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APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN ACADEMIC LIBRARIES

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Abstract — The application of artificial intelligence involves the areas such as artificial intelligence, expert system, artificial neural network, fuzzy logic, image processing, natural language processing, speech recognition, robotics etc. Though these areas are not separate, at times two or more applications are contributes to enrich the library services. In this article, the authors have explored the various possible applications of artificial intelligence as mentioned above. In addition, authors explain the possible areas where few of these applications can be implemented which enhances the quality of services and thereby create the potential impact of AI on library services.

Keywords — Artificial Intelligence, Academic Libraries, Expert systems, Robotics, Machine Learning.

INTRODUCTION

An attempt to replace human power with the machines was the creation of the first industrial revolution. The impact of artificial intelligence and advanced computer technology on the nature of future libraries will be enormous, and the quality differences will be different from what our current work expects. Most library-oriented artificial intelligence applications developed until today or currently under development are basic business aids of the runtime because they built today. Potential applications include systems that help perform the different tasks for the library such as people, budget, collection development, scheduling etc. These applications include systems for enhancing user services, such as ready references and information storage & retrieval.

REVIEW OF LITERATURE

Norman Jacknis (2017) expressed in his blog that though librarians have acquired many skills to organize the information and making it accessible anywhere, libraries can ensure the application of the tools for the new generation of knowledge, which surpasses Google search has been developed for academic purposes. It is explained in the Merriam-Webster (2019) that, artificial intelligence is "a part of computer science that deals with giving ability to the machines to look like they have natural human intelligence." Artificial intelligence (AI) is perhaps most familiar to the public in many ways today. According to Kristin (2016), with many Al applications, it gives libraries the opportunity to change the emphasis and attention. The way we navigate the information is kept altering. Al gives a very useful shortcut to apply this knowledge and produce better outcomes. Libraries focus on enhancing the access to content with the application of AI. We have been watching the evidence of this transformation toward AI application with many libraries initiating and providing Makerspace competences. The libraries are positioning themselves to take advantage of the application of cognitive computing in general and artificial intelligence in particular for their potential utility as a tool for refining the quality of library services. Liu (2010) in her articles provide a comprehensive literature review on the utilization of intelligent agent technology in the library environment. The researcher here expressed that both AI and librarians reinforcing each other in the interest of providing the best service to patrons. Hence, application of AI can never be a threat for librarians, rather supplementary.

ARTIFICIAL INTELLIGENCE

Artificial Intelligence focuses on non-algorithmic methods for solving problems and symbols. AI depends on the skill of mapping the symbols. New applications have created great opportunities for informational researchers, such as multimedia systems, digital libraries, GISs and e-commerce.As the application becomes

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increasingly powerful, diversified, pressing, several known problems in finding information became even more important in this technological era.

The basic technique in the IR includes the identification of key characteristics in the object. For example, natural language processing and automatic indexing used to distinguish meaningful words. In general, image identification uses texture, color or shape - based indexing and segmentation techniques. Machine learning, graph-based clustering and classification, statistical-based multivariate analysis, artificial neural networks, and evolution-based programming are popular techniques. These technologies are good alternative for summarizing, analysing and processing a large number of multimedia messages, which is different and rapidly changing. The results of the semantic analysis process expressed in the form of semantic networks, decisions, rules, or predicate logic. Activation-based, Propagation-based reasoning methods commonly used to negotiate various structures of large-scale knowledge.
All search engines for text, images and videos increase user expectations for presenting and manipulating information.

Recent advances in language and platform development, for example VRML, Java, OpenGL, and the provision of affordable high quality graphic workstations have also made visualization of information perspective in the field of research. Although artificial intelligence is a young discipline, it makes society beyond imagination. Al sub-areas, namely expert systems, natural language processing, pattern recognition and robotics, aim to simulate human intelligence with computers. Some recent computing techniques and areas for artificial intelligence development discussed below:

