

Revolutionizing Library Operations with AI: Enhancing Efficiency and User Experience in Academic libraries in Nigeria

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Abstract

Libraries have long been thought to be the foundation of knowledge, providing access to a broad diversity of books, information resources. However, in today's digital age, the emergence of novel technology is transforming old techniques of library management. Library management software has emerged as a game changer, transforming library operations and improving overall user experience. The realm of library management software in this trending topic, covering its benefits, features, and impact on modern libraries with AI technology.

Keyword: Artificial Intelligence, Revolutionizing, Library Operations, User Experience,

Introduction

Artificial Intelligence (AI) has emerged as a transformative force across various industries, and libraries are no exception. In recent years, libraries have embraced AI technologies to streamline operations, improve user experience, and optimize resource management. From automating routine tasks to enhancing search capabilities and personalizing user interactions, AI has revolutionized the way libraries function. In this article, we will explore the significant impact of AI in library operations and the benefits it brings to both librarians and library patrons.

The four main infrastructures in higher education institutions are laboratories, equipment, teachers' classrooms, and libraries with a wide variety of information resources to assist teaching, learning, and research projects. (Tiemo & Ateboh, 2016). Libraries serve as the hub of an institution of learning and a place where information is made available to all clients, regardless of their ages, political and ethical perspectives, religion, sex, etc. Moving information resources

from book collections to audiotape collections, video collections, databases, digitized information resources, automating libraries, and now implementing artificial intelligence in library operations. (Vijayakumar & Vijan, 2011).

This implies that one of the motives of adopting AI technologies in university libraries is to satisfy user needs. According to Sivarajah in 1980, utilizing AI in academic libraries enables improved dataset analysis, particularly for huge datasets that are used for analysis across various datasets. Furthermore, it aids in the abolition of tiresome and repeated task. This has the implication that integrating AI into library operations enables libraries to acquire skills that go beyond the human mind. Libraries, notably university libraries in poor nations like Nigeria, have struggled to accept digital technology and exhibit reluctance to change in the use of technologies across the board (Wheatley & Hervieux, 2019).

The origin of Artificial Intelligence (AI) can be traced to John McCarthy's research in 1955, with the assumption that every aspect of learning and other forms of intelligence can be stimulated through the use of a machine (Wang, 2018). Scholars have defined the concept of Artificial Intelligence (AI). According to Benhamou and Janin (2018), AI involves a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. Merriam-Webster English Dictionary (2018) stated that artificial intelligence is "a part of computer science that deals with giving ability to the machines to look as if they have natural human intelligence." These human capabilities of AI are improved through learning from experience and adaption over time.

As an aspect of computer science, AI comprises an expert system, fuzzy logic, artificial neural network, evolutionary algorithms, case-based reasoning, image processing, natural language processing, speech recognition, and robotic (Tella, et al., 2012). According to Tiemo (2017)

described AI as a cluster of technologies, and various computing science approaches to make flexible rational decisions that align with unpredictable environmental conditions. However, this trend can be linked to process automation, the Internet of things, data processing, tangible robotic, conversational interactions and decision support.

Sivarajah et al. (2017) It has been observed that employing AI in academic libraries enables improved dataset analysis, particularly for huge datasets utilized for analysis across many datasets. It also facilitates the removal of tiresome and repeated chores. The implication of this is that integrating AI into library operations enables libraries to develop powers that go beyond the limits of the human intellect. Libraries, notably university libraries in poor nations like Nigeria, have struggled to accept digital technology and exhibit resistance to change in the use of technologies across a range of library activities (Wheatley & Hervieux, 2019).

Similar to this, Asefeh and Asemi (2018) provide a list of numerous applications for AI technologies that can be utilized to enhance library services, such as circulation services, book shelving, cataloguing and classifying library materials, and more. Aside from assigning metadata, AI technology can also help with non-textual searches. Fernandez (2016) lists seven potential applications for AI in library operations, including large data analysis, metadata creation, search item translation, and search item integration across information resources.

According to Divayana et al. (2015), among the benefits of AI for library operations include its capacity to carry out tasks effectively. When using AI, libraries can complete tasks far more quickly than they could with human labor. AI is useful for uncovering previously undiscovered ideas, like space, and for minimizing human mistake in library operations. According to Liu (2011), academic libraries can build artificial intelligence by utilizing expert systems in the

reference section to suggest to users the library materials that will best address their inquiries.

Mogali (2015)

The following are advantages of AI

Automating Routine Tasks

One of the most significant advantages of AI in library operations is its ability to automate routine tasks. Librarians spend a significant amount of time on administrative duties, such as cataloging, data entry, and circulation management. AI-powered systems can take over these repetitive tasks, freeing up librarians to focus on more value-added activities. For example, AI can automatically categorize and tag books, suggest metadata, and manage circulation processes, resulting in increased efficiency and reduced human error.

Enhancing Search Capabilities

AI technologies have vastly improved the search capabilities of library systems, enabling users to find relevant information quickly and easily. Natural Language Processing (NLP) algorithms can analyze user queries and provide accurate search results, even for complex or ambiguous queries. AI-powered search engines can also employ machine learning algorithms to understand user preferences, recommend related materials, and personalize search results based on individual interests and reading habits. These advancements enhance the user experience by making library resources more accessible and tailored to each user's needs.

Data Analytics and Predictive Insights

AI enables libraries to leverage the vast amount of data they generate, providing valuable insights for decision-making and resource optimization. By analyzing user behavior, borrowing patterns, and resource usage, AI systems can generate predictive insights, helping librarians

make informed decisions about collection development, resource allocation, and service improvements. For example, AI can identify popular genres or authors, detect emerging trends, and anticipate demand for specific materials, enabling libraries to proactively meet user needs and improve resource allocation.

