

# Use of artificial intelligence in the library services: prospects and challenges

Abid Hussain

## Introduction

Libraries are regarded as service-oriented organizations and have been altered by advanced technologies in the era of modern days information technologies (ITs). The growing demands of library clienteles have compelled the librarians to modify their service delivery mechanism (Hussain, 2022a, 2022b, Library Philosophy and Practice, 1–11). These new technologies have changed teaching and learning attitudes; for this reason, the latest digital technology-driven service innovation promotes a new teaching and research paradigm (Walter and Lankes, 2015). This has compelled librarians to seek new and innovative technologies to maintain the user experiences of their libraries.

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).

The past two decades have shown tremendous changes in library services and in such advancement, the role of artificial intelligence (AI) remained remarkable. AI has been defined as “the ability of machines to do things that people would say require intelligence; it has been infiltrated as one of the modern technologies for library operations (Jackson, 1985). AI has become an indispensable tool for improving organizational efficiency and productivity. It is astounding that AI technologies have strongly influenced trades in the 21st century, including libraries.

## Nexus between artificial intelligence and libraries

Although research on AI in libraries has been growing for the past few years,

previous studies have focused on librarians’ perceptions of AI (Wood and Evans, 2018). Many scholars have their views that AI could reasonably transform library services. Cox (2021) opined that librarians should be more skillful in instructing patrons about the use of AI in library services and its implications for searching and browsing information. In other studies, it was also noticed that many librarians are worried about the implication of AI in library services for so many reasons like job security, its usages and technical issues; however, most of them are optimistic that AI will create new opportunities and open new horizons for the librarians (Wood and Evans, 2018). Some studies argued that librarians should involve themselves with professional interest groups experiencing this technology. Engaging with these professionals will create new skills and develop new services by deploying this technology in library services.

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. A few scholars, like Hussain (2020a, 2020b), observed that in developing countries, most librarians are still unaware of deploying it in their libraries. Perhaps this might be because of a low awareness level or the heavy budget required for implementing AI in library services. Another reason for not including AI in library services is lacking research activities connecting AI to librarianship. Some libraries have implemented AI partially, like virtual reference chatbots that use machine learning as a subtype of AI. Through

these services, a librarian can answer its patron regarding library queries (Arora *et al.*, 2020). Similarly, Zimmet (2020) noted that some libraries use its partial application, like virtual assistance, which can be used to answer the patron.

AI like Alexa skills which have been introduced at The University of South California fulfill various demands of users like frequently ask question answers and events. It has also been interconnected with a library catalog to search for desired information (Hussain and Shahid, 2022). Some scholars note that AI has been associated with automation and searching of information like Yewno Discovery, which was launched in 2016 for data visualization to help patrons view the concepts more visually than traditional library catalogs (Gramatica and Pickering, 2017).

AI can also help patrons review disinformation, privacy and ethics. AI can also help the patrons to locate print books on the shelves and help them to find the right book in the right place. A chatbot or AI conversational agent can provide virtual reference services to better guide users via AI. Librarians in the age of AI are known as virtual storytellers or reader advisory humans. To satisfy the needs of library patrons, AI chatbots will bring positive changes in library services. Based on The Massachusetts Institute of Technology research, global positioning system (GPS) can better guide library patrons to find relevant information about the library. Many libraries in developing and developed countries have interconnected GPS with library websites for the past few years (Cox *et al.*, 2018).

Modern social media applications like Twitter, Snapchat, Facebook and Instagram use AI. Many libraries have transformed their services on social media to attract their patrons. Through

these applications, users store and manage their relevant information; these applications use AI for managing and storing data. Libraries should also use it to maintain a massive amount of data (Jan and Abid, 2018).

Libraries deal with information and withhold costly tools like computer machines, scanners, photocopiers and multimedia. Observing libraries from various corners requires surveillance cameras to save library material from theft; AI surveillance applications have made it possible to develop face recognition tools that may be used for security purposes and surveillance activities (Ali *et al.*, 2020). With cyber-attacks, AI can be used as a security tool for safeguarding data. For security applications, AI used the AEG bot and AI2 platform to positively determine software bugs and cyber-attacks (Prasad and Rohokale, 2020). Radio frequency identification (RFID) technologies are some of the best examples of AI. RFID technologies are connected with modern library software, which controls the library collections from theft and misplacing. Security doors and walk-through gates are fixed on library doors which intimate the staff in case of theft and other security measures.

