

Impact of NEP on Library & Information Centers with Special Reference to Applications of Artificial Intelligence in Library Services: A Review Study

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ABSTRACT

This study aims to investigate the application of Artificial Intelligence in library services and the challenges faced in implementing AI in libraries. Artificial Intelligence is one of the newest technological trends in digital transformation that libraries can use to provide services to library patrons. AI can support retrieving and sharing information with end users. In this paper we have examined different areas where AI can be implemented in the libraries and various expected difficulties can emerge during the implementation of AI. The benefits of using AI in the library are also additionally studied. The research findings would be useful for libraries and administrators interested in implementing AI applications in their libraries for the satisfaction of all concerned stakeholders.

KEYWORDS: Artificial Intelligence, Application of AI, Library services.

INTRODUCTION

Artificial intelligence (AI) is the study of how to make computers do things that at the moment, people do better. Artificial intelligence is the process of creating machines that can act in a manner that could be considered by humans to be intelligent. This intelligence could be reflected in a machine that exhibits human characteristics or even much simpler behaviors such as the ability to survive in dynamic environments.

The adoption of artificial intelligence is rapidly growing in the private and public sectors. Artificial intelligence (AI) technologies have the potential to be extremely transformative, and they can be used to further innovation. The majority of computer systems and smartphones being developed today have artificial intelligence features, and we have probably used them without realizing that they are intelligent devices. Artificial intelligence already affects many of our daily computing activities. Speech recognition, natural language processing, autonomous or self-driving cars, machine learning, deep learning, and robotics are a few examples of artificial intelligence in computers. Unlike humans, who function on deep cognition, artificial intelligence is based on perceptual recognition. Artificial

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intelligence is based on computers' ability to recognize patterns quickly and efficiently at a scale that is not possible for humans.

Artificial intelligence discovers applications in a multitude of fields, including healthcare, education, gaming, military, business, and libraries. In 1990, the concept of implementing artificial intelligence systems in libraries was first proposed. These intelligent library systems provide knowledge-based services to both the library staff and patrons (Asemi&Asemi, 2018). Artificial intelligence applications in library systems include subject indexing, shelf reading, collection development, technical services, reference services, and information retrieval systems, among other things. These have transcended knowledge-based services and natural language processing (NLP). The development of artificial intelligence programming has made the creation of a smart library both possible and imminent.

2. HISTORY OF ARTIFICIAL INTELLIGENCE

The 1950s began the modern era of AI. AI in the 1950s was primarily symbolic. During this era, it was discovered that computers could manipulate symbols as well as numerical data. This discovery led to the construction of several programs such as the logic. The Orist for theorem proving and the general problem solver for means-end analysis. Perhaps the biggest application development in the 1950s was a checker-playing program that eventually learned how to beat its creator. Two AI languages were also developed in the 1950s. The first, Information Processing Language (IPL), was developed by Newell, Simon, and Shaw for the construction of the Logic Theorist. LISP was developed in the late 1950s and soon replaced IPL as the language of choice for AI applications. LISP was developed at the MIT AI lab by John McCarthy, who was one of the early pioneers of AI. In the late 1950s, John McCarthy and Marvin Minsky founded the Artificial Intelligence Lab at MIT, which is still in operation today.

In the 1960s, an expansion of AI occurred, due to advancements in computer technology and an increasing number of researchers focused on the area. Perhaps the greatest indicator that AI had reached a level of acceptability was the emergence of critics. Knowledge representation was a strong theme during the 1960s, as strong AI continued to be a primary theme in AI research. The first practical application of fuzzy logic appeared in the early 1970s. The creation of language for AI continued in the 1970s with the development of Prolog. Prolog was well suited for the development of progress that manipulated symbols and operated with rules and facts.

The 1990s introduced a new era in weak AI applications. It was discovered products that integrates AI sell not because of their AI characteristics but because they solve a problem more efficiently than do products that use traditional methods. AI found integration within a greater number of applications.

