

seeking a basic understanding of intellectual property law.—*Colleen Lougen, Mount Saint Mary College.*

Lancaster, F. W., and Amy Warner. *Intelligent Technologies in Library and Information Service Applications.* Medford, N.J.: Information Today (ASIS Monograph Series), 2000. Published for the American Society for Information Science and Technology. 214p. \$31.60 (members); \$39.50 (nonmembers) (ISBN 1573871036). LC 05-53951.

Ambivalence would seem to be an apt descriptor for *Intelligent Technologies in Library and Information Service Applications* by F. W. Lancaster and Amy Warner. The book is a review of the literature on artificial intelligence (AI) “and related technologies,” with an eye “on what can be applied today and what one might reasonably expect to be applicable to library and information services in the near future.” Professors Lancaster and Warner bring substantial experience and perspective to the effort. Lancaster, professor emeritus at the University of Illinois, is well known in the fields of information transfer, bibliometrics, bibliographic organization, and the evaluation of library and information services. Warner is a thesaurus designer with Argus Associates and a former associate professor at the University of Michigan. Her expertise is in digital library and search engine design and evaluation. To give away the ending, their answer to the question, To what extent can libraries apply AI today or in the near future? is, essentially, very little.

Lancaster and Warner define AI operationally: “those who work in the field seek to develop computer systems capable of doing some of the things that humans now do better.” This involves the capacity to exhibit humanlike characteristics, including reasoning and learning from experience. The goal is to deploy systems that can supplement human expertise in defined task areas. A useful taxonomy by Ralph Alberico and Mary Micco (*Expert Systems for Reference and Information Re-*

trieval [Meckler, 1990]) is used to organize the discussion. AI moves outward from symbolic processing through four major techniques—pattern matching, search, knowledge representation, and inference—and is applied to a variety of areas. Expert systems, an application area associated largely with inference, receives most of the attention, partly because of its ubiquity, but also due to the fact that “all implementations of AI within the library field itself are of the expert system type.” Classically defined expert systems consist of three components: a knowledge base, an inference engine, and a user interface. As the “intermediary” between database and user, the inference engine is the distinguishing component of an expert system: “it operates on the knowledge in the knowledge base, frequently through a series of pre-established rules, in order to interact with the user, presenting questions, reminders, recommendations and suggested answers or solutions.”

The authors move briskly from definitions into the literature. In four chapters, they travel from library literature through “Applications Closely Related to Library Problems,” and “Applications from Other Fields” to “General Technologies.” They conclude with a discussion of this literature’s applicability to libraries and information services. Four appendices outline methodology, sources for further investigation, and, interestingly, reprints of decision tools for evaluating the applicability of expert systems for particular tasks. Their method involved searches in the appropriate databases, followed by survey questions and phone and/or e-mail contact with authors.

Chapter one surveys expert systems applied to cataloging, subject indexing, collection-building, and reference. It reviews a large number of projects, including quite a few at name-brand institutions. A pattern emerges—an interesting application area is identified, a system is prototyped, it shows some promise. Then, it is abandoned because results do not quite compare with human labor, the effort to maintain the knowledge base be-

comes more trouble than it is worth, or the researcher moves on. Consider the conclusions of the designers of an expert system for selection of main and added entries at the University of Linköping in 1989:

An operational expert system for cataloging is technically feasible but would not be cost-effective for most libraries at present. In order to perform as well as an expert human cataloger, an expert system would require computer resources far beyond the means of libraries in general.

Although technology has come a long way since then, more recent analysts at the Library of Congress reached similar conclusions. Overall, the authors conclude that library “systems that have progressed to an ‘operational’ state ... are almost nonexistent.”

If libraries have not developed successful AI technologies, perhaps we can draw on systems developed in other areas. Four closely related applications are discussed in chapter two: text processing, agents, interfaces, and data mining. Intelligent text processing involves text retrieval, translation, or manipulation based on patterns. Classic AI text processing built on rule-based structures has given way to statistical analysis of large volumes of digital text. However, outcomes, we learn, are mixed. For example, machine translation of varying quality is a going concern on the Web. On the other hand, “relatively crude Boolean search methods” still outperform expert systems when working with large volumes of data, such as multimillion bibliographic record databases.

