

S.Y. KUNG
Professor of Electrical Engineering
Princeton University

Editor-In-Chief:

"Journal of VLSI Signal Processing Systems," Springer, since 1990.

Books Authored/Coauthored:

1. "VLSI Array Processors," Textbook, Prentice-Hall, Inc., 1987, 667 pages. Also published in Russian and Chinese translations.(Author: S.Y. Kung)
2. "Digital Neural Networks", Textbook, Prentice-Hall, Inc. 1993, 444 pages. (With accompanied Video Short Course produced and distributed by IEEE. (Author: S.Y. Kung)
3. "Principal Component Neural Networks: Theory and Applications", Adaptive and Learning System Series, John Wiley & Sons, Inc., New York, 255 pages, 1996. (Authors: K.I. Diamantaras and S.Y. Kung)
4. "Video Object Extraction and Representation: Theory and Application", Kluwer Academic Publishers, Boston/Dordrecht/London, 2000. (Authors: I-Jong Lin and S.-Y. Kung)
5. "Biometric Authentication: A Machine Learning Approach", Textbook, 476 pages, Prentice-Hall (2005), (Authors: S.Y. Kung, M.W. Mak, and S.H. Lin)

Books Edited:

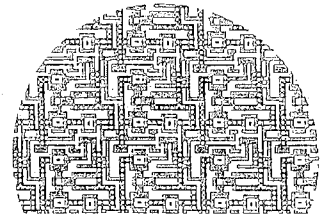
1. "VLSI and Modern Signal Processing," Prentice-Hall, 1985. Also published in Russian translation. (Editors: S.Y. Kung, H.J. Whitehouse, and T. Kailath)
2. "VLSI Signal Processing, II.", IEEE Press, 1986. (Editors: S.Y. Kung, R.E. Owen, J. G. Nash)
3. "Multimedia Image and Video Processing", CRC Press, Boca Raton/London/New York/Washington,D.C., 2001. (Editors: L. Guan, S.Y. Kung, J. Larson)

Since 1990,

Journal of VLSI SIGNAL PROCESSING SYSTEMS

for Signal, Image, and Video Technology

Volume 42, No 2, February 2006
Editor-in-Chief
S. Y. Kung



This journal is abstracted and/or indexed in *ISI: Science Citation Index, ISI: Current Contents-Engineering, Computers and Technology, ISI: Compumath Science Index, ISI: Scisearch, The ISI Alerting Services, INSPEC Information Services, Engineering Index, COMPENDEX* Plus database, Artificial Intelligence Abstracts, ACM Guide to Computing Literature, MATH Database, CompactMATH, and CompuTec. Computer and Information Systems Abstracts, Solid State and Superconductivity Abstracts, Electronics and Communications Abstracts, Compendex, SCOPUS.*

Aims and Scope

The *Journal of VLSI Signal Processing-Systems for Signal, Image, and Video Technology* is an archival peer-reviewed technical journal publishing survey and research papers on the implementation of signal processing systems with VLSI circuits. It is published in nine issues with distribution to engineers, researchers, and educators in the fields of VLSI design and signal processing. A Volume Table of Contents is included in the last issue of each volume.

The scope of the journal includes:

- signal, image, and video technology and systems
- multimedia and visualization architecture and systems
- design and implementation of signal processing algorithms and architectures
- performance analysis of signal processing systems
- VLSI design methodology
- design of DSP components, arithmetic circuits, and number systems
- application of advanced technology (e.g., WSI, FPGA, etc.) to signal processing
- generic and programmable signal/video processors
- special purpose signal/video processors
- application specific parallel and pipelined processors
- systolic/wavefront arrays
- neural nets and applications

No paper published previously in another journal, transactions, or book will be considered for the *Journal of VLSI Signal Processing-Systems for Signal, Image, and Video Technology*, although material published in workshop, symposium, and conference proceedings will be considered. In the case of previously published material, the author is responsible for obtaining the necessary copyright releases. In all cases, the author must obtain all necessary institution and/or government clearances prior to submission. All submissions will be reviewed by anonymous referees prior to acceptance.

