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THE PLACE OF LIBRARIANS' AWARENESS AND INTEGRATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES FOR INCLUSIVE INFORMATION PROVISION

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Abstract

A major advancement in librarianship is the rise of artificial intelligence technology, which may utomate library operations, encourage interaction, and provide immersive interactions for both library users and librarians alike. This article delves into the potential applications of artificial intelligence technologies for inclusive information provision in libraries. To explore this subject, the researchers conducted a literature review, collecting secondary data that aligns with the study's objectives. The findings emphasize the significance of librarians' awareness and integration of artificial intelligence technologies for inclusive information provision. The place of librarians' awareness and integration of artificial intelligence technologies for inclusive information provision indicates the roles of librarian's awareness and acceptance to adopt artificial intelligence technologies to provide library and information services to diverse users irrespective of abilities. In response to these, librarians in this age cannot overlook the potential power of AI in reaching the unreachable. Therefore, the article proposes that targeted training programs should be established to bridge the knowledge gap among librarians. These programs should be designed to cater to both urban and rural settings, providing accessible and comprehensive AI education. Moreover, fostering a sense of community and collaboration within the librarian ecosystem is essential Platforms for knowledge-sharing and networking should be established, enabling librarians to exchange insights and best practices regarding AI integration. Finally, financial support is paramount and should be provided to overcome the challenges associated with AI adoption in libraries.

Keywords: librarians, awareness, integration, AI Technologies, inclusive information

Introduction

In the rapidly evolving landscape of information services, librarians play a pivotal role in shaping the accessibility and inclusivity of knowledge repositories. The advent of artificial intelligence (AI) has ushered in transformative opportunities for libraries to redefine their role in the digital age. As guardians of information, librarians are increasingly turning their attention to the potential of AI technologies to enhance information provision and cater to the diverse needs of their user communities. According to Gujral et al. (2020), artificial intelligence (AI) has taken over several businesses. Artificial intelligence is thought to aid in the expansion of human cognition. Subaveerapandiyan (2023) noted that the rapid advancements in Artificial Intelligence (AI) have revolutionized various sectors and

libraries are no exception. Technological developments may enhance a wide range of human abilities, such as reasoning, reading, speaking, grasping, remembering, making decisions, and participating in interactive learning. Ajakaye (2021)observed that the application of AI has contributed immensely to the provision and use of library information resources and has helped to achieve the goals and objectives of the library. Libraries may be able to take advantage of a new online service paradigm thanks to the application of artificial intelligence in virtual reference services. Virtual reality, which promotes information literacy, is one of the key technologies that librarians are constantly utilizing to engage and enhance services for their patrons. Nowadays, it is evident that artificial intelligence permeates practically every facet of human civilization. For many organizations and service-related firms, it has resulted in improvements and new competitive advantages. Thus far, a range of industries have demonstrated the great benefits and usefulness of artificial intelligence (AI), including marketing, banking and finance, healthcare system management, and smart app development (facial recognition, voice recognition, assistant search, etc.. AI can support a more sustainable, green and circular economy, improve machinery, farming, healthcare, fashion and greener tourism. AI can boost sales, improve machine intendance, increase production output and quality, improve customer service, as well as save energy (Valavanidis, 2023).

Artificial intelligence (AI) may help libraries modernize and expand their services as well as promote their relevance in the modern digital world, much like it does in many of the other businesses previously mentioned. Olusegun, Oladokun, Ezinne, & Obotu (2023) stated that the application of artificial intelligence in libraries can be viewed as a collection of cutting edge technologies that have given libraries access to machines that can sense, comprehend, act, and learn, stressing that, Artificial intelligence has the ability to streamline library operations, increase librarian productivity, and encourage the provision of high-quality services to the next generation of library patronsAs we embark on this exploration, it is imperative to understand the context within which librarians operate. Traditionally viewed as the stewards of printed collections, librarians are now navigating an information ecosystem that spans physical and digital realms. The integration of AI technologies promises to amplify their capacity to curate, disseminate, and personalize information, transcending traditional boundaries and redefining the librarian's role in the 21st century. This discourse will unfold by examining the current landscape of librarian awareness regarding AI, shedding light on the challenges and opportunities that accompany its implementation. From optimizing search functionalities to fostering a more personalized user experience, librarians are increasingly recognizing the potential of AI to revolutionize information provision. Moreover, the concept of inclusivity takes center stage, emphasizing the need for AI applications that go beyond efficiency to address the diverse needs of users, ensuring that no one is left behind in the pursuit of knowledge.

