, but it also presents several challenges that need to be addressed to ensure its effective and ethical use. Here are some of the key challenges:

- **Cost and Resource Constraints:** Implementing AI systems can be expensive, requiring investment in hardware, software, and staff training. Smaller libraries with limited budgets may struggle to adopt AI technologies.
- **Data Privacy and Security:** AI systems rely on vast amounts of data, including user information. Libraries must ensure that patron data is protected, and privacy concerns are addressed. Unauthorized access or data breaches can have severe consequences.
- **Bias and Fairness:** AI algorithms can inherit biases present in training data, potentially leading to discriminatory outcomes. Libraries must actively work to mitigate bias in AI systems to ensure equitable service provision.
- **User Resistance:** Some library users may be uncomfortable with AI-powered services or concerned about privacy implications. Libraries need to communicate the benefits and safeguards of AI to build user trust.
- **Staff Training and Preparedness:** Librarians and library staff may require training to effectively operate

and maintain AI systems. Ensuring that staff are well-prepared to use these tools is crucial for successful implementation.

- **Integration with Existing Systems:** Libraries often have complex existing systems for cataloging, circulation, and patron management. Integrating AI into these systems can be challenging and may require significant technical expertise.
- **Ethical Considerations:** Libraries must grapple with ethical questions surrounding AI, such as the impact on employment if routine tasks become automated and how to ensure that AI technologies are used in ways that align with the library's mission and values.
- **User Education:** Patrons may need guidance on how to use AI-powered services effectively. Libraries must invest in user education programs to ensure that patrons can make the most of these tools.
- **Maintenance and Sustainability:** AI systems require ongoing maintenance, updates, and periodic retraining to remain effective. Libraries must allocate resources for long-term sustainability.
- **Digital Divide:** AI-powered services may exacerbate the digital divide, as not all patrons have equal access to technology or the skills to use it effectively. Libraries must consider how to bridge this gap and ensure equitable access to AI services.
- **Vendor Dependence:** Libraries that rely on third-party vendors for AI solutions may become dependent on these providers, potentially leading to issues with data ownership, control, and vendor lock-in.
- **Accuracy and Trustworthiness:** AI recommendations and information retrieval must be accurate and trustworthy. Errors or misleading results can undermine user confidence in library services.

Addressing these challenges requires careful planning, collaboration, and a commitment to ethical and equitable use of AI technologies in library services. It's essential for libraries to assess their unique needs and resources to develop strategies for successful AI integration.

Suggestions and conclusion

Safely harnessing AI for library services involves careful planning and ethical considerations. First, ensure transparent data handling and privacy protection by adhering to robust data security protocols, including anonymizing user data. Implement responsible AI algorithms that minimize biases in search results and recommendations, promoting equitable access to resources. Continuously monitor and audit AI systems for accuracy and fairness. Prioritize user education by offering guidance on AI-powered tools, promoting digital literacy, and informing patrons about data usage and privacy. Establish clear policies for AI system use, data retention, and access, emphasizing patron consent and data protection. Collaborate with professional organizations and experts to stay updated on AI ethics and best practices, fostering a safe and trustworthy AI-driven library environment. The incorporation of artificial intelligence (AI) in library services is essential because it offers transformative opportunities rather than challenges. AI can enhance the efficiency of cataloging and resource discovery, enabling users to access information more quickly and accurately. It also enables personalized recommendations, making it easier for patrons to discover relevant materials.

AI-driven chatbots and virtual assistants provide instant support, extending library services beyond physical boundaries. Moreover, AI aids in the management of vast digital collections, ensuring proper organization and preservation. Furthermore, by automating routine tasks, AI frees up librarians' time to focus on more complex and value-added services, such as research assistance and community engagement, ultimately enriching the overall library experience and adapting it to the digital age.

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