Virtual Assistants

AI-powered virtual assistants are transforming user interactions in libraries. These intelligent systems can provide instant assistance, answer frequently asked questions, and guide users through library services and resources. Virtual assistants can be available 24/7, ensuring that users receive support even outside of regular library hours. By automating routine inquiries, librarians can focus on more complex user requests and provide personalized assistance when required. These virtual assistants enhance self-service capabilities, improve user satisfaction, and create a more efficient and user-friendly library experience.

Preservation and Digitization

AI technologies play a crucial role in preserving and digitizing library collections. Optical Character Recognition (OCR) combined with AI algorithms can accurately convert printed materials into searchable digital text, facilitating wider access to historical and rare documents. AI can also assist in the identification and restoration of damaged or deteriorated texts, enhancing preservation efforts. Furthermore, AI-powered image recognition and tagging systems can automate the digitization process, making it more efficient and cost-effective.

Challenges of Adopting AI in academic libraries

Academic libraries in Nigeria have not yet adopted and used AI, in spite of the potential that it holds for libraries. Given that there has been relatively little study linking artificial intelligence

(AI) to librarianship, this may be because there is a low degree of awareness and adoption of AI's importance in libraries. In contrast to other industries, library and information science has not seen an exponential rise in the usage of AI. The difficulties that libraries are currently facing put their conventional function at real jeopardy. Currently, Libraries are now struggling with operational inefficiency, technological disadvantage, difficulty in maintaining current audiences and engaging new ones, and an inability to demonstrate value and benefits to all stakeholders.

Korinek and Stiglitz (2017) maintained that advances in AI technologies could bring about job losses or job polarization. AI adoption has the potential for a high rise in inequality due to automation. World Bank (2016) maintained that developing countries may be more hindered at the adoption of AI because it will lead to a high job loss rate. The report further states that 69% of job loss will be experienced in India through AI adoption; 72% in Thailand; 77% in China and 85% in Ethiopia. All these studies indicate that AI can lead to job losses and the potential for gross job destruction. International Labor Organization (2018) also stressed that with the current trend in technological change based on the adoption of artificial intelligence in different organizations that include libraries, AI adoption has created widespread fear of job losses and a high rise in inequality.

Other challenges posed by the adoption of AI in academic libraries include:

1. **Financial uncertainty:**

When government funds are shrinking and political or economic changes are underway, cultural institutions are often the first to suffer cuts. In many ways, the struggle for institutional or government funding is much like the chicken and egg problem. Libraries are expected to show value for money and demonstrate cost effective practices, but they can't do that without integrating new technologies to upgrade their physical spaces, offer new services, and improve

the user experience for today's patrons – all of which requires additional funding (Tella, 2020). Thus, today's libraries often find themselves in a financial limbo - unable to show value without additional funding.

2. **Emerging skill gaps:**

The digitalization of information has impacted both library operations and systems. Today, the digital realm is just as important as the physical one, making it essential for libraries to develop new skills not only to stay competent, but to better serve patrons in the digital age. These services require new competencies, such as: higher levels of digital fluency, the ability to provide the most relevant resources at a much faster pace, and supporting hands-on creative activities to maximize a patron's learning experiences.

3. **Competing with today's alternative sources of information:**

According to Horizon report (2017) a survey found that 68% of college students start their research with Google and Wikipedia. These free providers of information, along with the emerging open access trend in scholarly publication methods, are daring libraries to rethink their distribution of high-quality information in to the context of maintaining a vital presence in the new information landscape.

4. **Attracting new and more diverse audiences:**

For libraries to appeal to their existing audiences and engage new ones, they need to offer services that meet the expectations of the new generation of hyper-connected patrons. This includes rethinking the library's traditional physical space, moving from a quiet place filled with bookshelves for reflective reading and writing to something entirely different. For the library to remain relevant, it needs to become a vibrant space for collaboration and innovative activities,

alongside a quiet space for reflective studying. Conclusion The adoption of AI technology in academic libraries is setting a new level of efficient and effective library services delivery. Also, the adoption affords libraries the opportunity to render 10 improved and dynamic services to library patrons. AI is being used to guide and support library activities, and at the same time user-friendly, particularly in information search are among the benefits derived from the adoption AI in libraries. However, despite the benefits associated with the adoption of AI in libraries, some challenges such as financial uncertainty, emerging skill gaps, job loss, lack of adequate infrastructure and erratic power supply still hinder the smooth adoption of AI in many academic libraries in Africa.

Conclusion

AI has become a game-changer in the world of libraries, transforming traditional operations and enhancing user experiences. By automating routine tasks, improving search capabilities, providing predictive insights, offering virtual assistance, and facilitating digitization efforts, AI technologies optimize library operations, increase efficiency, and empower librarians to deliver enhanced services. As AI continues to advance, libraries and information centers will undoubtedly explore further innovative applications.

Recommendations

Some of the recommendations suggested include:

1. Government and library management must come together to proffer the way forward for academic libraries in terms of meeting up with the latest standard of the use of AI in libraries

2. Library staff should be exposed to training and retraining in the use of artificial intelligence in delivering of libraries' services in order to achieve improved operational efficiency in libraries where the technology is to be adopted or already adopted.
3. There must be proper policy formulation and implementation prior to, during and after the adoption of AI in African academic libraries.
4. Higher institutions libraries should intensify efforts in adopting artificial intelligence in the delivery of libraries' services for libraries users to gain very high level satisfaction.
5. Government and concerned agencies should provide adequate artificial intelligent hardware and software to aid in the delivery of libraries' services to users.

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