simple geometric primitives, Chapter 10, *Interpolating and Approximating Three-dimensional Data*, addresses representation of higher level geometric objects. The author selects some relevant topics in higher level shape representations, such as shape topologies, stochastic geometry, Delaunay triangulation, etc. and shows applications of these ideas in extracting or reconstructing higher level geometric objects from the data of some sensory processes. Unfortunately well-established 3-D representation schemes have been completely left out.

Chapter 11, *Recognizing and Locating Objects and Places*, deals with the problems of recognizing and locating objects and places to perform navigational tasks by a robot, from the higher level geometric description of objects. This can be regarded as the highest level representation of a scene to accomplish simple perceptual tasks by a machine. Considering the vast amount of work that has so far been done on this topic, this chapter appears incomplete. Short discussions at least on the following issues would have been of interest to the reader and provide a more comprehensive idea about the topic:

- minimum distance classifiers,
- statistical classifiers,
- some discussion on neural networks, and
- syntactic methods for handling structural recognition problems etc.

The language of the book is simple and the presentation concise and logically sequenced. A large number of figures, diagrams, and photographs help the reader in understanding the mathematical concepts easily. In keeping with the high quality of the contents, the printing and production quality are also excellent.

Overall, this is an excellent book highly recommended to all interested in the field of computer vision.

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DONALD R. YAGER and DIMITAR P. FILEV
Essentials of Fuzzy Modelling and Control. John Wiley, 1994, £41.50, 388pp. hardbound. ISBN 0 471 01761 2

This is a very authoritative book written by two authors, one of whom is an internationally recognised expert in the field and another who is currently working on applications. It covers its subject material comprehensively and can justifiably claim to be a leading text in its discipline.

The reader is introduced to the subject with a very gentle explanation of the concept of a fuzzy set but the introductory chapter soon picks up pace and formalism and sets the tone for the rest of the book.

Chapters 2 and 3 are an exposition of the formal mathematics which underpins fuzzy logic. They are well written and very thorough but the mathematics is general and very formal. They will not make easy reading for people who do not have the necessary mathematical skills. These people could have been accommodated by the provision of more worked examples.

Chapters 4 and 5 discuss, respectively, fuzzy control and fuzzy modelling. These two chapters are still very formal but are not quite as intense as the three which precede them. The former draws comparisons between traditional control methods and those using fuzzy logic so a reader familiar with traditional methods should feel very comfortable with this chapter. The same cannot be said of the chapter on modelling. Traditional mathematical and numerical models such as simulations use very different techniques to those of fuzzy models. A reader who is approaching the subject from this background will soon realise that the two approaches do not have very much in common.

The book then enters its most pragmatic phase and gives the reader some respite from formal mathematics. Chapters 6, 7 and 8 deal with the various stages of constructing both fuzzy models and fuzzy controllers. They discuss the design, the implementation, the tuning and the defuzzification of the result (an essential step to produce an output signal for fuzzy control). These chapters give numerical examples of how various techniques are applied and a practitioner could be forgiven for feeling that these are the only chapters which come close to reality.

The final chapter, far from being a conclusion, looks at how two competing approaches, the Mamdani or constructive method versus the logical or destructive method, which are discussed earlier in the book, can be combined and generalised to provide even greater flexibility. It returns to the very formal style used earlier but proposes a very interesting combination of the afore mentioned methods which should provide a useful technique for solving problems which stretch the earlier methods to the limit.

The publishers quite correctly claim that this book is not 'a loose collection of papers' but one gets the impression that it has drawn heavily on this source for much of its material and at times the joins show. For example, in some places both the style and the mathematical notation change. In general, most chapters start with an easy introduction but quickly adopt a style which is not significantly easier to read than those of papers on the subject. In an attempt to comprehensively cover the field, some chapters finish by covering material so quickly that the reader would have to resort to the papers quoted in order to pursue the topic.