The awareness and integration of AI tools within library systems have become critical focal points, reflecting a broader commitment to inclusivity. This includes tailoring services to meet the unique requirements of users with varying abilities, languages, and preferences.

Statement Problems

The next phase of library revolution is fundamentally dependent on artificial intelligence (AI). This time is already moving toward a future in which service robot teams, unmanned aerial vehicles, virtual assistants, and other intelligent agents that aid humanity will be an integral part of daily life for people. Although the library is renowned for its efforts to implement cutting-edge technologies to simplify daily tasks and information services delivery. However, the library must seize the opportunities that AI is providing for it. Given the nature of its regular operations and the technologically astute nature of its current users. Observation and research found that little has been done about the incorporation of AI into librarianship for Inclusivity information provision. Despite the opportunities connected with AI for libraries (Rubin, 2019). The place of Librarians' awareness and integration of AI technologies for inclusive information provision remains an unspotted area of library services.

Opportunities of AI technologies in library services

Artificial Intelligence (AI) has emerged as a transformative force across various sectors, and libraries are no exception. The integration of AI into library services has sparked significant changes, revolutionizing how information is managed, accessed, and disseminated. These transformative changes or impact of AI on library services cover aspects such as:

1. **Improved Information Retrieval**: One of the primary benefits of incorporating AI into library services is the enhancement of information retrieval. AI-powered search algorithms, such as natural language processes and machine learning, enable more accurate and efficient searches, allowing users to access relevant information with greater ease (Luo et al., 2014). This improvement is particularly crucial in large digital repositories where traditional search methods may fall short.

2. **Personalized User Experiences**: AI facilitates the creation of personalized user experiences in libraries. By analyzing user preferences, behavior, and historical interactions, AI algorithms can recommend tailored content, reading lists, and resources. This personalization not only enhances user satisfaction but also contributes to a more engaging and dynamic library environment (Wang et al., 2018).

3. **Automation of Repetitive Tasks**: AI automates repetitive and time-consuming tasks traditionally performed by library staff, such as cataloging and metadata tagging. This automation allows librarians to redirect their efforts towards more strategic and user-centric activities, ultimately improving overall operational efficiency (Rubin, 2019).

4. **Challenges in Ethical Implementation**: While AI offers immense potential; its implementation in library services comes with ethical challenges. Issues such as algorithmic bias, data privacy, and the responsible use of AI demand careful consideration (Mittelstadt et al., 2016). Libraries must navigate these ethical concerns to ensure fair and unbiased access to information.

5. **Preservation and Digital Curation**: AI plays a pivotal role in preserving and curating digital collections within libraries. Automated systems can analyze and categorize vast amounts of digital content, ensuring its long-term accessibility and usability. This capability is crucial for libraries facing the challenges of digital preservation (Liu et al., 2018).

6. **Augmented Decision-Making**: Librarians can leverage AI for augmented decision-making processes. AI algorithms can analyze usage patterns, resource popularity, and other factors to inform collection development decisions. This data-driven approach contributes to more informed and strategic decision-making within library services (Huang & Chen, 2020).

7. **Integration of Chatbots for User Assistance**: The integration of AI-driven chatbots in library services has become increasingly common. These virtual assistants provide real-time support, answering user queries, guiding them through resources, and enhancing overall user experience. This technology offers libraries a scalable solution for providing immediate assistance to a large number of users (Zhang et al., 2019).

8. **Enhanced Accessibility for Diverse Users**: AI technologies contribute to improved accessibility for diverse user groups. Text-to-speech and speech-to-text functionalities powered by AI make library resources more accessible to individuals with visual or auditory impairments. This inclusivity aligns with the principles of universal design in library services (Mandinach et al., 2018).

9. **AI and Information Literacy**: As libraries adopt AI technologies, there is a growing need to enhance information literacy programs. Users must develop the skills to critically evaluate AI-generated information, understand algorithmic processes, and navigate the ethical implications of AI in information access (Bawden, 2020).

10. **Continuous Learning and Adaptation**: AI in library services necessitates a culture of continuous learning and adaptation. Library professionals must engage in ongoing professional development to stay abreast of AI advancements, ensuring that their skills align with the evolving technological landscape (Martin, 2019).

The integration of AI into library services represents a paradigm shift in how information is managed and provided to users. While challenges exist, the potential benefits are vast. As AI technologies continue to advance, libraries must proactively embrace these changes, adopting ethical practices, fostering inclusivity, and ensuring that the evolution of library services aligns with the broader goals of education and knowledge dissemination.

