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APPLYING ARTIFICIAL INTELLIGENCE IN THE LIBRARIES

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Abstract

The rapid advancements in the field of artificial intelligence (AI) have ushered in a new era of profound opportunities for research and development across the globe. The future is, indeed, both challenging and bright as artificial intelligence (AI) technologies continue to be integrated into nearly every sector, maximizing their potential.

The processing of information resources and services provided by the libraries as knowledge resource centers has a pivotal role as to achieve the library's aims and objectives in this modern era. The application of AI tools in libraries certainly disseminate the benefits at large more particularly to the students. Due to the many uses of AI in libraries, librarians will have opportunity to be creative thinker in order to remain relevant in their roles with the updated technology. The implementation of AI opened up a number of new arrays for the library, including the ability to link electronic and physical resources and to associate video assistance with specific materials and items. The author of this paper made earnest efforts to cover some of the elements of artificial intelligence (AI), in the services of libraries, its advantages of use, and the challenges encountered by the libraries while implementing AI in their operations.

Keywords: Artificial Intelligence, Challenges, optimum use, benefits, cost-effective, challenging, and bright future.

Definitions of AI

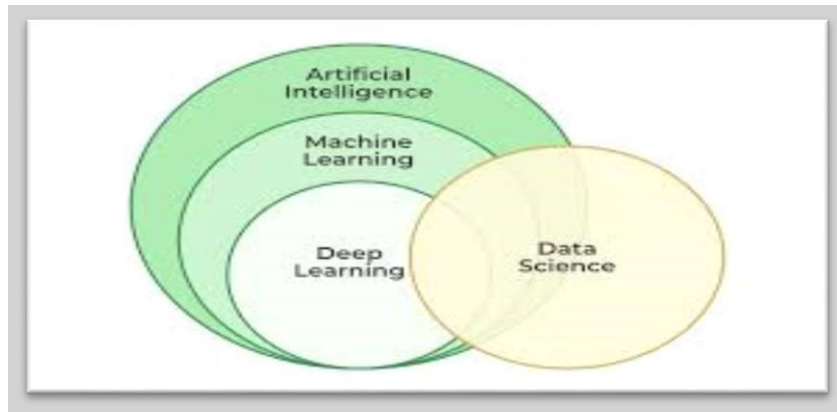
A fundamental component of artificial intelligence is the idea that computers are capable of performing tasks that are typically performed by intelligent humans. The UNESCO definition of artificial intelligence (AI) states that it is an "imitation of human cognition."

"Machines that imitate some features of human intelligence, such as perception, learning, reasoning, problem-solving, language interaction, and creative work" (UNESCO, 2022: 9).

More broadly, UKRI (2021:4) define AI as "a suite of technologies and tools that aim to reproduce or surpass abilities in computational systems that would require 'intelligence' if humans were to perform them. Artificial Intelligence (AI) has been a topic of fascination and debate for decades, as researchers and developers strive to create systems that can mimic and even surpass human-like intelligence. The significance of data is emphasized in the EC definition. "Simply put, AI is a collection of technologies that combine data, algorithms, and computing power." (European Commission, 2020: 2)

Components of AI

Artificial intelligence (AI) has become an increasingly prevalent and influential field in recent years, encompassing various technologies and approaches that aim to emulate human intelligence and cognition. At its core, AI encompasses machine learning (ML) and deep learning (DL), which are powerful tools for solving complex problems and making intelligent decisions.



Machine Learning

Machine learning is a subfield of AI that involves the application of statistical models and algorithms to data, enabling computers to learn from examples and make predictions without being explicitly programmed (Panch et al., 2018).

