

# Artificial Intelligence and Expert System: Intelligent Library

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**Abstract** – As we all know about the development of latest technology in every field, and the library science is not exception of it. This paper explores many things regarding impact of Artificial intelligence and Expert Systems on library field, type of artificial intelligence in libraries and how artificial intelligence as a expert system actually works for libraries. Artificial Intelligence (AI) is concerned with intelligent behavior in artifact and intelligent behavior, in turn, involves perception, reasoning, and learning, communicating, and acting in complex environments.

An expert system is a subset of AI which is a subfield of computer science concerned with designing systems that perform human-like intelligent function. In order to meet the requirements of a genuine expert system, the intelligent capabilities of humans must be rivaled essence, the human thinking public reasoning processes are cloned. For e.g., the expert system must ask intelligent questions, solve problems, explain reasoning, and justify conclusions. An expert system is basically an intelligent computer program that uses and inference procedures to solve problems that are difficult enough to require significant human expertise for their solutions.

**Keywords** – Artificial Intelligence (AI), Expert System (ES) Knowledge, Latest Technology, Intelligent Library.

## I. INTRODUCTION

### *Artificial Intelligence and Expert System*

Artificial Intelligence (AI) is the science and technology that seeks to create intelligent computational systems. Researchers in AI use advanced techniques in computer science, logic and mathematics. It helps in to build computers and robots that can mimic or duplicate the intelligent behavior found in humans and other thinking things. The desire to construct thinking artifacts is very old and is reflected in myths and legends as well as in the creation of lifelike art and clockwork automatons during the Renaissance. AI as we know it today's is relatively new field. Even though some ground work had been laid earlier, AI began in earnest with the emergency of the modern computer during the 1940's and 1950's. It was the ability of these new electronic machines to store large amounts of information and process it at very high speeds that gave researchers the vision of building systems which could emulate some human abilities. AI requires an understanding of related terms such as intelligence, knowledge, reasoning, thought, cognition, learning and a number of computer related terms. AI encompasses the following general areas of research: (1) automatic programming, (2) computer vision, (3) expert systems, (4) intelligent computer-assisted instruction, (5) natural language processing, (6) planning and decision support, (7) robotics, and (8) speech recognition.

AI will come bundled with OPAC's, online services and communications networks. It is commercial knowledge based industry rather than local development efforts. Through the application of artificial intelligence technologies numerous prototype intelligent library systems have been created for the library routine work like cataloging, indexing, information retrieval, Reference and other purposes. To build an intelligent computer system we need to collate, organize, represent and use human expert knowledge in a narrow vertical domain

An expert system is a computer program that attempts to mimic human experts by the system's capability to render advice, to teach and execute intelligent tasks.

Library developed expert systems will address problems in a number of areas. Most will focus on narrow domains with an emphasis on local concern. Information and referral system s will be among the first expert systems to be developed by libraries. Expert system will assume an important role in library instruction and clearing houses will allow libraries to share tutorial systems with one another. Tutorial systems may one day replace library work books and other forms of in house documentation for user assistance. The future of expert systems in libraries will follow the evolution of expert systems as **knowledge media**. Expert systems, which are now clever, occasionally useful computer programs, will eventually assume and important role as a format for recording the working knowledge of human experts. Information media vary in suitability for carrying different types of message, and expert system are now exception. One of the major uses of expert systems will be to reconcile the differences among other information media, but the following two basic problems are likely to remain:

1. Knowledge is growing exponentially. The classic information explosion is being compound in by the introducing of new computer-based media, and the merging of exiting media. Not only will there be merge more recorded knowledge, there will be new formats and forum for storing and communicating knowledge.
2. Knowledge is heterogeneous. There is no search thing as a uniform structure for representing knowledge. Knowledge is not data. It is fusion, abstract, and bound up with language, and consequently any thesauri, classification, schemes, record structures are formalisms for representing knowledge are limited.

### *Intelligent Library*

An intelligent library have the ability to personalize, maximum-reuse, index, analyze and integrate valuable information and knowledge from a wide selection of existing sources. A number of tightly integrated search components (text search, audio search and video search) can be used. Such search possibilities ensure that take

advantage of quickly retrieving the most relevant information from the available content that has already been developed and approved for different manuals, handbooks, directives, research, normative documents, databases of best practice and other sources. Although an intelligent library can allow users to type queries in all languages, word meaning, words frequency and combination when the developed search engine's only purpose is to retrieve documents or their parts based on a keyword search.

*Promising AI tools and Techniques and the Major Components of ES are*

The breadth and diversity of AI there are a number of technological tools and techniques that may be valuable in constructing intelligent library systems. Some, such as neural networks, are too immature to assess their usefulness. The following list briefly summarizes selected AI tools and techniques. It is by no means a comprehensive list of potentially useful tools and techniques.