Available
online

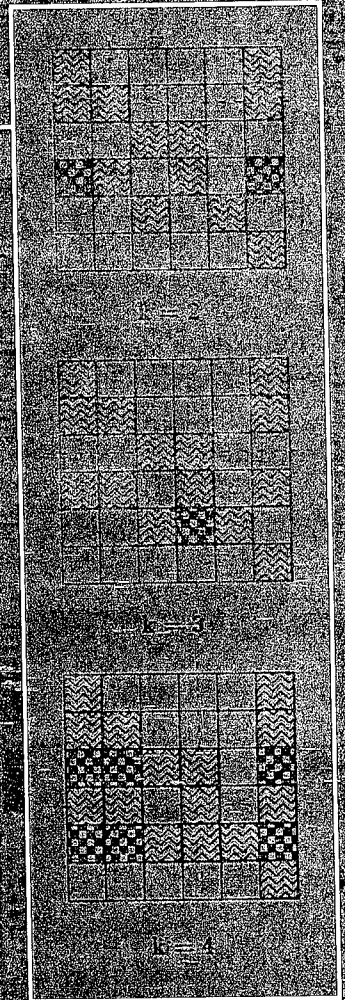
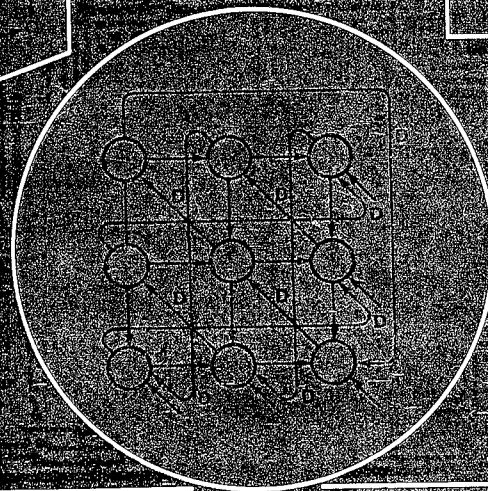
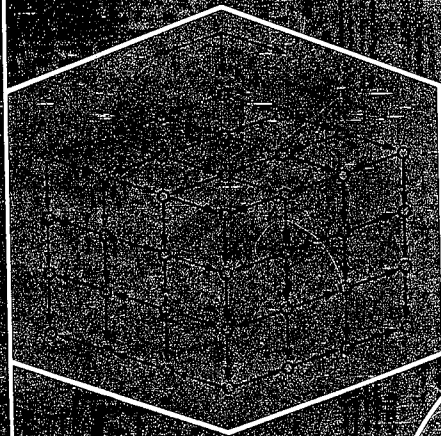
 Springer

ISSN 0922-5773

www.springerlink.com

VLSI ARRAY PROCESSORS

S. Y. KUNG



PRENTICE HALL INFORMATION AND SYSTEM SCIENCES SERIES
Thomas Kailath, Series Editor

VLSI S. Y. KUNG ARRAY PROCESSORS

This book gives readers a cohesive and cross-disciplinary study of *applicational, algorithmic, architectural, and technological aspects* of VLSI array processors. It adopts a vertically integrated VLSI system design methodology and covers

- technology constraints
- algorithm analyses
- parallelism extractions
- architecture design
- system development
- application understanding

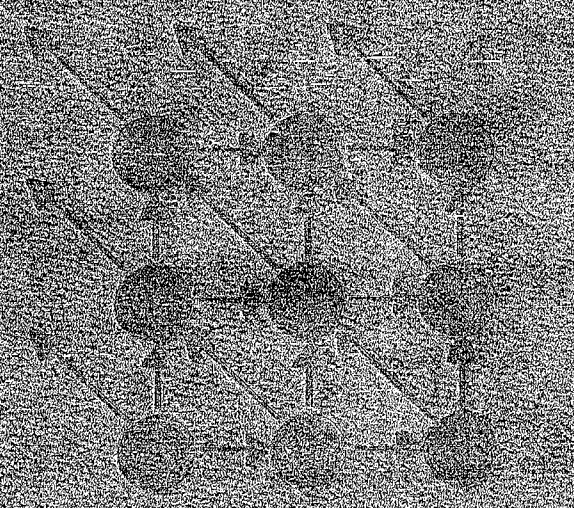
This book also notes the importance of signal processing algorithms and the common attributes of regularity, recursiveness, and local communication.

Readers of this book will find very active and expanding areas of research that may inspire further study in the areas of VLSI array processors and special purpose supercomputers.

