stimulating and amusing. For those interested in AI, the book must stand against these "straight" introductions to the subject. For the general reader, on whom I suspect most of the cognitive science aspects would be lost, it must stand against a large supply of "straight" detective thrillers.

This book may be successful as an elaborate "in-joke" for a small community of readers who are particularly interested in cognitive science *and* detective stories, since they could be amused by finding references to the former in the format of the latter. However, the publishers claim on the jacket that it contains "treatments of . . . aspects of artificial intelligence that help the reader to understand this emerging science". To succeed in this laudable aim, it would have to be a sufficiently gripping novel to entice the reader to persevere with the more theoretical passages. It is not, and therefore misses an opportunity to contribute to the serious purpose of making challenging ideas accessible to a wider audience.

Reviewed by Saki.

Artificial intelligence – concepts and applications in engineering by A. R. Mirzai (Ed.), Chapman and Hall, London, 1990, pp 304, £25.00.

Many engineers are using artificial intelligence in some way in the search for solutions to their often complex problems. Some engineers find the techniques embodied within expert system shells sufficient to meet their needs. Others find a single approach too restrictive, and need to extend the range of techniques within the shell using a programming language. For still others the only sensible option is to implement their system entirely using a language. It is primarily at these engineers who have this need to write programs that the book is aimed.

While the engineering community is always amongst the first to investigate new technologies and to try out new techniques, it can take some time before they become aware of the new ideas emerging from artificial intelligence research. In addition to this it can be difficult to find suitable introductory level texts on the theoretical and practical issues associated with these new ideas.

This book is an attempt to fill this gap, informing the engineer about the application of artificial intelligence to a range of engineering problems. Unlike many books in the field this text is not centred around knowledge representation issues and system design, but concentrates more on a discussion of artificial intelligence techniques. Although many of these techniques are still current research topics they have already been seized upon and their potential exploited by academic engineers. The chapters have been written by leading researchers in the fields of both artificial intelligence and engineering and outline the advantages and disadvantages of the various techniques.

The book itself is divided into two parts: concepts and applications. The first part provides an introduction to the concepts behind the techniques which have been used in the applications described in the second part of the book. To set the scene a brief history of developments which have occurred in the AI field since the 1950s is provided in the first chapter. This is followed by an introduction to a range of concepts such as blackboard architectures, machine learning systems, neural networks, pattern recognition and adaptive signal processing.

Personally, I felt the time spent reading the first part of this book was time well spent. Although I have heard about nearly all the concepts covered, by the time I had finished the introductory chapters I understood more about where they had come from and some of the theory underlying them, making the second half of the book infinitely more readable than it otherwise would have been.

However, the preface was too long. At six pages in length consisting of a paragraph outlining the content of each of the eleven chapters, and using terms which had not yet been defined, it may dissuade the very engineer whom it would help the most from reading any further. Still, not that many people read the preface I suppose.

I enjoyed reading the first half of chapter one giving a historical review of developments in AI. Much of the information contained in this chapter is presented time after time in introductory texts to AI, but here the approach was new with the information clearly presented and well illustrated.

The second part of this chapter dealing with expert systems in practice was a bit of a letdown. There was too much emphasis placed on rule-based programming with scarcely a mention of the other AI programming paradigms. Also the examples used to illustrate various points were not taken from an engineering domain and the commercial products used to code up the examples are not particularly representative of what is around in the market place at the moment. In addition to this, sample code was presented in the body of the paper without adequate supporting explanation in the text.

Of the other introductory chapters I particularly liked the paper on blackboard architectures. The blackboard model and architecture was illustrated using a jigsaw model, with each component of the blackboard and its purpose being described using further examples. With all the chapters in part one of the book the reader was brought from a position of no knowledge of the topic to a position of understanding not only the basic concepts behind the topic, but also where the current research interest lies in a number of easy and interesting steps.

Part two concentrated on applications of artificial intelligence within engineering. Some of these applications were very interesting, and clearly illustrated the concepts described in part one. In many of the applications the AI techniques have been used to improve on existing conventional processing techniques. A blackboard architecture was used in one application to enhance traditional signal processing algorithms, producing a system capable of intelligent spectral estimation with relation to foetal heart signals, and in another application in relation to sonar interpretation. Foetal heart sounds are analysed in another paper too, this time using a combination of signal processing algorithms and rule-based reasoning to estimate the duration of various phases of the cardiac cycle.

The use of AI techniques in automatic speech recognition is another application area covered. The problem of speech recognition has been tackled using both a mainstream applied AI approach, known as the "strong knowledge" approach, and using a more mathematical approach, known as the "strong algorithms" approach. Here the emphasis is given to research into the use of neural nets and multi-layer perceptrons.

Machine learning features strongly in the remaining papers. One paper contrasts aspects of a diagnostic system built using both a production rule system and a machine learning system. The other paper considers machine learning in relation to tuning waveguide filters used for tailoring filters before and after transmission.

The applications are readable and interesting, probably as a result of the background ideas having been explained in the first part of the book. A criticism however is that the examples are drawn almost entirely from electrical engineering, and from the signal processing area within that discipline. The applications described illustrate the use of AI techniques to tackle a wide range of problem-types which could be relevant to a number of engineering disciplines. It is a shame that other engineering disciplines are not represented in any way.

I enjoyed reading the book and I learned a lot. I would recommend it to engineers having some knowledge of artificial intelligence who have reached the limitations of toolkits and shells. The techniques described in this book will help these engineers to understand and use more sophisticated techniques alongside other knowledge based or conventional programming approaches. Although I see it primarily aimed at academic engineers carrying out research projects requiring the use of artificial intelligence, this book has additional value in making the AI community aware of the level of activity going on in the engineering area and the continuing need for AI research to overcome the problems which are still outstanding.

Reviewed by Terri Lydiard, Knowledge Engineering Group, AI Applications Institute, University of Edinburgh.

Envisioning information by E. R. Tufte, Graphics Press, London, 1990, pp 126, £30.

Information comes in all shapes and sizes, and can be complex or simple, dynamic or static. It is therefore not surprising that problems arise when trying to summarize information in a clear,