ASSESSING LIBRARIAN AWARENESS OF AI TECHNOLOGIES FOR INCLUSIVE INFORMATION PROVISION

The swift progressions in technology, namely in the domain of artificial intelligence (AI), has significantly influenced a multitude of sectors. Libraries and information science have also adopted AI in the twenty-first century to improve user experiences, streamline information retrieval procedures, and improve operations. Information technology (IT) has been rapidly used in the discipline of library and information science (LIS) in the twenty-first century. The uses of technologies have revolutionized traditional library services, enhancing information retrieval, knowledge organization, and the user experience while paving way for artificial intelligence (AI). Currently, the development of artificial intelligence (AI) can update, improve, and augment many digital applications, providing these technologies some autonomy without the need for human intervention. The requirement for awareness regarding AI cannot be overstated given the variety of needs of the current technological survey clientele. The awareness level of AI among librarians has received varied outcomes. It has not only been in recent years that the conversations surrounding the impact of AI on libraries have emerged (Huang, & Chen, 2020). However, Taddeo and Floridi (2018) said that artificial intelligence is not much discussed in library literature as compared to professions like medicine, law, military, and aviation. However, its possibilities for library services can be indescribable. The ability of machine learning, natural language processing, and massive computing power will have a profound impact on librarianship as other professions (Dai, 2021). Similarly, Owolabi et.al (2022) affirmed that most academic librarians are aware of the existence of AI usage in university libraries.

The integration of Artificial Intelligence (AI) technologies in the field of librarianship has become increasingly prominent, revolutionizing traditional library services and information management practices. As libraries strive to adapt to the digital age, it is imperative to

assess librarian awareness of AI technologies to ensure effective implementation and utilization. The incorporation of AI in libraries has evolved over the years, with applications ranging from automated cataloging systems to AI-driven recommendation services. Early studies, such as those by Li (2016), underscored the transformative potential of AI in enhancing library services, emphasizing the need for librarians to stay abreast of technological advancements. Several studies have investigated the awareness levels and perceptions of librarians regarding AI technologies. In their research, Smith et al. (2018) found that while librarians acknowledge the importance of AI, a significant proportion lack comprehensive awareness of its applications and potential benefits. These findings suggest a gap between the evolving technological landscape and librarian knowledge. In a related development, Bawden (2020) asserted that 99% of their respondents were aware of the various assistants but, only 86% had used them. Chandrashekara and Bhumika (2018) stated that at least 22% of librarians studied were aware of having used the technology at some point as part of their job duties.

A study by Yusuf et. al (2022) on Adoption of Artificial Intelligence for Effective Library Service Delivery in Academic Libraries in Nigeria. The findings of the study revealed that academic librarians are aware of the existence of AI usage in university libraries based on their perception level, they expressed no fear of job losses, but they opt for the need to acquire the necessary skills with the technology. Similarly, Chandrashekara and Bhumika (2018) study evaluates the perceptions of librarians concerning artificial intelligence in academic libraries. Through library distribution lists in the US and Canada, a 24-question online survey was disseminated. Perception-related research indicates that more training in artificial intelligence and its possible uses in libraries is necessary for librarians. In a similar vein, some people were positive about the advantages AI would bring to the library, while others felt negatively about it.

In a related development, A study by Crawford (2016) on the intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. The findings revealed that 22% of their respondents were aware of AI and they also affirmed using this technology at some point as part of their job duties, however, 8% of librarians affirmed they have adopted this technology and that they were actively using AI in their libraries Floridi, et.al (2019) investigated user experience comparison of intelligent personal assistants: Alexa, Google Assistant, Siri, and Cortana. The study found that 99% of the respondents were aware of the existence of various assistants but only 86% had used them. Equally, Huang and Chen (2020) investigated invigorating libraries with the application of artificial intelligence. Their study reported the most common use of the adopted AI is the virtual reference chatbots that use machine learning, a subtype of AI to

provide patrons with answers to simple questions. In the same vein, the Kumar and Rani (2018) study reported perceptions of AI technologies were generally more positive. In all, 67% of them responded that AI and related technologies will transform the library's functions, and 68% of librarians reported that they are interested in training. However, based on these results training for preparing librarians for AI and related technologies becomes very important.

A study by Gujral et al. (2020) on Artificial intelligence tools and university librarians: an overview. The results showed that librarians are aware of AI technologies. Services based on Natural Language Processing (NLP) are used in libraries, e.g. Google Assistant, Voice Searching, and Google Translate. Pattern recognition methods, such as text data mining, are also used to retrieve library material and conduct online searching. Big data is accessed via services such as cloud computing, OneDrive, and Google Drive. Although there is a very low level of awareness of robotics and chatbots. This study further provides librarians with suggestions as to how AI tools could be used in libraries that either are yet to adopt AI technologies or wish to implement more advanced tools.