PRENTICE HALL, Englewood Cliffs, N.J. 07632

ISBN 0-13-942749-X

THE
INTERNATIONAL
MAGAZINE
OF
LITERATURE



EDITED BY
J. H. M. [Name]

数字信号处理丛书

数字信号处理丛书

VLSI 阵列处理

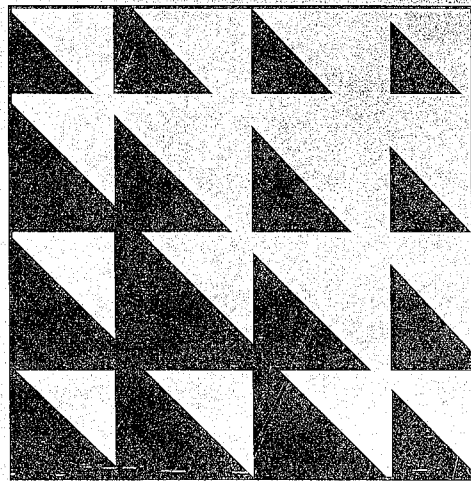
东南大学出版社

数字信号处理丛书：

- 信号处理的数学方法
- 离散变换及快速算法
- 信号复原与重建
- 现代谱估计
- 自适应信号处理
- VLSI 阵列处理

(柳重堪教授)
(钱惠生教授)
(王延平教授)
(王宏禹教授)
(何振亚教授)
(S. Y. Kung 教授)

DIGITAL NEURAL NETWORKS



S. Y. KUNG

ELECTRICAL ENGINEERING
Neural Networks

DIGITAL NEURAL NETWORKS

S. Y. KUNG

Covering the fundamental theory and practical implementation of various neural models, **Digital Neural Networks** provides a coherent exploration and a well-structured presentation of the three most important aspects of the neural networks: application, algorithm, and architecture. Author S. Y. Kung offers readers a working knowledge of the various neural models, the fundamental theoretical basis, the potential application domains, and the basic implementation issues.

In addition, this invaluable reference:

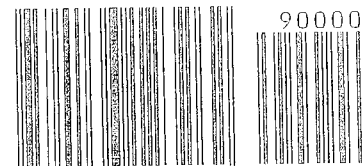
- Offers fundamental and structured explorations of various learning neural networks
- Provides extensive treatments on numerical computing and parallel processing
- Uses unified notations and unified model analyses with cross-references between chapters

About the author

S. Y. Kung received his Ph.D. in Electrical Engineering from Stanford University. Since 1987, he has been a Professor in the Department of Electrical Engineering at Princeton University. His research interests include spectrum estimations, signal/image processing, VLSI array processors, and digital neural networks.