3. CONCEPT OF ARTIFICIAL INTELLIGENCE

Several definitions of artificial intelligence (AI) have surfaced over the last few decades, John McCarthy offers the following definition in this 2004 paper (link resides outside ibm.com), " It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to biologically observable methods." Artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving. It also

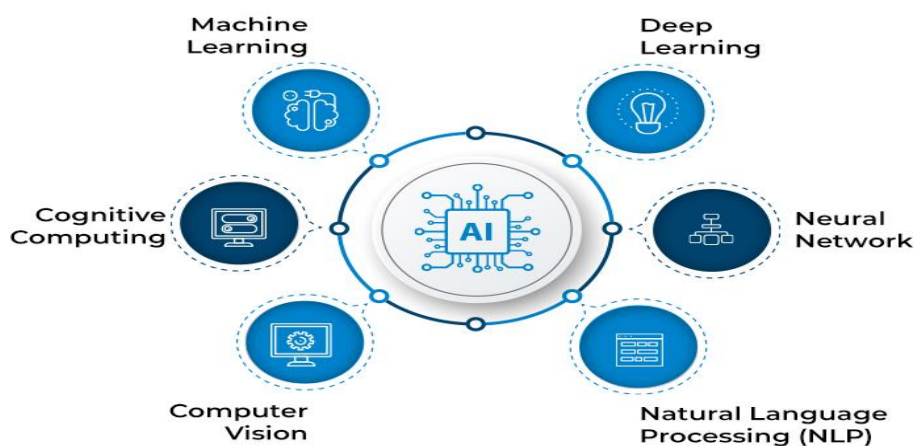
encompasses sub-fields of machine learning and deep learning, which are frequently mentioned in conjunction with artificial intelligence. These disciplines are comprised of AI algorithms that seek to create expert systems that make predictions or classifications based on input data.

According to Wikipedia “Artificial intelligence (AI) is the intelligence of machines or software, as opposed to the intelligence of humans or animals. It is a field of study in computer science that develops and studies intelligent machines. Such machines may be called AIs.

Alan Turing was the first person to carry out substantial research in the field that he called Machine Intelligence. Artificial intelligence was founded as an academic discipline in 1956. AI technology is widely used throughout the industry, government, and science. Some high-profile applications are: advanced web search engines (e.g., Google, recommendation systems (used by YouTube, Amazon, and Netflix), understanding human speech (such as Google Assistant, Siri, and Alexa), self-driving cars, generative and creative tools (Chat GPT and AI art), and superhuman play and analysis in strategy games (such as chess and Go).

AI uses multiple technologies that equip machines to sense, comprehend, plan, act, and learn with human-like levels of intelligence. Fundamentally, AI systems perceive environments, recognize objects, contribute to decision-making, solve complex problems, learn from past experiences, and imitate patterns. These abilities are combined to accomplish tasks like driving a car or recognizing faces to unlock device screens.

4. KEY COMPONENTS OF AI



Source: <https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-ai/>

5. APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Major applications of AI is in E-commerce, Education, Healthcare, Robotics, social media, Automobiles, Agriculture, GPS & navigation and many more. Some of the above are discussed here.

5.1. Artificial intelligence in e-commerce

Artificial intelligence finds extensive application in the e-commerce industry as it facilitates the development of positive user-company relationships. Using the user's search history and preferred views as a guide, artificial intelligence assists in providing relevant suggestions and recommendations.

5.2. Artificial intelligence in education:

Up until a few years ago, the entire organization and management of the educational sector was done by humans. However, artificial intelligence is also having an impact on education these days. It provides recommendations for courses that benefit both the teachers and the students. "Voice Assistant" feature can be used in multiple and broad ways to save time, provide convenience, and assist users as and when required.

5.3. Artificial intelligence in robotics

Artificial Intelligence is one of the major technologies that provide the robotics field with a boost to increase their efficiency. AI provides robots to make decisions in real-time and increase productivity. Natural Language Processing plays a vital role in robotics to interpret the command as a human being instructs. Object recognition and manipulation enable robots to detect objects within the perimeter and this technique also helps robots to understand the size & shape of that particular object.