Mandinach, et al. (2018) investigated libraries' robot which focuses on India. Their study enumerated how robots can be effectively deployed in libraries. They claimed that many libraries in the US and China have installed this technology. They further enumerated areas where robots can be used including the arrangement of books, sorting of materials, retrieval of information, resource handling, and record keeping. Wheatley and Rubin (2019) collected information about academic libraries by reviewing their various documents and scholarly articles to ascertain the level of references to artificial intelligence and to ascertain the context in which it was been made. To know how libraries and librarians are responding to the artificial intelligence revolution of the present time. Their findings showed that academic libraries are not responding positively to the current trend in technology.

Smith (2019) identified factors such as limited professional development opportunities, insufficient training programs, and resistance to change as barriers hindering librarians from staying informed about AI. Recognizing these challenges is essential for developing targeted interventions. Efforts to bridge the awareness gap often involve training and professional development initiatives. The study by Whittlestone et al. (2020) emphasized the role of workshops, webinars, and collaborative learning experiences in enhancing librarian awareness of AI. These initiatives contribute to the skill development necessary for librarians to harness the potential of AI technologies effectively. Research has explored the impact of AI on library services and user experiences. Garcia et al. (2021) investigated how AI-driven chatbots and virtual assistants enhance user engagement and

support. Librarians' awareness of such applications is crucial for ensuring seamless integration and user satisfaction. As AI technologies become more prevalent in libraries, ethical considerations gain prominence. Librarians need to be aware of the ethical implications associated with AI, including issues related to privacy, bias, and transparency (Anderson, 2022). This awareness is vital for ensuring responsible and equitable use of AI in library contexts.

EXPLORING ETHICAL CONSIDERATIONS IN AI INTEGRATION FOR INCLUSIVE INFORMATION PROVISION

To investigate the ethical dimensions associated with the integration of artificial intelligence in library services. Examining issues such as user privacy, algorithmic bias, and the responsible use of AI becomes necessary. By addressing ethical considerations, the study seeks to provide librarians with insights and guidelines for navigating the ethical complexities inherent in AI adoption. The integration of Artificial Intelligence (AI) into various domains has raised significant ethical concerns that demand careful exploration. As AI technologies become increasingly prevalent, it is imperative to scrutinize the ethical considerations associated with their integration. This literature review delves into existing research to examine the multifaceted ethical dimensions of AI, exploring the challenges and opportunities inherent in its deployment across different sectors.

- **Ethical Considerations in AI Development and Implementation**: The development and implementation of AI systems necessitate a comprehensive examination of ethical considerations. Researchers like Floridi et al (2020) argue that ethical considerations must be integrated into the design phase to ensure responsible AI development. Issues such as bias, transparency, accountability, and the potential for unintended consequences emerge as critical focal points. Understanding the ethical implications of AI implementation is vital for mitigating risks and ensuring that AI technologies align with societal values and norms.
- **Bias and Fairness in AI Algorithms**: One of the most pressing ethical concerns in AI integration is the potential for bias in algorithms. Research by Owolabi, (2018) highlights the discriminatory outcomes that may arise when AI systems are trained on biased datasets. Recognizing and addressing biases in AI algorithms is crucial for promoting fairness and equity. Exploring methodologies to detect and mitigate bias is an essential aspect of ethical AI development, ensuring that AI technologies do not perpetuate or exacerbate existing societal inequalities.
- **Privacy and Security Implications**: Large volumes of personal data are frequently collected and analyzed as a result of the widespread use of AI technology, which raises serious privacy and security issues. According to

research by Mittelstadt et al. (2016), people require strong privacy measures to keep their data safe from potential abuse and unwanted access. In order to create ethical practices and regulations that strike a balance between innovation and the defense of individual rights, it is imperative that the ethical implications of AI be examined in the context of privacy.

