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Book reviews

Computers in Critical Care and Pulmonary Medicine, edited by S. Nair, 1980; 427 pages. (*Plenum Press*, $47·40)

This volume is a collection of papers of the first international meeting in critical care and pulmonary medicine, held at Norwalk Hospital, Yale University, School of Medicine in 1979. It is a collection of 38 papers covering various aspects of the application of computerised information systems sometimes used to guide and control both care and therapy with the objective of minimising human intervention. Thus, the importance of good systems analysis and design cannot be overstated.

Indeed, some of the papers dealing with artificial ventilation control and closed loop therapy emphasise the importance of adequate systems analysis and design before going to develop their systems which support intensive types of care. Only in this way can serious mistakes be avoided. Other papers are devoted to different ways of organising appropriate measurements and presenting the data to care staff using new and different monitoring facilities. Unfortunately, the terminology used is not always compatible and some familiarity with the fields of knowledge under consideration is necessary by the reader.

It is a rather gregarious collection of many different experiments in critical care from many countries. It will be of major interest to those involved in the field that demands the co-operation of biochemical engineers and those engaged in this difficult, arduous and specialised field of health care. The advances in monitoring and controlling care by computerised systems are now becoming significant. The widespread use of information processing implied by the volume illustrates that it can solve existing difficult problems. It is not a book for the unitiated but should have a place in medical libraries.

J. ANDERSON (London)

Hardware/Software Design of Digital Systems, by R. E. H. Bywater, 1981; 477 pages. (*Prentice-Hall*, £15·95)

To quote from the Preface: 'This book has been written as a second-level text on computer engineering. It is designed for students who already possess some elementary knowledge of digital computers and some familiarity with computer programming. It has also been prepared with practising digital system engineers in mind and provides a reference for design approaches.' It would be hard to formulate a better description of the book: like that of so much of the material in it, the author's description is a precise and accurate one.

On commencing reading the book for the first time the reader might well suppose it is just another treatise on computer engineering but soon finds out that it is not—in fact the title is as apt as the description in the preface. The author has spent much time and gained great experience in designing machines like hybrid computers and D.D.As. The book is written for designers of digital systems which may well contain conventional computers or parts of them. Hence the test deals quite cursorily with the conventional elementary material of computer engineering but deals in depth with refinements to it. It deals, for instance, with microprocessors comparatively, since these might well be components in a specially designed digital system. It deals with simple arithmetic units cursorily but it deals in depth with techniques for gaining speed or efficiency. Thus it is indeed a 'second-level' test, and it is a useful one, and should be read by system designers and all others who take an earnest interest in digital computer design. There is much that is factual in the text—it is a thick book—but there is also a wealth of valuable counsel based on hard experience.

B. S. WALKER (Reading)

Advances in Digital Image Processing: Theory, Application, Implementation, edited by P. Stucki, 1980; 332 pages. (*Plenum*, $37.50)

This book contains 15 papers delivered at an international symposium on digital image processing held at Bad Neuenahr, FRG during 26–28 September 1979 and is one of a series of books in the *IBM Research Symposia* series. The book is divided into four main areas: general, theory, application and implementation. The first section gives two papers which describe the development of photography in image science, and future trends in computer graphics and image processing in general. The theory section consists of three papers which are more mathematical, covering signal analysis applied to images, coding of TV signals and digital image analysis. The applications section of the book was found to be the most interesting. Topics here included biomedical image processing, x-ray image processing, Landsat image processing, document reproduction and sampling, computer graphics and automatic vision for industrial applications. Several colour plates are also provided in this section. The final section on implementation comprises four papers describing the technicalities of hardware image processing systems, viz. distributed, parallel, vector-array and other high speed signal processors.

The book is well illustrated and strikes a useful balance between mathematical theory and hardware implementation of digital techniques. In many edited books of this kind, which present a number of papers contributed by several authors, there tends to be a large amount of overlap and also areas which are not covered at all. Another problem is the non-standardisation of nomenclature throughout the book which can be confusing for first time readers. Certainly the book does provide the reader with some insight into the advances in image processing, but the subject would probably be better served if more papers had been included or if the book had concentrated on fewer topical areas, considering the vast scope of the subject.

N. P. WOOTTON (London)

Search Theory and Applications, edited by K. B. Haley and L. D. Stone, 1980; 277 pages. (*Plenum*, $42·00 (outside USA))

This book comprises most of the papers presented at working group and plenary sessions at the NATO Advanced Research Institute on Search Theory and Applications held in Portugal in March 1979. Their content covers a wide academic range, from theoretical, involving degree-level mathematics, to general and non-mathematical (e.g. the search for radioactive fragments of the Russian Cosmos satellite which disintegrated over frozen N.W. Canada). Many discuss the optimal allocation of existing search resources in the light of the available detector characteristics and the most up-to-date information; thus two papers refer to the CASP (computer-assisted search planning) system, now in use by the US Coast Guard Service, which produces an irregular two-dimensional probability map of a target's location resulting from a simulation using input scenario data and blank searches to date. The difficult economic and ethical problems of what level of resource to employ at any stage of a search are mostly not considered.

The book hopes to demonstrate that search theory unifies problems in many different fields; thus one short paper on industrial applications presents an excellent account of applying two solutions in search theory to practical problems in quality-control testing, detecting defective components and managing a research and development project.

The format is photographed typescript: minor production faults, such as different apostrophes and alternating dark and light print (which appear to be due to revisions), should have been avoidable. Overall, when used judiciously, a book to whet the appetite.

R. E. THOMAS (Stirling)