

ies on focusing and discourse structure. The author then explains on the main part of the book how these theories are integrated, and how inference and generation mechanisms are added into SPAR.

Although the book reads like a good Ph.D thesis, I feel that the publisher's referees should have exercised a greater editorial power in order to turn it into a more readable book. In particular, the initial section should have been greatly expanded to make it more accessible to its intended wide readership, which according to the cover consists of those in "artificial intelligence, computational linguistics, cognitive science, pragmatics, computer science, English language, psycholinguistics, linguistics, expert systems and knowledge engineering". The references to the ideas on which SPAR is based may be sufficient to refresh the memory of the working computational linguist who is already familiar with them, but I do not think they are sufficient for the reader who meets them for the first time. It is unfortunate therefore that the whole work seems somewhat rushed, which is probably a reflection on the pressure that publishers are under to get books out into the market in a rapidly moving field.

Reviewed by John Beaven, Department of Artificial Intelligence, University of Edinburgh, 80 South Bridge, Edinburgh EH1 1HN.

Developing expert systems for business by Benchimol, Levine and Pomerol, North Oxford Academic Press, 1987.

This book is intended to introduce a non-technical audience to some of the technical and managerial aspects of expert systems. It takes the stance of providing information for the potential users of such systems, claiming therefore to be neither too theoretical nor too superficial. It is written in an uncomplicated style, which is translated from an original French language edition published in 1986.

In its intent, level and style it most closely resembles Harmon and King's *Expert Systems* (Wiley, 1985), which is similarly aimed at the business manager. It sets out to demonstrate the role expert systems might make in business decision making, with an emphasis very much on promise rather than fulfillment, for as the authors honestly acknowledge in the book's foreword, "there are in fact very few (expert systems) operational in businesses". This, the authors conclude, is because insufficient attention is paid to the feasibility of the applications chosen, and a lack of careful preparation in their implementation. The final quarter of the book is devoted to some of the factors surrounding the introduction of expert systems into an organization, which the authors claim, with some justification, are often given insufficient prominence in the literature.

Chapters 1 to 6 define expert systems and their operations. All very clear and mostly to the point, although there is little in these chapters to distinguish the book from many similar "management appreciation" expert system books. Chapter 7 considers the relationship between AI, DSS and expert systems, but does not really do justice to its subject matter. The chapter is a mere six pages long and perhaps it would have been better either to incorporate this material elsewhere or to examine its relevance to the business development of expert systems in greater depth. Chapter 8 looks at shells and hardware. As might be expected, such an examination becomes quickly dated. Of the overview presented in the section entitled "recent systems", the criteria for inclusion is not made clear, and the functionality for business applications of each shell, which in view of the book's readership is likely to be of particular interest, is given insufficient prominence. The choice of shells has a particularly French flavour; some old favourites familiar to UK readers are not included (SAGE, SAVOIR) and the passage of time since the book's original publication has meant that most of the newer micro-based shells are not considered.

Chapters 9, 10 and 11 concentrate on some of the wider organizational issues referred to above. The authors suggest that implementors of expert systems ask themselves a number of questions before starting, along the lines of who, what, where, how, when and how much? An excellent framework, but sadly omitting what could be the most crucial business question, why?

In providing guidance to help the potential business user select his first application, the authors note a useful distinction between selection criteria associated with the application, the organization,

the resources, and the users. Would that such a thorough approach was adopted for many traditional, non-expert, systems! Most of the key points on systems implementation are covered although sometimes somewhat superficially. Problems associated with sizing, for example, tend to be dismissed with advice such as “break the project down into separately budgeted stages”. The chapter’s message, that of taking a wider view when implementing a business system, is a sound one which should be welcomed.

This brings me to my final point. In taking the stance of the potential business user, as it claims to do, the most obvious question is surely, why expert systems? What’s in it for my business? For me, these questions are not satisfactorily resolved by this book. Many managers are now alert to the potential of expert systems. What they are looking for is success stories which they can see as relevant to their own business. In this sense the book is disappointing. Perhaps it’s too early yet to expect such successful applications, at least for larger systems. What makes more encouraging reading, for those eager to see expert systems introduced, is the inclusion of the contextual factors as essential ingredients in successful expert system implementation.

In conclusion, the book ought at least to wet the appetite of the manager curious to learn a little more of expert systems.

Reviewed by N A D Connell.

Automated theorem proving (second revised edition) by Wolfgang Bibel, Vieweg 1987.

This second edition has only minor changes from the first edition as the author considered that the contents and structure of the first edition were successful. This must be “successful” used with a relative interpretation. The cover note on this book claims that it can be viewed as a standard logic text with a strong emphasis on the computational features of logic. While the emphasis is certainly on computation, in my opinion it is not a standard logic text. The detective story of the first chapter certainly is an amusing way to introduce formal logic. But this is deceptive, Chapter 2 plunges into a morass of notation and definitions designed to serve the central thesis of the book.

The book is essentially a presentation of, and the author’s justification for, the connection proof procedure. The author claims that the connection method is the most advanced proof procedure for first order logic presently available. “Advanced”, here, must be interpreted in the sense of the most efficient, not the easiest to understand. The author claims that this method embodies all previous proof procedures in a unified formalism.

In the preface the author admits to the complexity of the connection method and that presentation is a real problem. He claims that because it is so complex a rigorous treatment is essential so that serious errors or misjudgements can be avoided. The author attempts to mitigate the unilluminating notation, definitions and rigorous proofs with informal descriptions. For this reviewer, this attempt was not successful; the informal descriptions did not provide much insight and I did not really gain a good understanding into what was going on until Chapter 4. I particularly found the convention for section and formulae numbering annoying, as there are many internal references, and this was an additional burden in a book which otherwise requires hard work and determination to finish. I suspect most readers would have given up well before Chapter 4; the book consists of only five (large) chapters.

Chapter 4 describes the Gentzen-Schutte calculus for first order logic. This calculus provides a synthetic schema for constructing valid formulae, the most fundamental one of which is $P \vee \neg P$. Such a disjunction of positive and negative literals in a formula is called a connection. In contrast the connection proof procedure is an analytic approach to determining the validity of a given first order formula. It is the analytic dual of the synthetic Gentzen-Schutte calculus in that it is an algorithm for determining the validity of a given formula which works by attempting to find a set of connections spanning the formula.

In general, the method is applied to formulae which have been transformed into a disjunction of conjunctions of disjunctions of conjunctions of . . . of literals. The transformation method is the same as reduction to disjunctive normal form but stops short of the use of the distributive law. The