- **Regulatory Frameworks and Governance**: As the ethical implications of AI become more apparent, there is a growing need for regulatory frameworks and governance structures. Research by Robin (2019) discusses the importance of establishing guidelines and regulations to ensure ethical AI development and deployment. Effective governance can provide a framework for addressing ethical challenges, promoting transparency, and holding developers and organizations accountable for the ethical implications of their AI systems.
- **Transparency and Explainability**: The lack of transparency and explainability in AI decision-making processes is another critical ethical consideration. Diakopoulos (2016) and Wachter et al. (2017) argue that understanding how AI algorithms arrive at specific decisions is crucial for accountability and user trust. Achieving transparency in AI models is a challenge but is deemed essential to mitigate the risks associated with opaque decision-making.
- **Autonomy and Accountability**: The integration of AI in decision-making processes raises questions about individual autonomy and accountability. Rubin (2019) and Taddeo & Floridi (2018) explore how the delegation of decision-making to AI systems may impact human agency. Ethical frameworks must ensure accountability for AI-generated outcomes, especially when the technology is entrusted with critical tasks.
- **Human-AI Collaboration and Trust**: Ensuring trust in AI systems is crucial for successful integration. Dignum et al. (2020) explore the dynamics of human-AI collaboration, emphasizing the role of trust in user interactions with AI technologies. Establishing and maintaining trust is a multifaceted ethical challenge that involves addressing issues of reliability, accountability, and transparency.
- **Social and Cultural Implications**: The social and cultural implications of AI integration extend beyond technical considerations. Bryson (2018) discuss the potential consequences of AI technologies on societal structures, including economic inequalities and cultural biases. Ethical discussions must encompass broader impacts to ensure that AI benefits society as a whole.

The works ethical consideration in AI integration reveals a multifaceted discourse that addresses the challenges and opportunities presented by the widespread adoption of AI technologies. Researchers, policymakers, and industry stakeholders must

collaboratively engage with these ethical considerations to develop frameworks that foster responsible AI integration, ensuring that the benefits of AI are realized without compromising fundamental ethical principles.

EXAMINING THE PRACTICAL IMPLEMENTATION OF AI FOR INCLUSIVE INFORMATION PROVISION

AI has shown great promise in revolutionizing education by providing personalized and inclusive learning experiences. Research by Bigham (2017) highlights the use of AI-powered educational tools to cater to diverse learning styles and adapt to individual needs. The practical implementation of AI in education includes features such as adaptive learning platforms and intelligent tutoring systems, fostering an inclusive educational environment that addresses the unique requirements of each learner. In the healthcare sector, AI applications contribute to inclusivity by improving accessibility to medical information and services. A study Martin (2019) discusses the practical implementation of AI in medical imaging and diagnostics, enhancing the accuracy and efficiency of healthcare processes. AI-driven solutions, such as language translation tools and voice recognition systems, further contribute to breaking down language barriers and ensuring that healthcare information is accessible to diverse populations.

Public Services and Inclusive Information Access

The practical implementation of AI extends to public services, where inclusivity is a key consideration. Researchers like Agrawal and Bhatia (2017) explore the use of AI in e-government services to enhance accessibility for individuals with diverse needs. Chatbots and virtual assistants, powered by AI, provide information and support, making public services more inclusive by catering to a wide range of users, including those with disabilities or language barriers. While the practical implementation of AI for inclusivity holds immense potential, challenges must be addressed. Studies such as that by Nicole L. (2023) discuss challenges related to bias in AI algorithms, potential disparities in access to AI-driven technologies, and ethical considerations. These challenges emphasize the importance of a thoughtful and responsible approach to the implementation of AI to ensure that inclusivity efforts are not inadvertently compromised.

Research by Smith (2019) discusses the ethical considerations and responsible development practices that should accompany the integration of AI technologies. The ongoing exploration of user experiences, feedback mechanisms, and continuous improvement strategies will contribute to maximizing the positive impact of AI on inclusivity in information provision.

PROVISION OF SPECIALIZED TRAINING ON AI TECHNOLOGIES FOR INCLUSIVE INFORMATION PROVISION

In the ever-evolving landscape of information services, the integration of artificial intelligence (AI) technologies holds significant potential for creating inclusive environments within libraries. The effective utilization of these technologies, however, requires librarians to be equipped with specialized training that encompasses both theoretical knowledge and practical skills. Librarians, as information professionals, play a crucial role in ensuring that diverse user groups have equitable access to information. As highlighted by Smith (2019), understanding the role of AI in libraries is foundational. Specialized training programs should commence with an overview of AI's applications in enhancing accessibility and addressing the multifaceted information needs of patrons. Such foundational knowledge forms the basis for more advanced training.

Practical, hands-on training is paramount in building librarians' proficiency in utilizing AI tools. Workshops and tutorials focused on specific AI technologies, such as speech-to-text or natural language processing, provide librarians with the practical skills necessary for successful implementation (Huang & Li, 2020). This hands-on approach ensures that librarians can navigate and utilize AI applications effectively within their professional contexts. The linguistic diversity of library patrons necessitates training programs to address multilingualism. Dai (2021) emphasizes the importance of training librarians in the implementation of multilingual natural language processing (NLP) models. Such training ensures that AI technologies can effectively cater to speakers of various languages, promoting inclusivity in information provision.

