

research interest of the authors', it would have been useful to have seen some discussion of the state of the art of the application of RMS's to this field.

The main suggestion is that an RMS be used to implement an incremental theorem prover in which a record is kept of the dependencies in the search space it has explored to answer a query. If a small change is made to the database (adding or deleting one clause) the dependency information may be exploited by the RMS to enable the *same* query to be efficiently resolved after the change. This idea is explored with a simple blocks world example (a surface with moveable blocks stacked on it). However, it is not at all clear that, in general, the overhead of storing dependency structures as new queries are solved, and updating them after small changes in the database, will be justified by the frequency with which those queries are repeated. If the modified clauses are buried deep in the proof tree, instead of being at or near the leaf nodes, the computation of the revised dependency structure may be quite complex. There is no suggestion in the book of a real world application in which such an approach would be a positive advantage.

In summary, those parts of this book which discuss the algorithms for more intelligent backtracking schemes contain much useful information. I remain agnostic, however, as to the value of their application to automated theorem proving.

So, two books covering important theoretical and computational work on the foundations of AI. But we still await some good sound scholarly work to consolidate our current understanding of the various numerical and symbolic models of automated reasoning.

References

- Buxton, R, 1989. "Modelling uncertainty in expert systems" *Int. J. Man-Machine Studies* 31 415–476.
 Clark, D A, 1990. "Numerical and symbolic approaches to uncertainty management in AI" *Artificial Intelligence Review* 4 109–146.
 Saffiotti, A, 1988. "An AI view of the treatment of uncertainty" *Knowledge Engineering Review* 2 75–98.

Expert systems for business: concepts and applications by D V Pigford and Greg Baur, Chapman & Hall, London, 1990, pp 391, £15.95.

This paperback edition is aimed at students on artificial intelligence/expert systems undergraduate courses, and business studies students. According to the authors' preface, "Practising professionals are also a viable user population". They may indeed be *viable*, but I would expect them, like me, to be intensely irritated by aspects of this book.

The book is organized into two sections—Part I, "The Concepts", consists of nine chapters covering: the intelligent computer; expert systems technology; knowledge representation; reasoning; the knowledge base; the inference engine; the user interface; software engineering and expert systems development/integration and the future of expert systems.

Part II, "The Applications", covers eight tutorial modules using the expert systems shell program VP Expert—a cut down version of which is included in the purchase price (though not received or therefore reviewed).

In essence, this is a book about the application of "intelligent" technology to practical problems. I found it astonishing and irritating to discover an enormous number of typographical and other errors in the text, including seven in the first 14 pages! The application of a little intelligent proof reading seems to have been sacrificed in the rush to get to press!

The early chapters are quite well laid out, though, with the student reader in mind they could be improved with more use of bold text and initial capitals for defined terms. Each chapter concludes with a list of key points which are generally useful, though the eight page chapter on the "Future of expert systems" generates 35 key points! Again aimed at the student, some exercises and more detailed assignments are given. Although these are helpful in the main, errors are found here too. The diligent student could find it frustrating seeking a specific reference to work on in Chapter 3 which is not given a year of publication!

There are some good things to say about this book—the range of examples in the overview Chapter 1 seem well chosen, and the explanations in the chapter on knowledge representation are clear and easy to understand, as is the section on search methods in Chapter 4. In Chapter 5, the section choosing the development tool contains some practical advice—indeed, the whole chapter indicates the authors' appreciation of the practical problems in knowledge engineering.

Chapter 6, on the inference engine, likewise is clear and well-constructed, with the concepts argued in simple terms (in particular, the section on “dealing with uncertainty”). The user interface is discussed in Chapter 7, whilst in Chapter 8 we turn our attention to software engineered expert systems development integration—the first of the practical, rather than conceptual, chapters. Here there is more good advice in the sections on “Putting the expert system together” and “Integration of the expert system into the organization”, though annoying inconsistencies in the use of bold type spoil an otherwise readable text. Whilst I am sympathetic to the problems of “open-ended” system development, I think it is rather too strong to advise students that “The knowledge engineer should not allow management to say ‘Well, that looks fine . . . but I would like the system also to do . . .’.”

Nowhere in the chapter is there a statement of what software engineering *is*.

What these sections lack, is an entertaining style with *interesting* or stimulating examples. In the main the examples used are inane, and the complex examples worked using symbols are not easily accessible for the business reader.

The tutorial modules are generally well worked, and clearly illustrated. However, not having read the VP Expert user manual or documentation it is difficult to judge if they offer a large benefit over consulting the supplier's own literature. Irritations occur here too—the instructions on installing the software on hard disk are tucked away in an Appendix and not referred to from the text, so are only discovered when having devoured the whole book. The authors also attempt to stretch beyond its limit the very simple example of an expert system developed—advice on selection of a word processing package—and further annoy the reader by the inclusion of inane questions such as “estimate the amount of money that you can afford?”, ‘low’ or ‘high’, and “what kind of technical support do you want for your word processor?”, ‘fair’ or ‘good’.

The module on “Using databases and spreadsheets” with the knowledge base is clear, though the examples worked are trivial. The authors indicate the limitations of the software in its use of called data. There is only sketchy detail on how to create so-called ‘smart forms’ which adapt to the user's input, and even less on the use of the HYPERTEXT feature of VP Expert.

The final sections of the book include the VP Expert command hierarchy, a table of ASCII characters, and answers to exercises—many of which simply appear to repeat the content of the chapters (including a word-for-word repetition of the dictionary definition from Webster's New World Dictionary, with which the book opens!).

The book concludes with a rather short list of references, and an index of less than three pages for this 400 page student text book. The indexing is incomplete and inconsistent in style.

In conclusion, this is a disappointing, unsatisfying book. The title is misleading, since it is aimed at students, the context is variable in quality, and in terms of its textual and typographical errors it is appalling. I do not recommend it.

Knowledge based systems for test and diagnosis by G Saucier, A Ambler, M A Breuer (eds.), North Holland, Amsterdam, 1990, pp 256, G135.

Seeing a book title always induces certain expectations regarding the book's content. These expectations are based on the background knowledge of the reader. The title *Knowledge based systems for test and diagnosis* may raise the expectation that the book will contain a collection of papers/chapters describing KBSs to test devices and machines, or perhaps even students, as well as to perform a diagnostic task, for example in medicine or in repair/maintenance situations.

After reading the preface of the book, one soon comes to the conclusion that the book covers a much narrower domain, viz. the application of KBS for testing and diagnosis of electronic chips and boards.