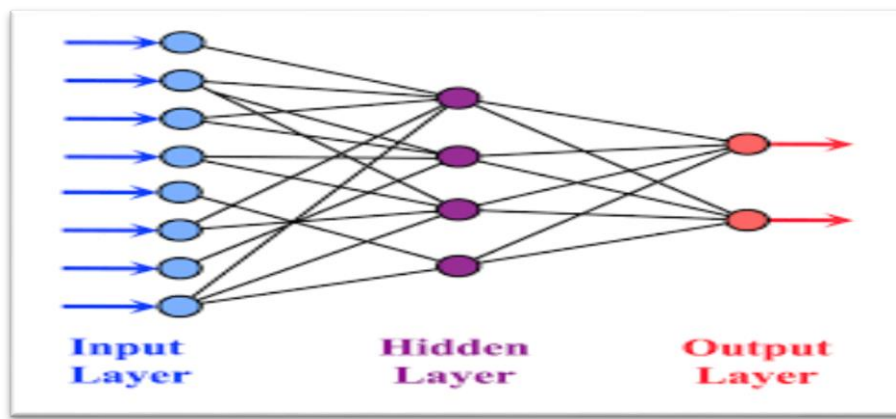
A machine-learning system receives data input and uses it to determine how the system responds or outputs. Programming can also be unique; for example, a machine learning system might be trained to identify certain models in case studies involving vast amounts of data. When the system's output is employed as an input or data source, it can also be created again, tested, and programmed continuously. Machine learning systems can also be built as sets or groups in which two machines learning systems are present, either cooperating or competing with one another. (2019 ALA). The goal is to create computer algorithms that can access and utilize data to train themselves. When it comes to the provision of library information resources and services, machine learning systems can be quite important. Big Data, Robotics, Pattern Recognition, Chatbots, and Text Data Mining (TDM) are a few examples of AI's Machine Learning technologies.

Deep Learning

A subset of machine learning is called deep learning (DL). Algorithms and artificial neural networks are inspired by the human brain and learn from vast volumes of data. Through deep learning, machines can tackle complex problems even with unstructured, highly diverse, and interrelated data sets. AI techniques utilized in the context of Deep Learning include Neural Networking, Image Processing, and Natural Language Processing (NLP).

Neural Networks

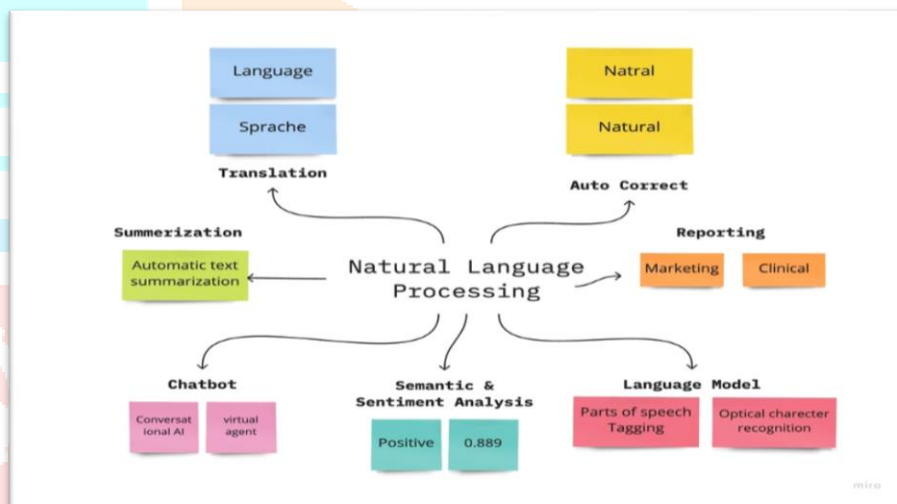
Neural networks, a subfield of machine learning, have emerged as a powerful tool for analyzing and understanding complex data. Inspired by the human brain, these computational models are designed to mimic the way neurons process and transmit information (Smarter AI & Deep Learning + A Mandate to Be Bold, 2019).



Natural Language Processing (NLP)

Natural Language Processing (NLP) is a field of computer science that deals with the interaction between human language and computers.

It involves the use of machine learning techniques to process and understand human text and speech, also known as Natural Language. Natural language processing is a subfield of artificial intelligence and is considered a crucial aspect of human intelligence, as the use of language is a defining characteristic that separates humans from other animals. (Real-World Natural Language Processing, 2022)



Computer Vision

Visual data interpretation using machine learning. can be used for sophisticated image-based searches or to digitize library materials.