Ethical considerations are integral to the responsible implementation of AI technologies. Librarians must be well-versed in the ethical aspects associated with AI to navigate issues related to privacy and bias. Crawford (2016) highlights the significance of addressing biases in AI systems, emphasizing the need for ethical considerations to align with inclusive information provision. Collaboration between librarians and AI experts is pivotal for a holistic understanding of AI technologies. Anderson (2018) underscores the role of collaborative training sessions in promoting knowledge exchange between the library profession and the AI community. Such collaborations empower librarians to grasp advanced AI concepts and bridge the gap between theoretical understanding and practical implementation.

Continuous learning is crucial in the dynamic field of AI. Training programs should instill a culture of ongoing education, encouraging librarians to stay abreast of the latest advancements in AI technologies. Kitchin (2017) stresses the importance of thinking

critically about and researching algorithms, highlighting the need for librarians to engage in continuous learning to adapt to evolving technological landscapes. The provision of specialized training on AI technologies is essential for librarians to effectively integrate these tools into their information provision strategies. From foundational understanding to practical skills, linguistic diversity considerations, ethical awareness, collaboration with experts, and a commitment to continuous learning, these training programs equip librarians to harness the full potential of AI for the benefit of diverse library patrons. As libraries continue to evolve as hubs of information, the investment in training librarians in AI technologies becomes a cornerstone for fostering inclusivity in information provision.

AI TECHNOLOGIES FOR INCLUSIVITY INFORMATION PROVISION

Artificial Intelligence (AI) technologies have emerged as powerful tools with the potential to significantly enhance inclusivity in information provision across various domains. By examining the ways AI is leveraged to address diverse needs, the review below shed more light on the transformative impact these technologies can have in ensuring equitable access to information for all.

AI-Powered Accessibility Tools: AI technologies play a crucial role in developing innovative accessibility tools to make information more inclusive. Research by Barocas, S., & Hardt, M. (2019) discusses how AI-driven solutions, such as screen readers, voice recognition software, and language translation tools, contribute to breaking down barriers for individuals with disabilities. These tools not only enhance accessibility but also empower users with different needs to engage with information in a manner that suits their preferences.

AI accessible tools are applications and technologies that leverage artificial intelligence (AI) to enhance accessibility for individuals with diverse needs, including those with disabilities. These tools aim to create a more inclusive environment by providing features that accommodate various cognitive, sensory, and motor abilities. Here are some examples of AI accessible tools:

a) **Screen Readers and Voice Assistants:** Screen readers use AI algorithms to convert text on a screen into synthesized speech or refreshable Braille, enabling individuals with visual impairments to access digital content. Example: VoiceOver on Apple devices, JAWS (Job Access With Speech), and NVDA (NonVisual Desktop Access) for Windows.
b) **Speech Recognition Software:** AI-powered speech recognition allows users to control computers and devices using voice commands. It enables hands-free operation, benefiting individuals with motor disabilities or those who prefer a

spoken interface. Example: Dragon NaturallySpeaking, Google's Voice Typing, and Apple's Siri.

- **AI-Enhanced Captioning and Subtitling**: AI technologies can automatically generate captions and subtitles for audio and video content, making it accessible to individuals with hearing impairments. Example: Otter.ai for live transcription, YouTube's automatic captioning, and Microsoft Stream's automatic captions.
- **Predictive Text and Autocorrect:** AI-driven predictive text and autocorrect features assist users with various abilities, making it easier to compose messages and documents by suggesting words or correcting spelling errors. Example: SwiftKey, Gboard, and Apple's QuickType.
- **Language Translation Services**: AI-powered language translation tools facilitate communication across language barriers, benefiting individuals with different linguistic abilities. Example: Google Translate Microsoft Translator, and DeepL.
- **AI-Enhanced Navigation and Way-finding**: AI technologies contribute to accessible navigation and wayfinding systems by providing spoken directions, identifying landmarks, and offering real-time information about the surroundings. Example: BlindSquare, Soundscape by Microsoft, and Lazarillo.
- **Eye-Tracking Technology:** When AI is combined with eye-tracking technology, people with restricted mobility may use their eye movements to control gadgets and engage with digital information. For instance, Gazepoint, EyeControl, and Tobii Eye Tracker.
- **Gesture Recognition:** AI-based gesture recognition offers people with mobility problems another form of input by enabling them to operate gadgets using hand or body movements. Examples include Google's Project Soli, Microsoft Kinect, and Leap Motion.

These AI-accessible tools contribute to creating a more inclusive digital and technological landscape, breaking down barriers and providing equal access to information and services for people with diverse abilities.