1. Expert System: The Expert System is a computerized knowledge system that serves as a gateway or interface for providing access to the database and obtaining relevant information. It ranges from simple regulatory systems with flat data to very large-scale, integrated development that takes many years to develop. An expert system is a computer program that offers expert advice, decisions or solutions to a particular situation. Knowledge base, inference engine and user interface are the various components of the expert systems.
2. NATURAL Language Processing: One of the longstanding goals of CS is to teach computers to understand the language we are talking about today. The ultimate generation of computer language is Natural Language. Artificial intelligence scientists have been able to build a natural language interface using a limited vocabulary and syntax. The computer can understand the key language concepts within a question and solution through the natural language process. It aims to design and create a computer that analyzes the language that a person uses, understands, and generates. Speech synthesis, machine translation, linguistic approaches, information recovery, information extraction and speech recognition are the various elements of natural language processing.
3. Pattern Recognition: The new stimulus and the pre-stored stimulus coincide closely by this process. This process takes place continuously through the lives of all living beings. Pattern recognition is being studied in many areas, including psychology, ethology, cognitive science, and informatics. Pattern recognition based on prior knowledge or on data from the patterns. Classified patterns typically consist of groups of dimensions or observations that define points in a multi-dimensional space. Components for pattern recognition are data collection, pre-processing, selection of characters, selection of models and training, and evaluation.
4. Robotics: The field robotics is frequently describes as an Al subfield, which deals with motor and perceptive tasks. Robot is a mechanical device, which carries out automation tasks using artificial intelligence techniques, either directly human control or a predetermined program.
5. Machine learning: Arthur Samuel, an American pioneer in computer gaming and artificial intelligence, invented the term 'machine learning' in 1959 and defined it as "it gives computer the ability to learn without explicit programming". Depending on the nature of the "signal" or "responses" to the learning system, machine-learning applications divided into the three primary categories, i.e., (a) Supervised learning (b) Unsupervised learning (c) Reinforcement learning (d) Semi-supervised learning.

The system is HAMLET (How about Machine Learning Enhanced Theses) currently a developer at the Berkman Klein Center for Internet and Society at Harvard. HAMLET uses the doc2vec algorithm. This is an

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algorithm for estimating the similarity in meaning between different documents, based on a widely used algorithm word2vec, which estimates the similarity between words. It explores the results online at the URL in the gray box. HAMLET has three prototype interfaces: a recommendation engine, an uploaded file oracle, and a literature review buddy.

APPLICATION OF AI COMPONENTS IN LIBRARY SERVICES

A. Expert System in Library Services

Library activities related to reading materials, users and staff. Application of expert systems where dialogue between staff and users, users and databases is promising. The expert system will help the librarian to understand the need for improvement in productivity. A well-programmed expert system will also improve quality.

1. Reference service is the foremost activity of any library and the expert system will serve as a substitute for reference librarians. REFSEARCH, POINTER, Online Reference Assistance (ORA), AMSWERMAN, PLEXUS all of these systems are advisory systems for locating reference resources and factual data.
2. Cataloging is one of the oldest library techniques. Recent attempts to automate cataloging through expert systems have focused on descriptive cataloging because it is rule-based (AACR2). There are two ways to apply artificial intelligence techniques in cataloging: (a) Human-machine interfaces, where intellectual work is divides between the intermediary and the support system. (b) An expert system with full cataloging capabilities associated with electronic publishing systems. Since the cataloging text is generates online, it can be passed through a knowledge-based system, and the intermediary does the cataloging process without any intellectual input.
3. Classification is the basic activity of a knowledge organization. Therefore, it is prominent in all systems that organize knowledge in libraries and information centers. The application of expert systems in the field of library classification includes Coal SORT, EP-X, and BIOSIS.
4. Indexing of periodicals is another area where expert systems are developed. Indexing a periodical article involves identification of concepts, to translate the concepts into verbal descriptions, & selecting and assigning controlled vocabulary terms that are conceptually equivalent to verbal descriptions. The reason for automating the intellectual aspects of indexing is to improve indexing consistency and quality. Based on the information provided by the indexer, the systems can arrive at appropriate preferred terms automatically to assign relevant subdivisions. The system can make inferences & based on the inference, it can take appropriate action. The 'Med Index' is the best example of the library indexing system. As there is a lack of exposure to these expert system oriented services in many libraries, very few library users have interacted with knowledge-based systems. In addition, most of these expert systems oriented services are evolving over the period and undergoing many improvements to suit the needs of the library patron.
5. Acquisition: The users of the library have a significant role to play in building library collection and online resources in particular. Several systems have been incorporates for the acquisition of these resources. Monograph Selection Advisor, a pioneering effort in modeled is the item-by-item decision that a subject bibliographer makes in selecting monographic. The prerequisite is that the knowledge base has to be broad enough and the interfacing aspect must be easy enough for the library to get the desired information from the machine.