PRENTICE HALL
Englewood Cliffs, NJ 07632

ISBN 0-13-612326-0

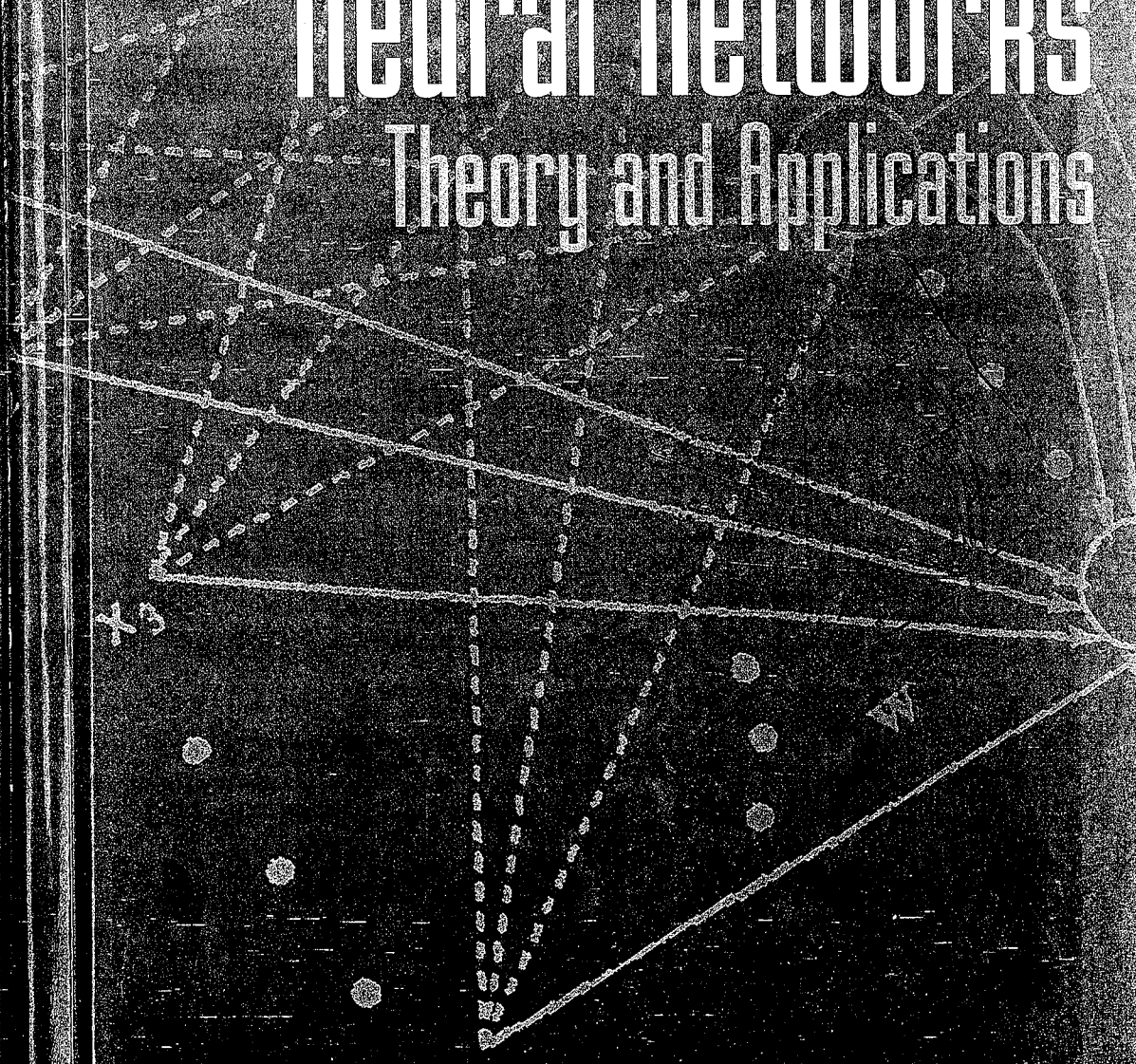


9 780136 123262

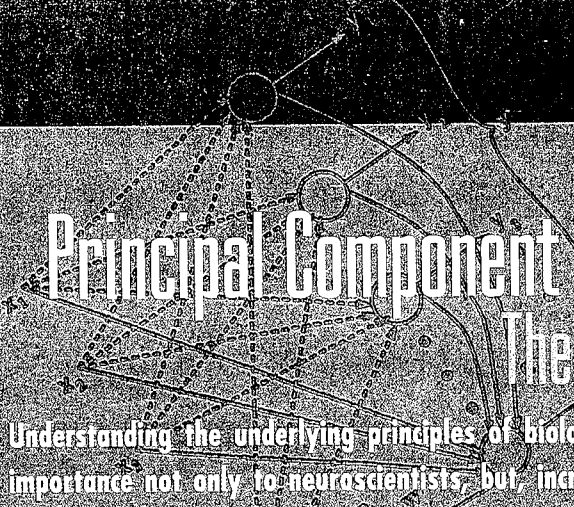
I. D. AMANTARAS • S. Y. KUNG

Principal Component Neural Networks

Theory and Applications



A Volume in the Wiley Series on Adaptive and Learning Systems
for Signal Processing, Communications, and Control
Simon Haykin, Series Editor



Principal Component Neural Networks Theory and Applications

Understanding the underlying principles of biological perceptual systems is of vital importance not only to neuroscientists, but, increasingly, to engineers and computer scientists who wish to develop artificial perceptual systems. In this original and groundbreaking work, the authors systematically examine the relationship between the powerful technique of Principal Component Analysis (PCA) and neural networks. *Principal Component Neural Networks* focuses on issues pertaining to both neural network models (i.e., network structures and algorithms) and theoretical extensions of PCA. In addition, it provides basic review material in mathematics and neurobiology. This book presents neural models originating from both the Hebbian learning rule and least squares learning rules, such as back-propagation. Its ultimate objective is to provide a synergistic exploration of the *mathematical, algorithmic, application, and architectural* aspects of principal component neural networks.

Especially valuable to researchers and advanced students in neural network theory and signal processing, this book offers application examples from a variety of areas, including high-resolution spectral estimation, system identification, image compression, and pattern recognition.

