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Intelligent Library Systems: Artificial Intelligence Technology

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ABSTRACT

Latest technological development has brought a dramatic change in every field, and library science is not exception to it. Information technology impact positively on library and information system and services they provide for users. Nowadays the library has been automated, networked and also now moving towards paper less or virtual library or without wall library. To gather challenges in the profession librarians are also applying different platforms in Library & Information science filed for attaining economy in information handling. In this paper overviews the basic concept of newly develop area known as 'Artificial Intelligence' in library. The type of Artificial Intelligence in libraries and how Artificial Intelligence actually works is illustrated in this paper.

KEYWORDS: Artificial Intelligence (AI), Nature of AI, Barrier of intelligencew

INTRODUCTION:

Artificial Intelligence (AI) encompasses general areas of research like automatic programming, computer vision, expert systems, intelligent computer assist instructions, natural language processing, planning and decision support, robotics, and speech recognitions. Intelligent library systems utilize the artificial intelligence technologies to provide knowledge-based services to library patrons and staff.

AI is a broad and complex area of the study, which can be difficult for non-specialists to understand. Its ultimate promise is to create computer systems that rival human intelligence and this clearly has major implications for librarianship also. If we are make progress in the area of intelligent systems, we must have well-developed understanding of AI technologies, AI as a tool with appropriate and inappropriate uses in light of current constraints. The interested reader should consult either a basic or a more challenging introductory work for a treatment of AI. There have also been several good reviews of research and development efforts relevant to librarianship.

This paper examines certain key aspects of AI that determine its potential utility as a tool for building library systems. This paper discusses the barriers that inhibit the development of intelligent systems in library, and it suggests possible strategies for making progress in this important and newly conceptual area. While all of the areas of AI research indicated previously may have some eventual application in the development of library systems, this paper primarily focuses on a few most immediate significance of expert systems, intelligent computer assist instruction, and natural language applications.

THE NATURE OF INTELLIGENCE

To understand the "intelligent" systems, you must first attempt to understand the nature of intelligence. The theories of human intelligence abound, but there is no consensus about what constitutes intelligence. This lack of a widely accepted definition of intelligence is an obstacle for AI researchers.

Based on a review of major models of human intelligence, conclude that the following ten factors are most pertinent to expert system research:

1. **Acquisition:** the ability to acquire new knowledge.
2. **Automatization**: the ability to refine procedures for dealing with a novel situation into an efficient functional form.
3. **Comprehension:** the ability to know, understands, cognize and deal with novel problems.
4. **Memory management:** the ability to represent knowledge in memory, to map knowledge on to that memory representation, and to access the knowledge in memory.
5. **Metacontrol:** the ability to control various processes in intelligent behaviour.
6. **Numeric ability:** the ability to perform arithmetic operations.
7. **Reasoning:** the ability to use problem-solving knowledge.
8. **Social competence:** the ability to interact with and understand other people, machines or programs.
9. **Verbal perception:** the ability to recognize natural language.
10. **Visual perception:** the ability to recognize visual images.

To illustrate this point, let's briefly examine one elusive feature of human intelligence is Well-known artificial intelligence critics. There propose is five stage model of human skill acquisition. At the novice level, a learner obediently follows rules provided by an instructor and regardless of the specific situation based on practical experience; a learner at the advanced beginner level starts to grasp important elements in the situation that no one can teach. When the competent levels is attained the learner weighs the importance of different factors in the situation for the devises goal oriented plans, and puts those plans to work.

BARRIERS TO INTELLIGENT SYSTEMS:

There are some barriers are mentioned which are as under;

General Limitations

Liebowitz scientist is identifies inadequacies in the following areas of expert system technology, leading to what he terms "artificial stupidity" in these systems: (1) common sense reasoning, (2) "deep" reasoning about the underlying principles of an area of knowledge, (3) explanation features, (4) ability to learn, (5) support for distributed expert systems, and (6) knowledge acquisition and maintenance.

Yen and Tang confirm the difficulty of performing common sense reasoning in expert systems. They point to additional problems, including like difficulties in allowing end-users to tailor expert systems to meet their needs, high system development and maintenance costs, inherent complexity of expert system development, limited natural language capabilities, and inability of expert systems to recognize the limits of their knowledge, deal with problems limits, and reject problems that exceed limits.

Common Sense Reasoning

Common sense is simply means "general knowledge that every human being supposedly has about the world," and, consequently, common sense reasoning is the use of this knowledge to make inferences about everyday objects and events.

Natural Language Processing

Natural language processing systems could be utilized for a variety of purposes, including the "natural language interfaces to databases and expert systems, text understanding, the text generation, and the machine translation."

Research in the natural language processing focus as under:

1. The lexical/morphological analysis which deals with words and the smallest meaningful units in language
2. The syntax, focusing on the relationship between words in larger structural units such as sentences
3. The semantics, which deals with meaning, and pragmatics, which deals with the relationship between linguistic expressions and their users

Since higher-level natural language processing is more tractable in restricted domains, certain task-oriented staff functions in library automation systems may be good candidates for natural language ap-

plications but care must be taken so that staff efficiency is increased--not decreased--by this strategy (e.g., function keys may be faster than words for some tasks).

The reason in which, may not be solved by future automated techniques, is that experts cannot always articulate how they solve problems. So the knowledge engineer building a reference expert system might have a cooperative, top-notch reference librarian as his/ her expert, but that individual may not be able to easily categorize different types of reference questions and explain the general strategies used to answer different types of questions. Presumably, a highly-structured area like cataloging would be different; however, based on a survey of expert system applications to AACR2 cataloging. There have been problems in every attempt to convert AACR2 into the highly structured rules necessary to run an expert system it appears that the pioneers who build intelligent library systems are likely to devote a considerable amount of effort to knowledge acquisition issues for the users. Until improved manual and automated methods of knowledge acquisition and maintenance are devised.

PROBLEM OF AI IN LIBRARY:

There are some problems which are as under;

The Difficulty in Scaling Up Prototypes to Operational 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 of Effort, Technical Expertise and Expenses

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 personnels 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.

Librarians and library automation vendors are already engaged in an accelerating effort to provide library patrons with access to a diversity of new computer systems. Assuming that the needed expertise was present to create intelligent systems, what priority will libraries and vendors give to developing these type of systems? The reality is that the staff resources, especially computer specialist are a precious and finite commodity. It will take more staff with greater skill levels to create a complex intelligent system than a simple one and this will inevitably affect decisions about what types of intelligent systems to build.

Librarians have also done work in the area of library expert systems. Some of this work appears rudimentary when compared to the work of computer and information scientists. So the librarians have developed some exemplary systems (e.g., the PLEXUS and REFSIM systems).

The fact that many librarians have little or no training in artificial intelligence techniques is problem. This lack of formal or informal training limits our conceptual horizons, and it reduces the repertoire of technological tools that we can skillfully deploy to create intelligent systems. Hopefully, library schools will provide more in-depth training to new generations of librarians.

Since library staffs are rarely devoted full-time to building expert systems and hardware and software budgets are tight, resource constraints also impose limits on the types of systems that librarians can create. In India no one librarians know about AI.

AI STRATEGIES FOR FUTURE PROGRESS IN LIBRARY

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 intelligence techniques in library automation systems.

Targeted Development Efforts

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.

Promising AI Tools and Techniques

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 that I currently feel hold special promise. It is by no means a comprehensive list of potentially useful tools and techniques. Like that;

1. Blackboard and Cooperative Distributed Problem Solving Systems
2. Frames
3. User Models

CONCLUSION:

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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