Intelligent Internet-related agents and interfaces represent one of the more important areas of AI for librarians to monitor because they offer potential means for managing and navigating resources in the digital library. Agents watch, search, or analyze input from the Web and may display limited learning capabilities. For librarians, the most interesting projects are probably those “designed to simplify

access to information retrieval systems.” Interfaces range in complexity from those that have some knowledge of external databases to those capable of adapting to user behavior patterns. Interfaces designed to “handle query formulation for multiple bibliographic databases” would seem to work up to a point but do not achieve better results than an expert (e.g., a reference librarian). Again, it is noted that very few systems have actually reached the production stage. In this arena, “conventional interface technology, which may be developed far more cheaply than expert system,” can outperform the intelligent tools.

Chapter three looks at applications somewhat further afield for librarians, focusing on help desk, medical diagnosis, and decision-critiquing systems. Of particular interest are observations that case-based reasoning—an approach that focuses on past solutions to a problem—is more cost-effective than rule-based knowledge systems and that the results of thirty years’ work in medical diagnosis are relatively disappointing. The discussion of general technologies in chapter four focuses on some interesting tests with speech technology—voice interpretation and generation (generation is easier than interpretation)—and tools for sound and image retrieval.

The concluding chapter returns from the generalized world of AI to the library environment. The relationship between AI, the Internet, and practical solutions to operational problems is nicely framed in an analysis of a 1995 report from the American Association for Artificial Intelligence on AI and the National Information Infrastructure. Lancaster and Warner consider the report “primarily a wish list.” There follows a brief sketch of the digital library. Techniques for wide-area, cross-platform searching, profile matching, digital rights management, and use evaluation would seem to be the priorities for digital library managers. Systems using conventional software tools would seem to be more cost-effective than expert systems. The bottom line for Lancaster

and Warner is that “the library community should not be overly optimistic concerning the immediate potential value of these technologies.”

Intelligent Technologies can serve as a useful gateway for librarians interested in application of AI and expert systems. As intellectual technology continues to evolve, intelligent software will certainly have a place in the digital library, but questions about pace, cost, and alternatives abound. Although there is no doubt of a continual replenishing of the AI literature in the computer science disciplines, a search of the *Library Literature* database using the authors’ search strategy turned up only six new citations on the topic in the past year. Their cautionary tone seems appropriate.—*Rick Moul, Western North Carolina Library Network.*

Lazzaro, Joseph J. *Adaptive Technologies for Learning & Work Environments*, 2nd ed. Chicago: ALA (ALA Editions), 2001. 204p. \$48, alk. paper (ISBN 0838908047). LC 2001-035284; \$35, CD-ROM (ISBN 0838908144).

Substantially revised from the 1993 first edition, the second edition of *Adaptive Technologies for Learning & Work Environments* addresses the assistive technology needs of the learning disabled in addition to the needs of people with sensory, physical, and speech disabilities. Slimmed down from 251 to 204 pages, the second edition has eliminated the illustrations and individual product descriptions contained in the ear-

lier edition. In their place are general overviews of categories of adaptive technologies, with specific product and vendor information located in five disability-specific appendices.

The work is divided into ten chapters. The first chapter provides an overview, in lay terms, of personal computer hardware. The necessity for the inclusion of a chapter on these basics is validated by statistics indicating that only one-quarter of people with disabilities own computers and only one-tenth ever use the Internet.

Chapter two is a general introduction to using keyboard and platform-specific, built-in accessibility features instead of a mouse to operate a computer. It addresses the Windows, Macintosh, and Unix platforms. Chapters three through seven discuss technologies designed to assist individuals with visual, hearing, motor, speech, and learning disabilities, respectively. Braille displays, visual indicator software, word-prediction software, touch screens, adapted switches, and speech-synthesis systems are some of the many adaptive technologies described that enable the disabled to use computers on the job, at home, in the library, or at school. A few non-computer-related assistive devices, such as handheld magnifiers and text telephones, also are discussed.

Adaptive technology is not one-size-fits-all, nor is it plug-and-play. The necessity for building a solid foundation for adaptive technology in universities, libraries, and other public facilities is described in chapter eight. This entails having an evaluation by an assistive technology specialist prior to purchasing equipment and in providing training and technical support. Chapter nine is an overview on making intranets and the Internet accessible. Those needing more information on accessibility may want to consult chapter two of Barbara Mates’s *Adaptive Technology for the Internet: Making Electronic Resources Accessible to All* (ALA, 2000) or Michael Paciello’s *Web Accessibility for Persons with Disabilities*

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