A statistical model called "topic modeling" is used to identify topics in text-based documents. beneficial for refining metadata, arranging digital collections, and advancing academic search engines.

Generative AI: Trained algorithms, like ChatGPT

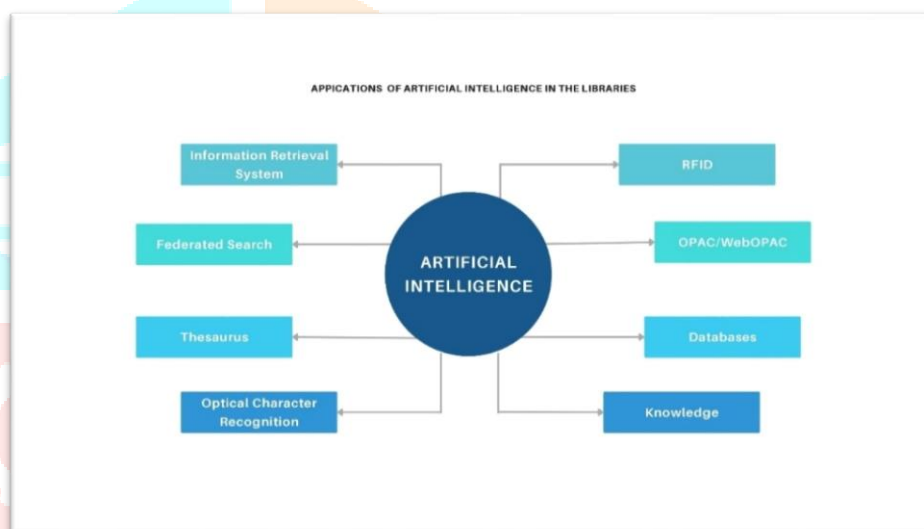
Artificial Intelligence (AI) mimics human intelligence and decision-making by using data, algorithms, and computing power. The following steps comprise the process breakdown:

Fig. 1 Applications of Artificial Intelligence (AI) in Various Library Domains



Source: Secondary data

Fig. 2 Application of AI in Libraries



Source: Secondary data

Increasing Resource Discovery and Access: More relevant and customized results are returned by AI-powered search engines since they can comprehend complex queries. This will ensure a smooth navigation of the extensive library contents and remove frustration.

AI can automate tedious processes, freeing up library staff members to concentrate on more high-value activities. This leads to the optimization of workflows. This gives librarians the freedom to commit their skills to improving the library experience.

Customized Suggestions: Artificial Intelligence algorithms has the ability to scrutinize user conduct in order to produce tailored suggestions that present users with novel and pertinent materials. Their horizons will broaden as a result, and their interaction with the library will deepen.

Chatbots driven by AI and Virtual Reference Services: Chatbots driven by AI have the ability to give customers round-the-clock virtual reference services and prompt support. This guarantees that clients can get assistance whenever and

Preservation and Conservation: Artificial Intelligence has the ability to analyze photographs of library resources to detect deterioration, allowing for prompt intervention and preventive actions. By doing this, the library's priceless collection will be protected.

Ensuring Equitable Access and Addressing Ethical Issues: When using AI, ethical issues including data privacy, algorithmic bias, and equitable access must be carefully considered. Libraries need to make sure AI

technologies are used ethically and do not favor or discriminate in the recommendations of resources or services.

AI Tools for Libraries

A. AI tools for research

Research Rabbit

It is a free online tool and helps researchers to find relevant scholarly research papers.

Endnote

It is a reference management tool. the role of endnotes has become increasingly significant, serving as a crucial tool for researchers, writers, and scholars.

Scite: -Scite is a platform that uses Smart Citations to find and assess scientific articles. With Smart Citations, users can view how a publication has been cited along with its context and classification that indicates if the citation offers evidence in favor of or against the cited claim.

B. AI tools to enhance user experience

Bot sonic: -Librarians can be in two places at once with chatbots! We go beyond the front desk with our help by teaching a bot with knowledge from our library. Quick responses to common inquiries are available to users 24/7, freeing up librarians to handle more difficult research requests.