- **Knowledge base :-** The software that represents the knowledge.
- **Inference engine :-** The reasoning mechanism.
- **User interface :-** The hardware and software that provide the dialogue between people and the Computer.
- **Domain expert :-** The individual who is considered an expert.
- **Knowledge engineer :-** The individual who acquires and represents the knowledge.
- **Explanation facility :-** The software that answers questions such as "Why" and "How."
- **Blackboard :-** A workplace for storing and working on intermediate information.
- **Reasoning improvement :-** A facility (not available commercially) for improving the Reasoning capabilities of an ES.
- **User :-** The non-expert who uses the machine for consultation.
- **Hardware :-** The hardware that is needed to support the ES.

*Genetic Categories of ES Applications are:*

**Rule-based ES:** Knowledge is represented by a series of rules.

**Frame-based systems:** Knowledge is represented as a series of frames (an object-oriented approach).

**Hybrid systems:** Involve several approaches such as fuzzy logic and neural networks.

**Model-based systems:** Structured around a model that simulates the structure and function of the System under study.

**Ready-made systems:** Utilize prepackaged software.

**Real-time systems:** Systems designed to produce a just-in-time response.

*Strategies for Future progress in Library and Limitations of ES are*

By recognizing the limitations of contemporary artificial intelligence techniques that's why establish realistic goals for intelligent library systems and devise appropriate system develop strategies. This section discusses some promising approaches to the application of artificial intell-

-igence techniques in library automation systems.

The Intelligent systems are often created utilizing the software development methodology called prototyping: The objective of the software prototyping is to validate proposed designs by constructing a low-cost system that has enough functionality to test out major designs decisions on examples. The Prototyping allows developers to fairly quickly create one or more systems that approximate the final system however, there is no any guarantee that the software techniques utilized in the small-scale prototype will work in the larger-scale production system. This can lead to a false sense of accomplishments. In the many library expert systems are prototypes, not production systems.

The level and caliber of effort that must be expended to create an intelligent system is directly related to the power and complexity of that system. The more "intelligent" the system is, the greater the effort that must be expended to create it and the greater the degree of expertise that is needed to do so. The need for skilled personnel combined with expensive development tools (e.g., advanced expert system shells) or techniques (e.g., original programming in logic or procedural languages) makes the creation of sophisticated intelligent systems a potentially costly venture.

- Knowledge is not always readily available.
- It can be difficult to extract expertise from humans.
- There are frequently multiple correct assessments.
- Time pressures.
- Users have cognitive limits.
- ES works well only within a narrow domain of knowledge.
- Most experts do not have an independent means to validate results.
- Vocabulary is often limited and difficult to understand.
- Help from knowledge engineers is difficult to obtain and costly.
- Potential for lack of trust on the part of the end-users.
- Knowledge transfer is subject to biases.

*Targeted Development Efforts and success features of ES*

AI is a means to an end any tool, it has strengths and limitations. Our true goal is not to create systems based on AI technologies is to create most the powerful, flexible, and easy to use systems possible for ourselves and our patrons. AI is one tool in the toolbox which should be employed when the characteristics of the task at hand indicate that an AI solution that is called for. And the success features of ES are:

- Level of knowledge must be sufficiently high.
- Expertise must be available from at least one expert.
- The problem to be solved must be fuzzy.
- The problem must be narrow in scope.
- The shell must be of high quality and naturally store and manipulate the knowledge.
- The user interface must be friendly to novice users.
- The problem to be solved must be difficult and important enough to justify the development of a system.

- Knowledgeable developers with good people skills are needed.
- The impact of the ES must be considered.
- The impact should be favorable.
- Management support is needed.

#### Abbreviations

AI: artificial Intelligence

ES: expert system

## II. CONCLUSION

Different reports contained an explicit criticism of the libraries focus on their specific collections and a recommendation to focus more on user needs. There is a need to overpass the key limitations in the development of traditional libraries, which have been developed for a particular content and a specific group of learners. We suppose that the future libraries will become a practical knowledge storehouse and will offer intelligent opportunities for people.

Through the application of artificial intelligence technologies numerous prototype intelligent library systems have been created for the library routine work like cataloging, indexing, information retrieval, reference, and other purposes. However the relatively few of these systems have evolved into production systems that are used in the daily operations of libraries. AI research has been underway for more than 2 decades it is only in the past 2 years that AI's impact has been measurable. To some degree the lack of penetration of AI technologies in libraries is due to the fact that appropriate tools and techniques have only been widely available for the relatively short time. Though there were other theoretical, technological, fiscal and human resource barriers as well and these significant problems are ongoing. This paper has outlined some of the major limitations of AI technologies of particular interest to libraries and suggested some possible.

Strategies for making progress in building artificial intelligent library systems. AI offers us a powerful set of tools, especially when they are combined with conventional and other innovative computing tools. It will not be an easy task to master those tools and employ them skillfully to build truly significant intelligent library systems. The use of intelligent Library systems is unlikely to be widespread until we move from the current era of hand-crafted intelligent systems to a future era of turnkey intelligent systems. To accomplish goal vendors and a small number of progressive libraries will need to create powerful, transportable and marketable intelligent library systems based on the continuing advances made in the commercial AI marketplace.

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