This, however, brings with it two advantages for the average reader. Firstly, the authors have provided a most comprehensive collection of apparently carefully selected references. One could pursue these references confident of finding relevant material. Secondly, and rather strangely, the later chapters repeat themselves initially in referring to earlier work in the book. They then branch

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out into their own specific aspect of the subject. It is almost as if they had been written in isolation. This has the effect of making the reader thoroughly familiar with the material, which when introduced earlier in the book, seemed abstract and remote. As a result, readers who become overwhelmed with the formality of the early material, would be well advised to read on to the later chapters and then re-read the earlier ones. They may well find that the earlier chapters are much more transparent in the light of repeated application of their subject material.

The only disappointment with this book was in the quality of production. Mathematical formulae in the early sections are subject to typographical errors and every occurrence of one character is so faint it is only detectable by spaces in the text. The lack of contrast in grey tones r esults in figures which are difficult to interpret. All of these could prove troublesome to a reader unfamiliar with the subject. Hopefully, these shortcomings will be corrected in later editions.

In conclusion, this book is potentially a very good book indeed. It will always have a classical text book style more suited to a researcher than a practitioner and more palatable to a mathematician than to a computer scientist. But, for anyone who is prepared to expend the effort required to read it, this book is very rewarding.

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N. METROPOLIS and GIAN-CARLO ROTA
A New Era in Computation. MIT Press. 1993. ISBN 0 262 63154 7 £12.50. 241pp. softbound.

This book, based on a 'Daedalus' special edition and two fresh articles, is a tour de force exploring the area of massive parallel computation(MPC). As the title implies, the book deals with all aspects of computation using this latest technology which in a way is a nascent one. What is significant is the attention paid to the applications covering the whole range where MPC may be used, thus opening up new vistas. It gives us a glimpse of what may be the future. In the introduction itself however there is a debunking of some of the earlier predictions of the social, economic and political effects of the 'computer revolutions'. I shall not deal with the myriad applications discussed in the book. Suffice it to say there are chapters dealing with neuroscience, robotics, simulation, air traffic control, virtual reality and many other possible applications of MPC, particularly in business, industry and daily life—the stock exchange on one hand and the home robot on the other.

The book is focussed on the policy maker, the industrialist, the economist, the sociologist and the user. This is helped by the almost total avoidance of technical jargon. Thus it can be read with interest and ease by a broad cross-section of interested people who may be laymen and not necessarily computer specialists, although it is expected that they will be 'computer literate'. Towards this end it starts with chapters describing what MCP is. What may be slightly controversial is an emphasis on a central computing facility as different from the extensive use of personal computers now becoming the trend. The arguments set forth are valid on economic and technological grounds. The comparison with the central power utility versus in-house captive power stations makes the point strongly and effectively. It raises the spectre, if one may say so, of a large system based on MCP monitoring our lives! Will the PC or the computer terminal become as ubiquitous as the telephone! There are very thoughtful chapters dealing with the sociological aspects. What to me, as a one-time policy maker, was immensely interesting was the thought-provoking chapter on 'America's Economic-Technical Agenda for the 1990s'. Even for the free capitalist society of America, a strong plea is made for the Government to invest in technology. I hope this message is also heeded by many other countries which are jumping on the bandwagon of the market economy. The last chapter on MCP and information capitalism deals, amongst other issues, with that of employment and the educational profile which is needed for MCP to be utilised in a meaningful manner. It also bemoans the fact that most communities develop an insular attitude and examine the social dimensions of their specialised technological 'niche de novo'. It is an aspect to which all of us should give thought and break out of the mental barriers we have created for ourselves. A chapter looks at the educational requirements and pleads for degrees in computation—something which I expect will and must happen sooner rather than later. To conclude it is a thought-provoking book covering the whole range of issues relating to MCP and perhaps 'required reading' for leaders in industry and Government. The concluding sentence of the last chapter reflects the theme of the book and I quote 'This is a superb time to carefully observe the social dynamics that generate these uses, and the ways that they, in turn, influence organistions, jobs and social life'.

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MICHAEL F. WORBOYS (Ed.)
Innovations In GIS 1. Taylor and Francis. 1994. ISBN 0-7484-141-5 £23.00, 267pp. softbound.

Geographical Information Systems (GIS) are increasingly to be found in use in business, local government and utilities (one can no longer talk of 'public' utilities),

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