ARTIFICIAL INTELLIGENCE

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ABSTRACT: - *In this paper an attempt has been made to trace the different applications of Artificial Intelligence to the libraries. The various concepts such as expert system, natural language processing, pattern recognition and robotics and their application to the libraries have enumerated. The advantages and disadvantages of Artificial Intelligence have also been discussed.*

KEY WORDS – ***Artificial Intelligence, Expert System, Natural Language Processing, Pattern Recognition and Robotics.***

INTRODUCTION:

The first industrial revolution attempted to create machines that could replace man's physical power. Industrialization has transformed the society totally and brought immediate crises in later development.

In fact there are machines that can outperform human beings over the century's man's working ability and thinking process have seen a sea change. The society is becoming increasingly centered on information handling, processing, storage and dissemination, using microelectronic based technologies, today's

computers can stimulate many human capabilities such as reading, grasping, calculating, speaking, remembering, comparing numbers, drawing, making judgments, and even interactive learning. Researchers are working to expand these capabilities and, therefore the power of computers by developing hardware and software that can initiate intelligent human behavior. For example, researchers are working on the systems that have the ability to reason, to learn or accumulate knowledge to strive for self-improvement, and to stimulate human sensory and mechanical capabilities. Experts are convinced that it is now only a matter of time; the present generation will experience the impact and utility of new applications based on artificial intelligence in offices, factories, libraries and homes. This general area of research is known as 'Artificial Intelligence.

DEFINITIONS:

- A branch of computer science dealing with the simulation of intelligent behavior in computers.
- The capability of a machine to imitate intelligent human behavior

ARTIFICIAL INTELLIGENCE:

Artificial Intelligence has come a long way from its early roots, driven by dedicated researchers. The expression "artificial intelligence" was introduced as a 'digital' replacement for the analog 'cybernetics'. Artificial intelligence began as an experimental field with opioneers like George Boole (1815-1864), Allen Newell & Herbert Simon, who founded the first artificial intelligence laboratory (Kumar, 2004). The emergence of a new field called 'Cybernetics' which has been coined and founded by Norbert Wisner brought together many parallels between human beings and machine. Cybernetics is the study of communication between human being and machine. In general Artificial Intelligence is the subfield of Computer Science concerned with understanding the nature of intelligence and constructing computer systems capable of intelligence action (Winston, 1999). It embodies the dual motives of furthering basic scientific understanding and making computers more sophisticated in the services of humanity. In other words Artificial Intelligence is the study of mental faculties through the use of computational models. Artificial Intelligence mainly focuses on understanding and performing intelligent tasks such as reasoning, learning new skills and adopting to new situations and problems. Artificial Intelligence or AI for short is a combination of computer science, psychology, and philosophy. It is concerned with the concept and methods of symbolic inferences by computer and the symbolic representation of knowledge to be used in making inferences (Nilson, 1998).

The most popular Artificial Intelligence programs are the Expert systems, which are computer programs that embody human mention of Artificial Intelligence which creates vision of

electro-mechanical devices replacing human beings. Hundreds of rules and facts make up AI programmers and these programmes process ideas and knowledge, not members, in several different ways.

AREAS OF ARTIFICIAL INTELLIGENCE:

Artificial Intelligence focuses on symbolic, non-algorithmic problem solving methods. Intelligence relies on ability to manipulate symbols. Artificial Intelligence though is a young discipline, has transformed the society beyond imagination. The goal of its sub areas i.e expert system, natural language processing, pattern recognition, and robotics is to simulate human intelligence with computers. Some of the recent computational techniques and areas that are utilized in developing fields of Artificial Intelligence are discussed below;

EXPERT SYSTEM:

Expert System are the knowledge based computerized systems which play a role of intelligence interface or gateway for providing access to database and to obtain relevant information. They range in scale from simple rule-based systems with flat data to very large scale, integrated developments taking many person, years to develop. An expert system is a computer program that provides expert advice, decisions or recommended solutions for a given situation.(Wikipedia /expertsystem,2014) The different components of expert systems are: Knowledge base, Inference Engine, and User Interface.

NATURAL LANGUAGE PROCESSING:

One of the long standing goals of computer science is to teach computers to understand the language we speak. The Ultimate generation of computer language is the Natural language. Artificial Intelligence scientists have succeeded in building Natural language interface to a large extent using limited vocabulary and syntax. Natural Language Processing allows a computer to understand the main linguistic concepts within a question or solution. Its goal is to design and build computer that analyze, understand and generate language that human use naturally.(Kumar,2004) The different components of natural language processing are, speech synthesis, speech recognition, machine translation, linguistic approaches, information retrieval and information extraction.

