References

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The Prentice-Hall Guide to Expert Systems, by Robert A. Edmunds, Prentice-Hall, Englewood Cliffs, NJ, 1988, 440 pp.

Mr. Edmunds has produced a broad introduction to expert systems, designed to allow traditional data processing professionals and even computer novices to make an informed judgement about whether to invest time and money exploring expert systems further. Its coverage is sufficiently comprehensive that Artificial Intelligence practitioners may find nuggets of information about aspects of the field with which they are unfamiliar. The book searches for a middle ground between deep technical exposition and gee-wiz fluff. Considering the scope and difficulty of the task and the bewildering rapidity with which the field is changing, Edmunds has succeeded to a creditable extent; the book should be useful to its intended audience.

Edmunds begins in Chapter 1 with some examples to whet the readers' appetite, and a brief overview of the subject. Chapter 2 argues that knowledge and knowledge workers have become key components of modern corporations, and that expert systems can provide a competitive edge in this area; it also discusses some pitfalls associated with the technology.

Chapters 3 through 7 provide the technical heart of the book, discussing the components of an expert system, the process of "knowledge engineering", the fundamental knowledge representation paradigms, inference engines, and the concept of a programming environment. Chapters 8 through 11 provide some insight into the problem of buying an expert system, discussing programming languages, hardware, the development process, and finally, a case history.

Chapters 12 through 14 discuss tools and their vendors, while Chapters 15 through 19 profile some examples companies and programs. Finally, Chapter 20 concludes with a discussion of some fundamental questions potential users need to address in going further. The index is useful, but perhaps a little brief in a book that may be used for reference.

For so broad an undertaking, the book is reasonably well organized and technically sound. The book assumes only a general familiarity with computers, but will be most valuable to those with some experience in writing or contracting for traditional software systems. For example, Edmunds discusses the development process by laying out the steps in a conventional software proj-

ect,contrasting traditional practice with expert system approaches. He repeatedly discusses the pros and cons of various approaches, including the entire field, in an objective and informative way; managers considering contracting for an expert system will no doubt find these sections particularly useful. Examples are used extensively, and seem fairly well chosen to provide as much technical insight as possible without excessively burdening the novice.

Inevitably, the treatment is somewhat uneven. For example, the discussion of LISP includes property lists, little used in most modern programs, and omits structures (a heavily used feature), as well as the more advanced and less standardized object-oriented features of this rapidly changing language. The hardware discussion omits the Apple MacIntosh, which has recently achieved considerable favor as a low-end AI workstation.

The book also exhibits the difficulty of writing about so dynamic a field in less technical ways. For example, it includes charts of the growth and distribution of the Artificial Intelligence market for periods beginning as early as 1989 and ending in 1990, without clearly labeling the reliability of the data. The 1990 figures are of course projections; they show continued exponential growth quite different from the actual path of the industry. The discussion of Symbolics, Inc., omits completely the company's more recent layoffs, stock slump, and struggling status.

These problems contribute to a more important difficulty, inherent in the book's intended mission. Artificial intelligence is a complex, ill-defined subject. A great deal has been accomplished, but these accomplishments are partly obscured by layers of hype and reaction. Determining what can be automated remains a subtle, difficult task, as is determining an appropriate approach. The term expert system means many different things to different people; Edmunds has presented a grab bag of technologies (omitting many more) each of which is a substantial subject in itself. The expert systems presented in the book are for the most part the old standbys, with XCON as the major example of a commercial success. The degree to which these systems have succeeded or failed is not made clear, let alone the reasons why.

Thus, while Edmunds makes a serious effort to cut through the hype and present a balanced picture, readers should not expect firm and reliable guidance sufficient to allow an informed decision on a major project. They will find a great deal of useful information, presented at a simple level, about an important and useful set of capabilities. The book should at least substantially enhance their ability to talk to professionals in the field, or to read further. For management professionals interested in the subject, it will be a very useful first source.

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