Almost every smartphone has facial recognition technologies that are controlled and powered by AI. Siri and Alexa are the best examples of facial and virtual voice systems. These kinds of technologies can be used for deep learning in the academic environment.

AI has been connected with the library catalog through an expert system. There are two ways to connect AI with a library catalog: a human-machine interface where we can trace the data intermediary and support system and linkages of an electronic publishing system with a library catalog, where the data can be passed through an online medium without intellectual input from an intermediary.

### Library challenges with artificial intelligence

Some librarians believe that AI in library operations has specific challenges that should be addressed before implementing this application in library services (Vijayakumar and Sheshadri, 2019).

Financial challenges are critical for implementing AI in library services. Often the library may have inadequate infrastructure because AI requires heavy and latest technological tools to run it successfully, so poor infrastructure will never support AI in library services (Ajani, 2022).

Resistance to change is an issue as some librarians are not interested in introducing new and innovative technologies. The negative perception of librarians toward inadequate skills of librarians with IT tools can create hurdles for AI as some librarians are not skillful in IT applications.

Some other challenges include poor networking, erratic power supply, lack of trained personnel, outdated technologies and economic factors and high cost of technological tools that should be addressed before implementing AI in library operations (Echedom and Okuonghae, 2022). Despite these challenges, AI will bring positive changes in library operations like information delivery services, time savings, cost-effectiveness and speedy services for the present and retrospective patrons.

### Concluding remarks

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. Adequate budgets for implementing AI in library operations should be kept in mind.

Advocacy programs for 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. The attitude of librarians regarding deployment of AI in library operations can be helped by bringing them to discussion forums.

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. Some low-cost applications like facial recognition, chatbot and Google maps can be associated with library websites; nevertheless, most applications like big data, the Internet of Things and augmented reality require high costs, which is out of control for libraries in developed and developing countries.

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#### FURTHER READING

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#### ABOUT THE AUTHOR

Abid Hussain is a Veteran Librarian based in Islamabad, Pakistan. Currently, he is working as Deputy Director Library at the Institute of Strategic Studies Islamabad. His research interests include, Library Technologies, library leadership, digital library services, web-based and Mobile technology, information literacy, bibliometric and information services. Earlier he served as a Digital Library Incharge at National Defence University Islamabad (April 2009–April 2017) and an Assistant Librarian at the Air University Islamabad (May 2005–September 2007). He has contributed 27 research papers to National and International reputed journals, whereas three of his articles are in pipeline. He has also published more than 80 columns, essays and opinion articles in various English dailies, magazines and blogs mostly relevant to library advocacy. His whole contributions can be viewed here: [https://scholar.google.com/citations?view\\_op=list\\_works&hl=en&hl=en&user=GdVB77sAAAAJ](https://scholar.google.com/citations?view_op=list_works&hl=en&hl=en&user=GdVB77sAAAAJ). He has designed, implemented, coordinated and assessed the library instruction program and trained fellow librarian master's instructional theory and methods. He is a MPhil scholar at the Department of Library and Information Science, University of

Peshawar, and earned the master's degree in library and information sciences from the same university in 2006; for dealing with social science scholars, he has completed master's degree in political science in 2011 from the University of Peshawar; and for instruction of library customers, he has attained a bachelor of education degree from Sarhad University Peshawar in 2016. He is an active member of American Library Association, Chinese American Librarians Association, IASL, International Federation of Library Associations and Institutions, Association of College and Research Libraries, Canadian Library Association, Association for Information Science and Technology, Pakistan Library Association, etc. He is raising library issues through TV programs, radio talk shows and other social blogs and keenly raises Pakistan's role in library scenario at national and international conferences, webinars and seminars. During his career, he completed many projects by digitizing various libraries in Pakistan, few praiseworthy projects are:

- Islamabad Policy Research Institute, Islamabad, Pakistan, [www.readerslounge.org/](http://www.readerslounge.org/);
- Institute of Strategic Studies Islamabad, Pakistan, <http://issilibrary.org.pk/>;
- National Defence University Library Islamabad, <http://111.68.99.107/libmax/opac/index.aspx>;
- Ghazi Library Command & Staff College Quetta, <https://cscquetta.gov.pk/library/>; and
- Islamabad Business School Library, Pakistan (IBS), <https://ibs.edu.pk/library/>

**Abid Hussain** ([abidhussain@issi.org.pk](mailto:abidhussain@issi.org.pk)) is based at Deputy Director Library, Institute of Strategic Studies Islamabad, Islamabad, Pakistan.