5.4. Artificial intelligence in Healthcare

Artificial Intelligence is widely used in the field of healthcare and medicine. The various algorithms of Artificial Intelligence is used to build precise machines that can detect minor diseases inside the human body. Also, Artificial Intelligence uses the medical history and current situation of a particular human being to predict future diseases.

5.5. Artificial intelligence in social media

There are various uses of Artificial Intelligence in the field of social media. Some social media platforms such as Facebook, Instagram, etc uses Artificial Intelligence to show relevant content to the user. It uses the search history and view history of a user to show relevant content.

6. APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN THE LIBRARY

AI can be applied to various aspects of library services, such as cataloging, classification, recommendation, reference, discovery, and preservation. For example, AI can help librarians automate the process of metadata creation and extraction, enhance the quality and consistency of bibliographic records, and identify and correct errors and inconsistencies. AI can also help librarians provide personalized and relevant recommendations to their patrons, based on their preferences, behavior, and context. AI can also assist librarians in answering complex and diverse queries, using natural language processing and semantic analysis. Furthermore, AI can help librarians discover new and emerging topics, trends, and patterns in the information landscape, using data mining and machine learning. Additionally, AI can help librarians preserve and digitize their collections, using image recognition and optical character recognition.

Artificial Intelligence has the potential to enhance the precision and effectiveness of library data, boost the diversity and pertinence of available resources and services, broaden information availability, and foster creativity and education. AI can help librarians by eliminating manual and repetitive tasks, minimizing data errors and inconsistencies, offering personalized recommendations to users, enabling anytime, anywhere library interactions, and facilitating the discovery of new information.

AI is also applicable to the library's security management system. While face recognition, fingerprint recognition, and other artificial intelligence technologies can help with the library's security management, daily services include seat management, lending management, identity management, and other security management. For instance, student information is linked to their faces using face recognition technology, which was created specifically for artificial intelligence. Students can directly enter and exit the library by simply brushing their faces rather than carrying their student IDs after binding.

AI can also be applicable to provide reference services in the library. Based on the preferences, behavior and perspectives of users AI can help librarians to provide personalized and relevant information to their patrons.

Some of the major activities for any library include acquisition, processing, collection building and management. AI helps with potential intelligent roles like, data acquisition, data curation, and data quality control (Gul & Bano, 2019). Moreover, AI can be utilized in cataloguing, classification, acquisition of collections, indexing and management activities as well (Walker & Jiang, 2019; Wójcik, 2020; Omehia, 2020).

7. CHALLENGES OF IMPLEMENTING AI IN LIBRARIES

Till today there is no such use of artificial intelligence systems in the library. There are some limitations to implementing AI in libraries.

1. Lack of technical knowhow to use AI in the library is the main part behind using of AI.
2. Lack of adequate budget in library is the another challenge as AI systems are very costly. Maintenance cost of AI system is also high.
3. The amount of work and technical know-how required to develop AI systems in libraries. The degree and kind of work required to create an intelligent library system are directly correlated with the system's strength.
4. Artificial intelligence is a complicated field that calls for a high degree of specialized knowledge. This necessitates bringing on additional staff locally.

CONCLUSION

To survive in the current digital era, libraries must apply innovative technology in the library. They must use new ICT trends to provide library services to their patrons. Development of artificial intelligence system can definitely benefit to the library in the areas like reference service, circulation service, security management, collection development, resource management, information retrieval and dissemination etc. The findings of this review article indicate that artificial intelligence will greatly enhance library operations and service delivery. Libraries equipped with AI technology can streamline all the library operations and can get help to satisfy users needs and save their time. AI has the potential to transform libraries into dynamic, user-centered spaces where information is easily

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accessible, and services are tailored to individual needs. As technology continues to evolve, libraries must adapt and innovate to remain vital in the digital age.

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