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ARTIFICIAL INTELLIGENCE IN CULTIVATING PROVISION DISTRIBUTIONS IN ACADEMIC LIBRARIES IN NIGERIA

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Abstract
Artificial intelligence is a subfield of computer science that deals with giving machines the capacity to Artificial intelligence (AI) with a specific field within computer science that aims to enable machines to replicate human intelligence. Librarians have a responsibility to embrace and utilize technology due to its significant impact on library operations. The objective of this study was to investigate ***artificial intelligence in cultivating provision distributions in Academic Libraries in Nigeria*** *by harnessing computer hardware programmed to be useful to humanity. AI technology has advanced human knowledge and has become applicable across various fields, including libraries. The study highlighted the services and activities of academic libraries, emphasizing their role as hubs for teaching and research activities to meet the ongoing intellectual and academic needs of their clients. The adoption of AI for distribution and provision was discussed as a means for libraries to maintain their relevance, take on additional responsibilities and services, and to keep up with current trends by utilizing machine learning for library applications. This paper also mentioned the implementation of robotic in the readers' services department of academic libraries, as robotics is a branch of AI that focused on perceptual and motor skills. Challenges specific to the use of AI in academic libraries in Nigeria were identified, including the underutilization of AI methods due to a lack of infrastructure, among other factors. The study concluded with recommendations for collaboration between the federal government and library managements to introduce and implement current technologies like AI in providing library services to potential customers.*

Keyword: *Academic Libraries, Artificial Intelligence, Cultivating, Distributions and Provision.*

Introduction

The widespread availability of computers, libraries have experienced significant transformations, and the pace of these changes has accelerated. To better fulfill their core mission of providing patrons with access to a wealth of information for knowledge acquisition and reading enjoyment, libraries have embraced and facilitated the adoption of new technologies and methods. However, the approach to achieving this purpose has undergone a shift. Nowadays, accessing written content is possible outside of libraries, which raises the question of whether libraries will retain their importance in the future. In the past, libraries served as the primary and almost exclusive source of written materials. However, with advancements in technology, the question arises: will libraries continue to be necessary and maintain their significance as vital community resources?

A comprehensive analysis of the literature indicates that libraries continue to hold significance in both American and African cultures. Extensive research has been conducted to determine the ongoing relevance of libraries considering the emergence of various digital alternatives to traditional paper-based library materials. According to the researchers, technological advancements, regardless of their nature, cannot render libraries obsolete. Instead, these advancements serve to support the mission and vision of libraries, which encompass research, education, and community service. Therefore, library services can effectively leverage the existing technology of "Artificial Intelligence (AI)." It becomes the responsibility of librarians to actively create, adopt, and implement technology, recognizing its importance in enhancing library routines and operations.

Artificial intelligence (AI) represents a significant advancement within the academic realm of technology. The term "Artificial Intelligence" has been widely used and recognized for quite some time. According to the online version of the British Dictionary (2023) the term "artificial" refers to something created through imitation, lacking authenticity or spontaneity, assumed rather than sincere. "Artificial" signifies something created by humans rather than occurring naturally. It can also imply something contrived or arbitrary, not stemming from inherent or natural causes. On the other hand, in the findings of Frankenfield (2021), he defined "intelligence" is defined as the field of science and engineering focused on developing intelligent machines, particularly intelligent computer programs.

The scientific and engineering disciplines devoted to creating intelligent devices, especially intelligent computer programs, are referred to as the "intelligence" fields. Engineering was primarily concerned with creating

intelligent machines, especially intelligent computer programs. Western libraries and librarians have long made extensive use of the idea of artificial intelligence (AI). Within Nigeria's system of academic libraries, it is still rather new. There have been numerous definitions and discussions about artificial intelligence and how it relates to library services from academic professionals all over the world. Western libraries and librarians have long made extensive use of the idea of artificial intelligence (AI). Within Nigeria's system of academic libraries, it is still rather new. There have been numerous definitions and discussions about artificial intelligence and how it relates to library services from academic professionals all over the world.

It can be difficult and time-consuming to come up with a single, complete definition of artificial intelligence because of the variety of viewpoints. However, we will take a few definitions from other writers into consideration for the sake of this study. Artificial intelligence (AI), according to Frankenfield (2021), is the replication of human intelligence in robots that have been trained to think and act like people. The use of such capabilities by devices may also fall within this description.

According to Asemi and Asemi (2018), artificial intelligence is a subfield of computer science that aims to enable machines to imitate genuine human intelligence. They identify various fields within artificial intelligence, including expert systems, fuzzy logic, artificial neural networks, evolutionary algorithms, case-based reasoning, image processing, natural language processing, speech recognition, and robotics. These fields collectively contribute to building machines that can exhibit intelligent behaviors as perceived by humans.