K. I. DIAMANTARAS is a research scientist at Aristotle University in Thessaloniki, Greece. He received his PhD from Princeton University and was formerly a research scientist for Siemens Corporate Research.

S. Y. KUNG is Professor of Electrical Engineering at Princeton University and received his PhD from Stanford University. He was formerly a professor of electrical engineering at the University of Southern California.

Cover Design: Sharon Klein

WILEY-INTERSCIENCE
John Wiley & Sons, Inc.
Professional, Reference and Trade Group
605 Third Avenue, New York, N.Y. 10158-0012
New York • Chichester • Brisbane • Toronto • Singapore

ISBN 0-471-05436-4



9 780471 054368

VIDEO OBJECT EXTRACTION AND REPRESENTATION: Theory and Applications

by
I-Jong Lin
S.Y. Kung



KLUWER ACADEMIC PUBLISHERS

VIDEO OBJECT EXTRACTION AND REPRESENTATION: Theory and Applications is an essential reference for electrical engineers working in video; computer scientists researching or building multimedia databases; video system designers; students of video processing; video technicians; and designers working in the graphic arts.

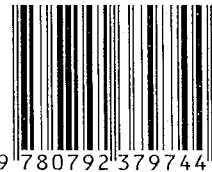
In the coming years, the explosion of computer technology will enable a new form of digital media. Along with broadband Internet access and MPEG standards, this new media requires a computational infrastructure to allow users to grab and manipulate content. The book reviews relevant technologies and standards for content-based processing and their interrelations. Within this overview, the book focuses upon two problems at the heart of the algorithmic/computational infrastructure: video object extraction, or how to automatically package raw visual information by content; and video object representation, or how to automatically index and catalogue extracted content for browsing and retrieval. The book analyzes the designs of two novel, working systems for content-based extraction and representation in the support of MPEG-4 and MPEG-7 video standards, respectively.

Features of the book include:

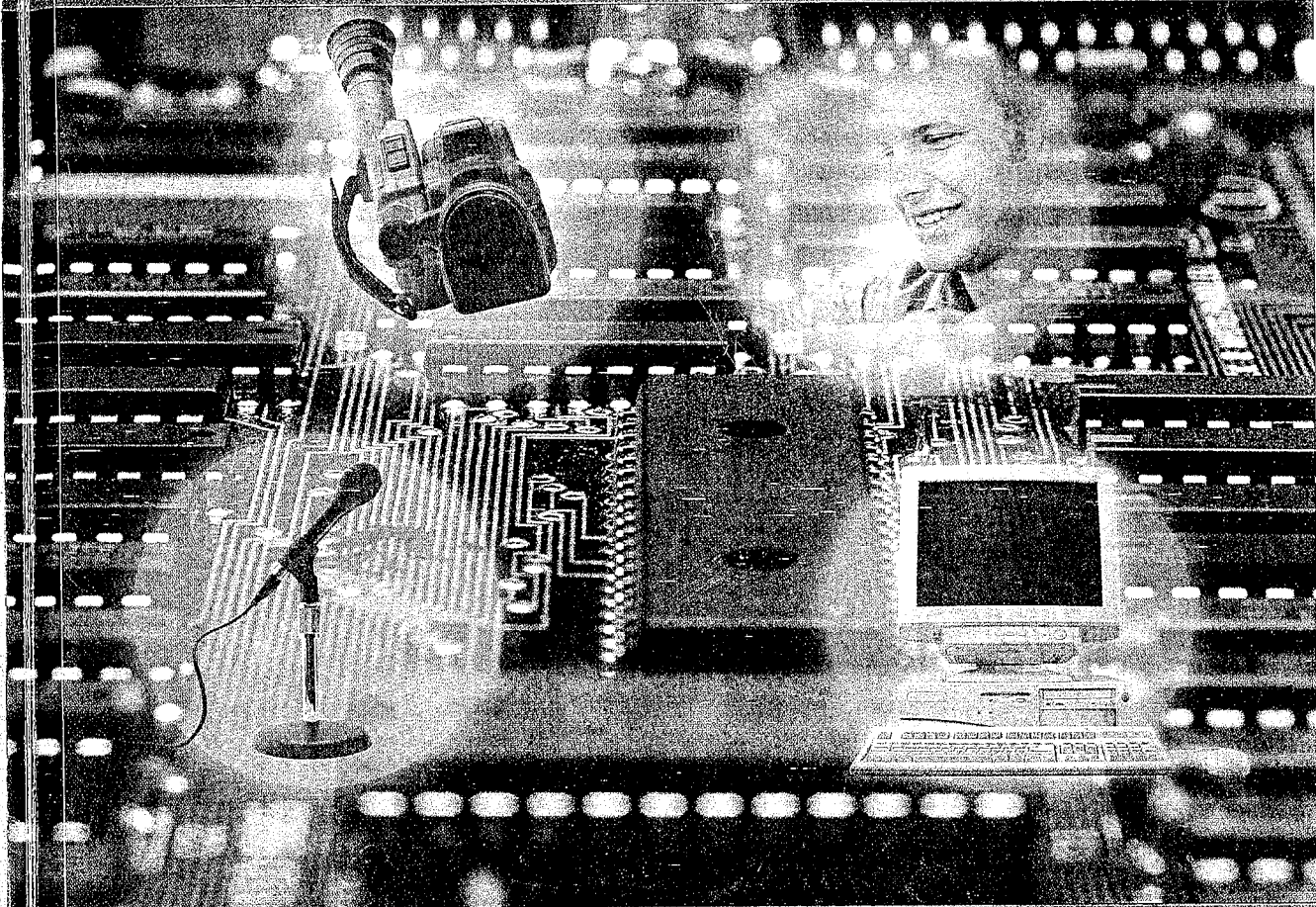
- Overview of MPEG standards
- A working system for automatic video object segmentation
- A working system for video object query by shape
- Novel technology for a wide range of recognition problems
- Overview of neural network and vision technologies