PATTERN RECOGNITION:

It is the process of establishing a close match between some new stimulus and previously stored stimulus patterns. This process is being performed continually through the lives of all living things. Pattern recognition is studied in many fields, including psychology, ethology, cognitive science and computer science. Pattern recognition is based on either a priori knowledge or on statistical information extracted from the patterns. The patterns to be classified are usually groups of measurements or observations, defining points in an appropriate multi dimensional space.(Wiki,2014) The components of pattern recognition are; data acquisition, pre-processing,

feature extraction, model selection and training, and evaluation.

ROBOTICS:

The field robotics is often described as the subfield of AI that is concerned with perceptual and motor tasks. Robot is a mechanical device which performs automation tasks, either according to direct human supervision or a pre-defined program or a set of general guidelines, using artificial intelligence techniques. (Wikipedia/ robotics,2014)

ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN LIBRARIES:

Computers provide the perfect medium for the experimentation and application of Artificial Intelligence technology in the present era. AI has more success at intellectual tasks such as computer based game playing and theorem proving than perceptual tasks. Sometimes these computer programs are intended to stimulate human behavior and they are built for technological applications also such as Computer aided instruction (CAI).In many cases the main goal is to find any technique that does the task quick in the better way.

APPLICATION OF EXPERT SYSTEM IN LIBRARY ACTIVITIES:

Library activities related to the reading materials, users and staff. The application of Expert Systems where dialogue between staff and users, users and database appears quite promising. An Expert System will help the librarian in realizing the need for an improvement in the productivity. A well programmed Expert System will also improve the quality.

APPLICATIONS OF EXPERT SYSTEMS IN REFERENCE SERVICE:

Reference service is a prime activity of any library and the Expert System will work as a substitute for a reference librarian. Following are some of the examples of Expert Systems used for Reference Service.

REFSEARCH:

It is a system that supplies patrons, the recommended sources to lookup for certain question. The system can be used to teach students reference skills or as a computerized aid for practicing reference librarians and information specialists.

POINTER:

It was the early successful working application of computer system in the area of reference work. It directs the users to the reference sources; It is not a Knowledge Based System but a computer assisted reference program.

ONLINE REFERENCE ASSISTANCE:

(ORA): This system intended to stimulate the services of an academic reference Librarian for questions of low and medium level, by using several technologies: a videotext like database, computer assisted instruction modules, and knowledge based system.ORA consists of Directional transactions like library locations, services and polices.

AMSWERMAN:

A Knowledge based system to help users for reference questions on agriculture topics. It uses series of menus to narrow down the subject of the questions and the type of tool needed. It can function as either a consultation system or as a front end to external databases and CD-ROM reference tools.

PLEXUS:

This is a referral tool used in Public Libraries. It includes knowledge about the reference process, information retrieval about certain subject areas, reference sources, and Library users. All the above systems are advisory systems for locating reference source books and factual data.

APPLICATION OF EXPERT SYSTEM IN CATALOGUING:

Cataloguing is one of the oldest library crafts. Recent attempts to automate cataloguing through Expert Systems have focused on descriptive cataloguing because it is considered rule-based(AACR2).There are two approaches for applying artificial intelligence techniques to cataloguing

- A human-machine interface, where the intellect effort is divided between the intermediary and the support system; and
- An Expert System with full cataloguing capability linked into electronic publishing system, so that as a text is generated on-line, it can be passed through knowledge based systems and cataloguing process is done without any intellectual input from an intermediary. There have been problem in every attempt to convert AACR2 into the highly structured rules necessary to run the Expert System.

ADVANTAGES OF ARTIFICIAL INTELLIGENCE:

- Can take on stressful and complex work that humans may struggle /can't do;
- Can complete task faster than a human can most likely;
- To discover unexplored things. i.e. outer space;
- Less errors and defects;
- Function is infinite. (sstramel,2014)

Disadvantages of Artificial Intelligence:

- Lacks the "human touch"
- Has the ability to replace human jobs
- Can malfunction and do the opposite of what they are programmed to do
- Can be misused leading to mass scale destruction
- May corrupt younger generation(sstramel,2014)

CONCLUSION:

The numerous applications of Artificial Intelligence have been deployed, that demonstrated for the time saving, money to Business sectors, Industrial sectors, Military sectors, Scientific sectors, Academic and Research organizations. AI applications and their utilities will be increasing day by day in many IT

oriented educational Institutions, which are contributing AI related recorded information on its AI technology and its utilities in various areas/subject fields. The success in Expert systems field, Natural Language Processing field, Pattern Recognition field, Robotics field has precipitated substantial commercial activity, including the formation of many ventures. The practicability of artificial intelligence in the areas such as cataloguing, classification, documentation, collection development etc appears to be improving year after year. It is sure that in the near future artificial intelligence will occupy in all the spheres with the introduction of competent models with AI techniques. Library and Information Science will be greatly benefited by the development of the efficient expert system for technical services as well as Information processing and management.

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