B. Natural Language Processing in Library Services ,When we think of the term NLP, the first thing that comes to mind is the ability to speak or write a complete sentence and have a machine process of requesting and speaking. NLP can applied to many disciplines, including libraries. When apply to the field of library and information science, more specifically, to search databases such as the Online Public Access Catalogue (OPAC), indexing is the basis of document retrieval. The purpose of the index is to improve the precision of retrieving parts of the relevant documents; and to reduce the proportion of recalls and related files retrieved.

C. Machine learning in Library Services. One specific challenge that is ripe is the improvement of library metadata generation. Libraries, through various vendors as part of the purchasing and acquisitions process, acquire thousands of pieces of metadata for print and digital resources made available to their library users.

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D. Robotics in the Library Services. The robot is "A reprogrammable, multipurpose manipulator, automatically controlled, programmable in three or more axes, which can be fixed on the location or portable for use in automation applications". Libraries providing an increased variety of services and resources for digital libraries, they are still acquiring a great number of printed documents. This combined pressure to provide electronic and printed resources and services has caused serious space constraints for many libraries, especially academic libraries and research. The objective of CAPM (comprehensive approach to printed material) is to build a personalized robotic scanning system based on a series, which allows the browsing of imprints in real time via the web interface. The user includes a CAPM system that, in turn, starts a robot that recovers the item requested. This item iss delivered to another robotic system, which opens the item and rotates pages automatically.

E. Intelligent Interfaces to Online Databases. Online access to databases is still difficult for many potential users. The user may need to know different communication protocols, master language control, search techniques, database file structures, and terminological terminology. The aim of the intelligent interface is to facilitate the access to the construction of some of the necessary knowledge in the front-end software used to test the online search system. This goal does not coincide with the goal of creating an intelligent search system. The interface of access to existing online systems, with all their limitations and disadvantages, so it can be equally successful as an on-line search system. The interface does not solve the problem of restructuring the database, but rather allows the search system itself to make the approach more intelligent.

Searching online databases can be helpful in these ways:
• select the appropriate hosts and databases.
6. allow the seeker to state an information want in their own terminology;
7. determine the level and access to the information requested;
8. adapt the extent of the information to be retrieved; formulate the vocabulary query used in the selected databases;

• express a search query in the format required; and Present search results in a helpful way, e.g. ranking in the order of probability of relevance.

CONCLUSION

There are a number of possible applications of Artificial Intelligence implemented and they have been creating a positive impact on libraries. This has proved that applications of Al saves time and money in almost all sectors in the society. The application of Al in the academic libraries have been increasing in very high speed. As authors of this paper discussed, implementation of Al in libraries has triggered the discovery of many new ideas. The development of expert system libraries greatly benefited, sometimes it appears like "Librarianship is at stake" and now it is challenging to ensure the values of librarianship. Artificial intelligence (AI) systematically tops popular lists of the most imperative emerging technologies. With a mixed feeling of fear and eagerness, readers seem to agree that the AI shapes the future libraries.

REFERENCES

1. A. A. Asefeh Asemi, "Artificial Intelligence (AI) application in Library Systems in Iran: A taxonomy study," Library Philosophy and Practice, vol. 2, March-April 2018.
2. S. S. Mogali, "Artificial Intelligence and its applications in Libraries," 2014.
3. J. Charles W. Bailey, "Intelligent library systems: artificial intelligence technology and library automationsystems,"Advances in Library Automation and Networking, vol. 4, pp. 1-23, 1991.

[4] W. Kristin, "Libraries in an Artificially Intelligent World," Public Libraries,
2016. [Online]. Available: http://publiclibrariesonli
ne.org/2016/02/libraries-in-an-artificially-intelligent-world/
[Accessed Feb 2016].

[5].B. Johnson, "Libraries in the age of artificial intelligence," Computers in Libraries, vol. 38, 2018.

[6]. G. Liu, "The application of intelligent agents in libraries: a survey," Electronic library and information systems, vol. 45, pp.78-97, 2011.

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LAW, ARTS AND HUMANITIES
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ISSN: 3070-0523 www.zesterapublications.com Original Research Paper

[7].N. Jacknis, "The Al-Enhanced Librarv,
https:/medium.com/@NormanJacknis/the-ai-enhanced-a34d96fffdfe [Accessed 2019 Jun 2017].
[8] Merriam-webster, "Definition of Artificial Intelligence," 2019.
[Online]. Available: https://www.merriam webster.com/dictionary/artificial+intelligence. [Accessed Feb 2019].