VIDEO OBJECT EXTRACTION AND REPRESENTATION: Theory and Applications will be of interest to research scientists and practitioners working in fields related to the topic. It may also be used as an advanced-level graduate text.

SECS584
0-7923-7974-8



Biometric Authentication



A Machine Learning Approach

S.Y. Kung • M.W. Mak • S.H. Lin

Prentice Hall Information and System Sciences Series
Thomas Kailath, Series Editor

A breakthrough approach to improving biometrics performance

Constructing robust information processing systems for face and voice recognition

Supporting high-performance data fusion in multimodal systems

Algorithms, implementation techniques, and application examples

AUTHORS

SUN-YUAN KUNG is a professor of electrical engineering at Princeton University. His research and teaching interests include VLSI signal processing; neural networks; digital signal, image, and video processing; and multimedia information systems. His books include *VLSI Array Processors and Digital Neural Networks* (Prentice Hall PTR).

MAN-WAI MAK is an assistant professor at The Hong Kong Polytechnic University and chairman of the IEEE Hong Kong Section Computer Chapter. His research interests include speaker recognition, machine learning, and neural networks.

SHANG-HUNG LIN is a senior architect at NVIDIA, a leader in video and imaging products.



PRENTICE HALL
Professional Technical Reference
Upper Saddle River, NJ 07458
www.phptr.com

Machine learning: driving significant improvements in biometric performance

As they improve, biometric authentication systems are becoming increasingly indispensable for protecting life and property. This book introduces powerful machine learning techniques that significantly improve biometric performance in a broad spectrum of application domains.

Three leading researchers bridge the gap between research, design, and deployment, introducing key algorithms as well as practical implementation techniques. They demonstrate how to construct robust information processing systems for biometric authentication in both face and voice recognition systems, and to support data fusion in multimodal systems.

Coverage includes:

- How machine learning approaches differ from conventional template matching
- Theoretical pillars of machine learning for complex pattern recognition and classification
- Expectation-maximization (EM) algorithms and support vector machines (SVM)
- Multi-layer learning models and back-propagation (BP) algorithms
- Probabilistic decision-based neural networks (PDNNs) for face biometrics
- Flexible structural frameworks for incorporating machine learning subsystems in biometric applications
- Hierarchical mixture of experts and inter-class learning strategies based on class-based modular networks
- Multi-cue data fusion techniques that integrate face and voice recognition
- Application case studies

The biometrics industry is expected to grow by 500 percent in the next four years. Machine learning will help to drive that growth. Whether you're an engineer, scientist, developer, or integrator, this book will help you make the most of it.

