

within the first depth. Neither of these engines allows variables in the rules or facts. This omission is redressed by a discussion of one of the pattern matching mechanisms in Argos-II.

The discussion of automatic proving constructs, in five stages, a Prolog-type prover with a depth-first linear input strategy, which searches for and displays all proofs. Predefined predicates are included: there is a detailed description of the implementation of the cut, and of evaluable functions. This chapter finishes with the construction of another prover, still based on Horn clauses but different from Prolog. It uses a breadth-first positive unit strategy, the final version of which eliminates subsumed unit clauses.

This is more a book to study than to read, although the general reader will find it interesting to dip into; the structure of the book, with several different topics, invites this. The claim that an elementary knowledge of Lisp will suffice to tackle the book seems justified, and reading code which implements interesting mechanisms/strategies is an enjoyable way to improve one's knowledge both of the language and of the functions described.

Artificial intelligence expert systems and languages in modelling and simulation—Proceedings of the 1st IMACS Symposium on Artificial Intelligence 1987, eds. Casimir A. Kulikowski, Rafael M. Huber and Gabriel A. Ferrate 1987, ISBN 0-444-70482-5, pp 374, \$97.74.

This book contains the papers presented at the first conference of the International Association for Mathematics and Computers in Simulation. The papers refer to work carried out prior to mid-1987 and, as such, are now a little dated. At a cost of over \$90 this is an expensive book, and cannot be recommended for individual purchase. In what follows I hope to say something about its contents that will help the reader decide whether there are any papers in these proceedings worth looking at. My guess is that for some readers there may be a few papers of interest if they are working in a very specialized area that is also being investigated by some of the authors of these papers and they want to see how others are tackling or planning to tackle similar problems. However, if the reader is looking for helpful hints as to how to solve practical problems in detail then he or she will be disappointed. If you are writing a review of the uses of AI in modelling and simulation then you should certainly scan through these papers. As is, unfortunately, common with many conference proceedings which rely on camera ready copy the quality of presentation varies from good to awful.

The book starts with a survey article by Kulikowski which covers most of the standard aspects of the evolution of AI, modelling, and simulations techniques now in use and the relationships between them. It is followed by a series of papers describing various environments for combining AI and simulation. These include the various standard approaches using Prolog, Lisp, Object Oriented programming languages, distributed and parallel computing environments and associated graphics interfaces. Disappointingly no substantial applications developed using these approaches are described, neither is there any information as to the availability of some of the environments or methodologies described, nor is there any discussion of their relative strengths and weaknesses. I could not help feeling that many of these papers were little more than extended abstracts. A major grumble is that many of the authors spend a lot of time extolling the virtues of their particular dialect of Prolog or Lisp or their particular enhancement or extension. I would dearly have liked to see some well documented heuristics or fragments of algorithm. Nowhere was this more frustrating than in those papers where symbolic and numerical techniques were combined. Often I was left at the end of the paper feeling "high and dry". After my appetite had been whetted by some promising introduction it eventually transpired that the paper was describing yet another piece of "preliminary design" or those very questions I was expecting answers to were "topics to be investigated further".

What I did get from this book, however, was an appreciation of the sheer number and modelling point of view. There were papers describing attempts to tackle problems in such diverse areas as forestry, transportation, computer integrated manufacturing, CAD, the modelling of ecosystems, planning haemo-dialysis treatment for patients with kidney disease and modelling of offshore escape and evacuation procedures. I hope that those attending the conference benefitted by getting

to know fellow workers and made many useful friends and contacts. Did I find any useful papers in these proceedings? Well, yes I did. I read the paper by Futo and his colleagues on using a discrete simulation model to plan treatments in a kidney dialysis unit with great interest because this is an area I happen to be very interested in. My favourite paper though, was that on computer-aided construction of ecological simulation programs by Muetzfeld and his colleagues. This was a balanced and unpretentious paper which described the strengths and weaknesses of the various possible approaches and left me with the feeling that it was based on a thorough and substantial piece of research.

My final verdict then is as follows. Do have a look at this book if you happen to come across it. Do not, however, go out of your way to get it. If you are desperate for an overview of the area then do have a look at "Artificial Intelligence Simulation and Modelling" edited by L. Widman and colleagues. This is a collection of invited papers covering much the same subject area and should set a standard which everyone in this field should try and at least follow and preferably to improve upon.