Likewise, Heath (2018) provides a definition of artificial intelligence as the technology that enables robots to possess skills such as planning, acquiring new knowledge, reasoning, problem-solving, movement, and, to some degree, even demonstrating creativity. This definition underscores the extensive range of capabilities that artificial intelligence can encompass when applied to robotic systems.

The remarkable aspect of this technology lies in its ability to identify patterns at a scale and speed beyond human capabilities. Its purpose is to create computers capable of thinking, perceiving, hearing, moving, speaking, and even experiencing sensations. Artificial intelligence is considered as a replication of knowledge achieved through programming computer hardware to manifest and serve the needs of humanity. This technology has significantly advanced human understanding and made it more relevant across various disciplines worldwide.

Services and Activities of Academic Libraries

Academic libraries serve as vital centers for teaching and research activities, aiming to support and fulfill the intellectual and academic growth aspirations of their clients. Chalukya (2015) emphasizes that the primary objective of academic libraries is to optimize the utilization of their information resources and services for the benefit of their users. These libraries are specifically designed to meet the educational and research requirements of the institutions they cater to.

According to the research conducted by Oniovoghai et al. (2023) they asserted that academic libraries offer a diverse range of services. These libraries are designed to meet the specific needs of the institutions they serve, prioritizing teaching and research activities. The aim is to optimize the utilization of information resources and services for the benefit of library users. Regardless of the materials they house or the purposes for which they are used, academic libraries have always provided individualized direct services to people.

The emergence of digital libraries and the influence of librarians in the digital sphere have had a profound impact on the functioning and services of academic libraries. Oniovoghai et al. (2023) underscore the transformation of these services into the virtual realm of the Internet. This shift in technology enables library users to conveniently send their inquiries via email to the library administration, regardless of the time or their geographical location. As a result, users now can access resources and information that extend beyond the physical boundaries of the library building.

As machines gradually assume a larger share of human "thinking" jobs, libraries will face the need to train their staff and transform into centers of continuous education for their communities. This shift presents a business opportunity that aligns with the longstanding efforts of academic and public libraries to position themselves as lifelong learning hubs. One potential area where libraries can contribute is by providing the new knowledge and skills that will be required by individuals, such as truckers who may be replaced by self-driving trucks. Libraries hold a significant level of affection and trust within their communities, likely attributed to their noble mission, role as hubs of discovery, and commitment to providing excellent customer service. Patrons are frequently treated with empathy and care, which further strengthens the bond between libraries and their communities.

The traits of sentience belong to humans, even though robots can imitate some of these traits. Libraries have a unique opportunity to support individuals who may distrust the government, media, or intellectual authorities, as they are trusted by the public. It is important to move beyond the misconception that

libraries' value solely lies in highlighting human characteristics that distinguish us from technology. Instead, there is a need to foster understanding of algorithms and their role in powering machines. One logical approach is to educate people in a way that prepares them to collaborate effectively with robots or undertake tasks that machines are unable to perform (Miller, 2017). It is necessary to develop quantitative and qualitative methods for analyzing large datasets, enabling us to grasp their significance and potential for manipulation.

The Implementation of Artificial Intelligence for Enhancing Distribution Services in Nigerian Academic Libraries.

Libraries may increase their offerings and avoid being out of date by utilizing machine learning for a variety of purposes. However, it is essential for libraries to overcome the barriers that hinder the adoption of artificial intelligence. Artificial intelligence has a wide scope and can enhance various aspects of academic libraries, making them more intelligent. By integrating artificial intelligence into service delivery, libraries can address critical issues related to traditional library operations, including space limitations, cataloguing, serials management, collection development, and resource acquisition. Prompt attention to these areas is necessary to ensure efficient and effective functioning of libraries.

Currently, the University of Lagos is the sole institution in Nigeria that has implemented artificial intelligence in certain library services and operations. However, the utilization of artificial intelligence in library services and operations remains relatively unknown among library professionals, as pointed out by Tunde et al. (2022). For this article, the focus of artificial intelligence will be limited to reference services, cataloguing and categorization, and circulation functions in academic libraries. Given its inherent characteristics, artificial intelligence holds significant importance for academic libraries. The academic library plays a pivotal role in shaping the institution's image, and by integrating technology into service delivery, it can enhance efficiency, effectiveness, and the overall quality of services provided.

Artificial Intelligence in Academic Libraries for Service Provisions.

