

# What is an Intelligent Library System ?

The British Council is supporting this Conference at Wagga — John Weckert and Craig McDonald explain why

**L**IBRARIES HAVE BEEN leaders in the introduction of new information technology. They need systems with massive information storage and retrieval capabilities and in the last decade these systems have become online, networked and accessible by the public—a trend that continues with CDROM and microcomputing. Attention has now turned from issues of storage and access to those of smart software and more 'intelligent' systems. But what is this 'intelligence'?

A naturally intelligent creature can reason from vast stores of knowledge, and has the ability to solve problems using its reasoning capability and knowledge. It has perceptual ability and the ability to learn, both from its environment and from its reasoning. It also is creative at some level, and is able to communicate, that is, it can generate ideas and actions of its own, and can inform others through language or by other means. An intelligent creature can cope with unclear, uncertain and ambiguous information; it has goals which it attempts to satisfy and that it is sensitive and adaptive to its environment.

No machine is like this. Whether any ever will be is open to debate, but it is true that machines, or systems, are being designed and built which appear to be smarter than current ones. If intelligence is not a purely a trait of living things, what would its characteristics be if it occurred in a machine?

**Knowledge** encoded in expert systems is the most common form of artificial intelligence. An expert system is often described as piece of software that is designed to duplicate the function of an expert in some specialised area. Expert systems enable computers to solve new kinds of problems, by making expert knowledge available to a wider audience. Unfortunately expert systems have been accompanied by much hype—it is very easy to build trivial expert systems, but they do seem to behave as an intelligent expert might perform.

**Communication** using natural language is difficult for machines, but relatively easy for most humans. In large part the problem lies in the ambiguity of much of our language. Many sentences cannot be understood without an understanding of their context, but context is not easily built into a computer—it involves so much knowledge and, moreover, the sort of knowledge that is usually not articulated.

**Perception:** the difficulties of natural language understanding are comparable to those of computer vision. This abstraction of knowledge from perception is a hallmark of an intelligent being and an understanding of a dynamic environment is necessary for reasoned, justified action. At the moment, computer interfaces with the world are crude, relying on static user stereotypes and keyboards.

**Learning**, the ability of a being to learn autonomously, both from its environment and from its reasoning, is an important part of intelligence, if for no other reason than adaptive behaviour depends on it. Much research is in progress on machine learning by analogy and discovery, learning by examples (especially in neural networks) and explanation based learning, but so far success has been minor and there has been little transfer of this success into intelligent library systems.

Intelligence involves an integration of aspects. Just as humans bring different aspects of intelligence to bear in a particular circumstance, machines, to be intelligent, also need to co-ordinate different perspectives, alternative structures and methods. The integration of expert systems, hypertext and other intelligent systems with more conventional

computer systems is an evolving part of library systems.

Do these characteristics amount to intelligence? No, at least not human intelligence. But computers are not humans, they have a different range of faculties, which in some respects mimic those of humans and in others are quite different. For example, both have memories and reasoning abilities (albeit of a different kind) but while intelligence in humans is an individual trait, constrained by the time and place of a person's mind, computer intelligence may be distributed, networked and replicated in a way that more closely resembles a social intelligence.

At the Intelligent Library Systems Conference we are dealing with what could be more accurately called 'computer intelligence' than artificial human intelligence, and from this perspective the developments and ideas of the authors which may seem crude in human terms, become interesting in computer terms.

An intelligent library system is a computer based information system which contains some intelligence over and above that required to simply store and access information. Up to the present, most research and development in intelligent systems in libraries has been concerned with particular isolated areas of expertise—especially in reference and retrieval.

The Intelligent Library Systems conference and workshop has been convened to explore issues in this new technology and three major themes have become apparent:

- the relationship between people and machine—even with all our human adaptability, no one person has a personal style that is 'right' for everyone else, so why should we expect a human/computer interface of a machine?
- the representation of librarianship knowledge in a computer;
- the integration of technologies including database, hypermedia/text, expert systems, office automation, decision support, information retrieval and so on to produce a multifaceted, yet coherent system.

A keynote address will be given by Crawford Revie, University of Strathclyde, who is working on integrating hypertext and expert systems technology to manage knowledge and information about the African disease trypanosomiasis. He has a travel grant from the British Council, which also enables him to visit RMIT and Curtin University. He will present a prototype of the system in the workshop, and he will also show a prototype of the Structured Information Management: Process and Retrieval system.

The conference and workshop is at Wagga, 25-27 September, \$150 plus a bus to ALIA. For more information call John Weckert (069)222372, fax (069)222733. ■

## Job exchange wanted

Hal Tarr, a reader services librarian at the Free Library of Philadelphia, has eight years' experience since qualification, including a year in Port Adelaide College SA on a previous exchange. He would like to exchange jobs again for one year. Any takers? Write to him directly at: 2001A Bainbridge Street, Philadelphia, Pa 19146-1308, USA.