COMPUTER ENGINEERING HANDBOOK

C. H. CHEN

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PREFACE

After nearly 50 years of rapid development, modern computers are still experiencing a vigorous growth, and the trend will likely continue well into the twenty-first century. Building better and more powerful computers is certainly the main direction of the computer engineering field. Computer engineers, however, should be more knowledgeable about the many roles of computers in order to design computers more suitable to the expanding information-intensive society.

The area of computer engineering now encompasses so many topics that it is not possible to cover all of them in one handbook. This single-volume handbook focuses on the basics and new developments in computer engineering. The topics presented include digital logic and design, computer arithmetic, computer architecture, digital system design and reliability, and computer graphics. Topics on recent computer hardware development include VLSI systems and processors, vector processors, parallel computing systems, supercomputers, neural network computing, optical computing, and computer networks. A major emphasis is placed on intelligent processing of numeric and nonnumeric data and information by computers as reflected by Chapters 9 through 12 and 18 on artificial intelligence expert systems and neural networks as well as computer vision. It is now increasingly difficult to draw a fine line between computer hardware and computer software, and Chapter 2, which presents software issues in hardware development, is thus unique and important.

The book is written with computer professionals in both industry and academia as well as computer engineering students in mind, and should serve as a key reference book in the field. The composition of chapters reflects our view that computers will be playing an ever more dominant role in intelligent information processing in the next century, and thus future design of computer components and systems will emphasize meeting such demands.

In preparing this book it has been my great fortune to work with some of the leaders in computer engineering. I wish to thank all the contributors of the volume for their important work, and Daniel Gonneau for his continuous encouragement and insistence on publishing the highest quality book in the field.

C. H. Chen

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