Libraries can use machine learning in a variety of applications to ensure their continued relevance, expanding their responsibilities and offerings to stay current. But for libraries, removing the obstacles to implementing artificial intelligence is a critical step. The concept of artificial intelligence is broad and can be applied to all aspects of academic libraries, enhancing their intelligence. The integration of artificial intelligence (AI) into service delivery within academic institutions has provided opportunities to address significant challenges related

to traditional library routines. These include aspects such as providing sufficient shelf space for books and resources, cataloguing and categorization, managing serials, developing collections, and acquiring resource materials.

Academic libraries play a significant role in shaping the institution's image, and the integration of technology in service delivery can enhance their effectiveness, efficiency, and quality. Cataloguing and classification involve providing specific details such as author names, titles, and subject terms to describe information resources. In this area of librarianship, the use of neural networks can greatly enhance the process, as the manual assignment of billions of neuron cells can be effectively replaced. Integrating neural networks and other artificial intelligence technologies into academic libraries offers several advantages, including the ability to self-organize and automatically restructure databases, support natural language interfaces, address semantic complexities in queries, and provide close (partial) matches. These advancements, as highlighted by Oniovoghai et al. (2023), will undoubtedly bring significant improvements to academic library operations.

Robotics in the Readers Services Department of the Academic Libraries

Robotics, as defined by Wikipedia (2014), is a branch of artificial intelligence that focuses on the development of mechanical devices capable of performing automated tasks using artificial intelligence techniques. These devices can operate under human supervision, follow predetermined plans, or adhere to general sets of rules. Robotics draws upon the fields of engineering and physiology to create robots with human-like physical capabilities, computer intelligence, and computer control. The integration of robotic services within the circulation unit of academic libraries has become increasingly important, given the diverse range of services provided by academic libraries worldwide. Robots are versatile manipulators that can be programmed to operate in three or more axes, perform tasks automatically, and be reprogrammed as needed.

While digital library resources and services are becoming more prevalent, libraries continue to acquire a substantial quantity of printed materials. This presents a challenge for many libraries, especially academic research libraries, as they grapple with space constraints due to the demand for both print and electronic resources. To tackle this issue, there is a growing trend of utilizing robots in various tasks, especially those that are deemed risky or time-consuming (Vysakh &Rajendra 2020)

Libraries with extensive collections are now utilizing robots for inventory management, as evidenced by the example of the PESIST central library. One such

robot assists in filing, categorizing, and replacing volumes on the shelves, enhancing the efficiency of library operations. By delegating these tasks to robots, librarians can utilize their time for other important work. Another robot named 'Bobbie' in the same library serves the International Journal of Library by providing materials such as pamphlets, newspapers, and magazines. It also introduces itself and guides patrons to different areas within the library. Furthermore, Tay (2014) observed the implementation of a robot programmed to answer frequently asked questions (FAQs) from students.

Challenges of Artificial Intelligence in Nigerian Academic Libraries

Despite the numerous advantages associated with implementing artificial intelligence software, academic libraries in Nigeria are lagging in its adoption. These libraries continue to operate in a similar manner as before, without fully utilizing AI capabilities. The Nigerian library system faces several challenges when it comes to implementing AI, including the following:

1. The lack of infrastructure hinders the implementation of existing methods. Based on the responses from the participants in the study, technical issues emerged as the primary barriers faced by academic libraries in Nigeria when attempting to develop intelligent systems. To address this, it is crucial for the library to have access to modern technology such as laptops and another device.
2. The limited availability of local suppliers offering artificial intelligence solutions in the library field poses a challenge, as there is a constant need to update programs and applications. Providers play a crucial role in handling the maintenance, repair, and development of these systems. Naseej is recognized as one of the prominent manufacturers of artificial intelligence solutions for libraries in the Western region.
3. The shortage of experts in artificial intelligence specifically focused on libraries, along with the challenge of resolving technical issues with electronic systems, is a significant obstacle. While Nigeria has computer science experts specializing in artificial intelligence who have graduated from local universities or gained international experience, the lack of strategic plans for library development, including the recruitment and utilization of these experts, is considered a fundamental issue.
4. The implementation of artificial intelligence in academic libraries in Nigeria has the potential to replace human roles. These computer systems can perform tasks similarly to real humans through programming and cognitive abilities. Consequently, there may be increased employment opportunities

for librarians with academic qualifications. This aligns with Jasrotia's (2018) findings, which suggest that artificial intelligence can be perceived as a "threat" to librarians' roles but not to the existence of libraries themselves. Intelligent machines in libraries can read and analyze digitized resources, providing customized insights, answers, and services more efficiently than librarians.