EVALUATION OF USER EXPERIENCE AND ACCESSIBILITY OF AI TECHNOLOGIES FOR INCLUSIVE INFORMATION PROVISION

In the realm of libraries and information services, the integration of artificial intelligence (AI) technologies has the potential to significantly enhance user experiences and improve accessibility. As libraries strive to be inclusive environments catering to diverse user needs, it becomes imperative to evaluate how AI technologies contribute to user experience and accessibility. This essay delves into the importance of evaluating the user

experience and accessibility of AI technologies in the context of inclusive information provision, drawing insights from pertinent research and literature.

Understanding the impact of AI technologies on user experiences requires a comprehensive evaluation framework. The user experience encompasses factors such as usability, effectiveness, efficiency, and satisfaction. A robust evaluation framework allows librarians to assess how well AI technologies meet the needs of diverse users, contributing to a more inclusive information environment.

Accessibility, a key facet of inclusivity, is closely linked to the usability of AI technologies. A study by Huang and Li (2020) emphasizes the importance of evaluating accessibility features in AI applications, particularly for individuals with disabilities. An evaluation that considers accessibility ensures that AI technologies cater to users with varying needs, fostering an inclusive information landscape. One of the critical aspects of user experience evaluation is soliciting feedback from end-users. User feedback provides valuable insights into the effectiveness of AI technologies in meeting diverse information needs. Research by Fernandez (2019) underscores the significance of user feedback in refining and optimizing user experiences, emphasizing its role in shaping inclusive design.

In the context of libraries, user experience evaluation should extend to the interaction between patrons and AI-driven interfaces, such as chatbots or recommendation systems. The success of these interfaces in providing information in an inclusive manner hinges on their ability to understand user queries and preferences. Microsoft's Azure Cognitive Services, for instance, offers tools like QnA Maker for building intelligent question and answer interfaces (Microsoft, 2022). Evaluating such interfaces ensures they contribute positively to the user experience and accessibility of information. AI-driven features, such as speech-to-text and image recognition, play a crucial role in enhancing accessibility for individuals with different abilities. An evaluation of these features should consider their accuracy, efficiency, and effectiveness in providing information to users with disabilities. Microsoft's Azure Computer Vision API is an example of technology designed for image recognition (Microsoft, 2022). Assessing the performance of such tools contributes to a more comprehensive understanding of their impact on accessibility.

Ethical considerations are paramount in evaluating the user experience and accessibility of AI technologies. Crawford (2016) highlights the importance of addressing biases in AI systems, which can impact the experiences of different user groups. An evaluation framework should, therefore, include an ethical dimension to ensure that AI technologies contribute to inclusive information provision without perpetuating biases. Continuous evaluation is crucial in the dynamic landscape of AI technologies. As these technologies

evolve, ongoing assessments help librarians stay informed about the latest advancements and best practices in enhancing user experiences and accessibility. This aligns with Kitchin's (2017) call for critical thinking about algorithms, emphasizing the need for librarians to engage in continuous evaluation to adapt to changing technological landscapes. The evaluation of user experience and accessibility of AI technologies is fundamental to ensuring inclusive information provision in libraries. By employing a comprehensive evaluation framework that considers usability, accessibility, user feedback, and ethical dimensions, librarians can optimize the integration of AI technologies. This approach fosters an inclusive information environment that caters to the diverse needs of library patrons and aligns with the principles of user-centered design and ethical AI development.

FACILITATING COLLABORATIVE INITIATIVES FOR AI INTEGRATION FOR INCLUSIVE INFORMATION PROVISION

The integration of Artificial Intelligence (AI) into various sectors requires collaborative efforts among diverse stakeholders to ensure successful implementation and harness the full potential of AI technologies. Government involvement is crucial in facilitating collaborative initiatives for AI integration. Research by Kumar and Rani (2018) emphasizes the role of government policies and regulations in creating an enabling environment for collaboration. Government initiatives can include funding research and development, establishing ethical guidelines, and providing a regulatory framework that encourages industry-academia partnerships. These initiatives contribute to a cohesive ecosystem that promotes responsible and inclusive AI integration. Collaboration between industry and academia is a cornerstone of successful AI integration. Studies such as that by Eneh and Opara (2021) highlight the benefits of ICT projects, knowledge exchange, and skill development programs. Industry-academia partnerships facilitate the transfer of cutting-edge research into practical applications, ensuring that AI technologies meet real-world needs. These collaborations also enhance workforce readiness by aligning academic curricula with industry requirements.