Quick Chat: -Basic questions can be answered by a chatbot in the library, freeing up librarians to concentrate on in-depth research and individualized support. AI chatbots enhance the self-service Experience by giving users 24/7 access to information.

Copyscape: -To make sure that the resources in their libraries are unique and free of plagiarism, librarians can use Copyscape. In addition to preserving the library's reputation, this leads by example for users.

C. AI tools to help librarians work more efficiently

AudioPen: -For librarians, AudioPen can transcribe audio recordings, saving them both time and effort. This allows users to search and access spoken content, such as lectures, interviews, and oral histories.

AI Cataloging: - Producing metadata for library materials, cataloging relieves librarians of the laborious duty of manual data entry.

Flixier: -For librarians, Flixier can transcribe audio and video materials, enabling search, sharing, and accessibility of the content. As a result, a larger audience can access and benefit from spoken content.

Quill Bot: -We are only as good as the words we choose to write. Quill Bot ensures that all of our writing, including grant proposals, newsletters, and signage, is accurate, succinct, and clear. Good communication helps us to inform and engage people in an efficient manner.

Impact of AI on the libraries

Numerous library services are being impacted positively by AI; in some cases, these changes may be significant and at a greater level, while in others they will just be slight. It makes sense to assume that libraries will integrate AI in ways that either complement current functions, have a strong connection to user needs, or require the least number of resources. Descriptive AI is important in improving accessibility to the library collection. AI is being utilized to provide initial metadata for items. It is probably going to show up in search results and be utilized to help with some aspects of systematic reviews (like result filtering). As more and more research scholars use AI techniques for their research the need to support data scientist communities will increase.

Libraries can provide assistance with data management, data preservation, copyright concerns, and data discovery. Artificial Intelligence is anticipated to transform routine knowledge work, such as translating, summarizing, and generating text. Professional work in libraries can benefit greatly from the widespread use of AI tools and applications. Research Rabbit, Scite, elicit, and open read are a few examples of tools that

help literature reviews. Because generative AI may tailor content to the requirements of particular audiences, it can be used in library marketing. AI is expected to be used in back-end library systems due to its accuracy in performing complicated routine operations. Processing bibliographic data via robotic process automation, or RPA, is one example of this.

Advantages of Artificial Intelligence

Without any doubt, the use of AI certainly has various benefits to the service provider, user, and students. A few of them are listed below,

- a) Able to handle difficult and complex tasks (workload) that would be difficult or impossible for humans to cope with at a given time.
- b) To discover unexplored things easily. e.g., space
- c) Faster and speedily done than a human workforce.
- d) Fewer mistakes and flaws.
- e) Improves efficiency and effectiveness.
- f) Improves accuracy in the dealing.
- g) No pilferages and damage to books etc.
- h) Congenial working environment.
- i) Conducive atmosphere for the students to learn.
- j) Increase the habit of peer learning among students.

Challenges of Artificial Intelligence

Any tools, software, methods etc., generally face so many challenges in the initial stage with lots of teething problems. Similarly, AI too has the following challenges.

- a) "Human touch" is missing
- b) Capable of taking the place of human jobs
- c) May experience malfunctions and behave contrary to their programming.
- d) Can be used to cause mass destruction
- e) Could harm the next generation
- f) Health hazards due to the use of screens and electronic gadgets.
- g) Initial investment is more, which some institutes don't afford.
- h) Non-commensurate utilization is certainly an expensive affair.

Findings

The major and very useful finding of the study is tabled below,

- a) Looking to the need and space of technology, without saying one should use AI in the libraries, for the functionalities.
- b) The digitation in teaching, learning, research, and the spectrum of education as a whole the integration of AI is essential.

Conclusion

AI has the ability to transform libraries into vibrant centres of knowledge and education for all. Within the subject of librarianship, artificial intelligence applications are growing technology at leapfrog speed. Artificial intelligence has great promise for better and easier access to, handling of, and utilization of library resources, as well as the security of information materials in the library. To address issues with teaching and research pertaining to the use of AI in libraries, LIS researchers need to work with AI specialists. Opportunities in

librarianship will arise from this, and library users will receive effective and efficient information resources and services.

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