5. Another obstacle to implementing artificial intelligence in Nigerian university libraries is the potential for errors or malfunctions. If there are problems with the programmed devices, such as robotics, that are responsible for carrying out specific tasks and providing information, the delivery of services may be affected. This issue must be addressed, as highlighted by the findings of Oniovoghai et al. (2023), who emphasize that artificial intelligence systems can potentially disseminate inaccurate information if the algorithms guiding them encounter difficulties.
6. An unreliable power supply poses a major hindrance to the implementation of artificial intelligence in Nigerian academic libraries. Due to the lack of consistent power supply in most academic institutions in Nigeria, it is challenging to install electrical equipment that could enhance academic activities and programs.
7. Another challenge arising from the implementation of artificial intelligence in Nigerian academic libraries is the lack of technical expertise to handle the technology effectively. Operating robots and other AI systems requires specialized knowledge, and finding qualified librarians with the necessary skills can be a challenge, as artificial intelligence is a complex field that may be difficult for non-specialists to grasp.
8. Insufficient funding is another major obstacle that could hinder the implementation of artificial intelligence in Nigerian university libraries. Many academic libraries are facing declining budgets, which limits their ability to purchase AI systems and information resources to the extent that they can afford.
9. The scarcity of librarians with expertise in artificial intelligence technologies, coupled with the limited technical proficiency of users in AI technology, highlights the need for curriculum content that educates researchers and students on utilizing digital databases effectively.

Conclusion

In summary, this study examines the roles of Artificial Intelligence in Cultivating Provision Distributions in Academic Libraries in Nigeria. It explores

how AI enables computer systems to perform tasks that traditionally require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. The study emphasizes the significance of AI in academic libraries and discusses its applications in various library services and activities, including distribution and provision. Additionally, it discusses robotics in the Academic Libraries' Reader Services Division and how these machines can function under human supervision, adhere to established plans, or follow general guidelines. The integration of robotic services within the circulation unit of academic libraries has become increasingly important, given the diverse range of services provided by academic libraries worldwide. This paper also heighted the challenges associated with AI adoption in academic libraries and proposes potential solutions. These include enhancing operational effectiveness through service efficacy, cost reduction, process automation, research data management, and digital asset management, among other strategies.

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1. The absence of strong decision-making among key stakeholders is a challenge as top management and employees need to be educated about the advantages of artificial intelligence and its potential to enhance service delivery for users.
2. It is essential for the federal government and library managements to collaborate to effectively introduce and utilize modern technologies such as artificial intelligence in library services for potential library users. Standard procedures should be established to ensure the sustainable acquisition of new technologies, including artificial intelligence, in Nigerian academic libraries. This policy will facilitate the procurement of library equipment in the future. Professional librarians and library managements should work together to identify the most suitable artificial intelligence technology that will enhance information services in libraries, improve service delivery, and streamline library material procurement.
3. Enhancing operational effectiveness through improved service efficiency and cost reduction is crucial for libraries. Process automation, efficient research data management, and digital asset management can contribute to identifying and improving operational efficiency. Machine learning can be employed to enhance collection analysis, visualization, and preservation, while also reducing service delivery costs. The implementation of advanced library services platforms (LSP) can support initiatives aimed at further enhancing operational efficiency.

4. To enhance the user experience and expand the reach of library services, incorporating chatbots and location-based services into search engine results can be beneficial. Machine learning algorithms enable the swift personalization of information from numerous sources, replacing the manual sorting of a limited portion of the data. AI systems can utilize customer touchpoint data, previous interactions, and behaviors to identify needs and provide exceptional customer experiences. This includes offering precise and tailored research recommendations to individual students, as well as matching search results to their level of knowledge, resulting in a more effective learning experience.
5. The implementation of AI can assist librarians in achieving their new objectives by reducing the need for manual search and reference tasks, thereby minimizing human errors and inefficiencies. By automating these routine tasks, library staff can allocate more time and effort towards more complex and valuable responsibilities such as curating library collections, supporting instructors with reading lists, and educating students on improving their research skills.
6. Libraries can play a crucial role in the evolving landscape of scholarly information by leveraging AI technology. Through AI, libraries can facilitate interdisciplinary research by uncovering connections within vast datasets that might otherwise be overlooked. By collaborating with open publication groups and adopting research tools that integrate with other institutions, libraries can contribute to the seamless flow of data and research across industries and disciplines. This enhances the discoverability, exploration, and analysis of their collections, creating a robust global network of high-quality resources.
7. Continuous training and retraining programs for library staff should include a focus on artificial intelligence. Participation in conferences, workshops, seminars, both locally and internationally, can provide opportunities for library workers to engage with AI experts, gain firsthand experience with the technology, and enhance their skills. Nigerian higher education libraries should prioritize efforts in this area to effectively serve library patrons with high levels of satisfaction and efficiency.

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