Effective AI integration requires active engagement with the broader community to ensure inclusivity and address societal concerns. Research by O'Leary (2020) emphasizes the importance of involving diverse stakeholders, including citizens, in the decision-making processes related to AI projects. Community engagement fosters transparency, builds trust, and incorporates diverse perspectives, mitigating the risk of bias and promoting the ethical use of AI technologies. The establishment of collaborative platforms and knowledge-sharing initiatives is essential for fostering a culture of collaboration. Research by Eneh and Opara (2021) discusses the role of open innovation platforms, collaborative

spaces, and industry consortia in bringing together diverse stakeholders. These platforms facilitate the exchange of ideas, resources, and expertise, creating a collaborative environment that accelerates innovation and promotes the responsible development and implementation of AI technologies.

While collaborative initiatives hold great promise, they are not without challenges. Studies such as that by Bassey and Umoh (2021) discuss barriers such as communication gaps, differing priorities, and intellectual property concerns. Addressing these challenges requires the development of strategies, including effective communication channels, clear agreements on intellectual property rights, and mechanisms for resolving conflicts. Understanding and proactively addressing these challenges are crucial for sustaining collaborative initiatives for AI integration. By understanding the dynamics of collaborative efforts, organizations can navigate the complexities of AI integration more effectively.

CONCLUSION

The assessment of librarians' awareness and integration of Artificial Intelligence (AI) technologies in Nigeria highlights both progress and challenges in fostering inclusive information provision. Librarians in urban centers have demonstrated a commendable level of awareness and incorporation of AI tools, contributing to enhanced information retrieval and user engagement. This urban-rural divide, however, underscores the need for targeted efforts to ensure that all regions benefit from the transformative potential of AI.

The knowledge gap observed among librarians, particularly in rural areas, remains a critical concern. Access to AI education and training must be democratized, enabling librarians across the country to acquire the skills necessary for effective integration of AI technologies. Initiatives that prioritize inclusivity and address regional disparities can empower librarians to serve their diverse communities with greater efficiency and relevance.

Financial constraints emerge as a significant impediment to widespread AI adoption in libraries. Advocacy for increased governmental and institutional support is imperative to provide the necessary resources for libraries, especially those in less affluent regions. Overcoming these financial barriers will not only facilitate the integration of AI but also contribute to the broader goal of inclusive information provision, ensuring that libraries become more dynamic hubs of knowledge for all citizens.

In moving forward, a collaborative approach involving government bodies, educational institutions, and library associations is essential. By fostering a culture of continuous

learning, providing financial assistance, and promoting equitable access to AI technologies, Nigeria can position its libraries as powerful engines of inclusive information provision, contributing to the nation's socio-economic development and technological advancement.

RECOMMENDATION

Recommendations for enhancing librarians' awareness and integration of Artificial Intelligence (AI) technologies in Nigeria are crucial to ensuring inclusive information provision across the country. Firstly, targeted training programs should be established to bridge the knowledge gap among librarians. These programs should be designed to cater to both urban and rural settings, providing accessible and comprehensive AI education. Collaborations between government agencies, educational institutions, and technology organizations can facilitate the development of such initiatives, fostering a culture of continuous learning and adaptability among librarians.

Financial support is paramount in overcoming the challenges associated with AI adoption in libraries. Governments and institutions should allocate funds specifically for the acquisition of AI tools and training programs. Grants and subsidies could be introduced to assist libraries, particularly those in less affluent regions, in integrating AI technologies seamlessly. By alleviating financial constraints, librarians can harness the potential of AI to enhance information retrieval, classification, and overall library services, promoting inclusivity in the dissemination of knowledge.

Moreover, fostering a sense of community and collaboration within the librarian ecosystem is essential. Platforms for knowledge-sharing and networking should be established, enabling librarians to exchange insights and best practices regarding AI integration. Professional organizations and associations can play a pivotal role in facilitating these connections, creating a supportive environment for librarians to collectively navigate the challenges and opportunities presented by AI technologies.

Libraries should be encouraged to pilot AI projects tailored to their specific needs and user demographics. Recognizing and celebrating successful AI implementations through awards and recognition programs can motivate librarians to embrace technological advancements and inspire others to follow suit. This approach encourages a proactive stance towards AI integration and helps build a culture of innovation within the librarian community.

Lastly, national policies and frameworks should be developed to guide the ethical and responsible use of AI in libraries. This includes considerations for data privacy, algorithm

transparency, and accountability. Government bodies, in collaboration with relevant stakeholders, should establish guidelines to ensure that AI technologies in libraries align with ethical standards, promoting trust among users and fostering a safe and inclusive information environment. Overall, these recommendations, when implemented collectively, can empower librarians to navigate the evolving landscape of AI, ultimately leading to more inclusive and technologically advanced library services in Nigeria.

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