ISBN 0-13-147824-9

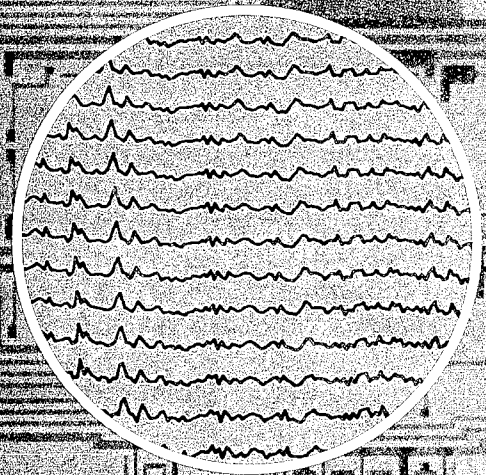
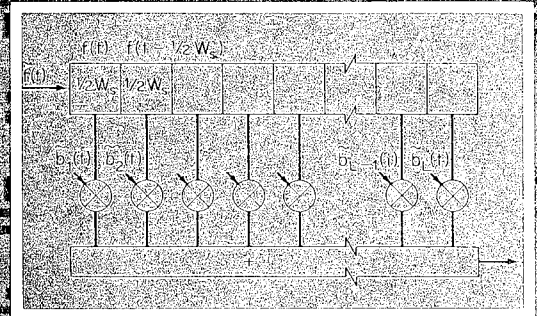
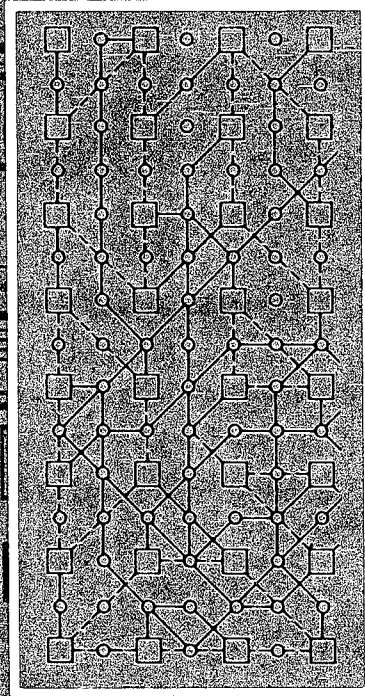
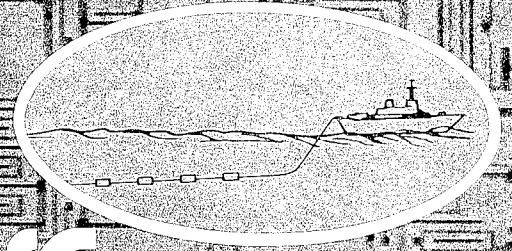
90000



9 780131 478244

VLSI AND MODERN SIGNAL PROCESSING

S. Y. Kung — H. J. Whitehouse — T. Kailath, EDITORS



PRENTICE-HALL INFORMATION AND SYSTEM SCIENCES SERIES
Thomas Kailath, Series Editor

VLSI AND MODERN SIGNAL PROCESSING

S. Y. Kung — H. J. Whitehouse — T. Kailath, EDITORS

The editors of this collection of articles point out that the ever-increasing demands of speed and performance in modern signal processing clearly indicate the need for tremendous computation capability. They show that the future trend of VLSI signal processing research will be cross-disciplinary, involving close interactions between VLSI, computer engineering, and signal processing.

The editors selected articles addressing three major themes:

PART I describes some of the new theory and new algorithms of modern signal processing taking VLSI's potential impact into account.

PART II deals primarily with novel VLSI architecture designs for Concurrent and Pipelined Array Processors.

PART III addresses the application of array processor concepts to signal processing.

The experts who contributed articles to this collection:

Ahmed, Arun, Bhaskar Rao, Bienvenu, Bromley, Chang, Chen, Cremers, Culler, Deprettere, Dewilde, Fisher, Fu, Gilbert, Greenwood, Hallnor, Harrison, Heller, Hibbard, Hwang, Kailath, Kinter, Kopec, Krueger, Kuekes, Kuhn, Kung, H. T. Kung, S. Y. Mead, Mermoz, Nash, Nauseef, Nouta, Nudd, Owsley, Parlett, Reed, Rosenfeld, Schreiber, Schwab, Shao, Snyder, Speiser, Swartzlander, Travassos, Truong, Uhr, Van Nurden, Wah, Whitehouse, Wood, Yeh, Zucca.

PRENTICE-HALL, INC., Englewood Cliffs, N.J. 07632

ISBN 0-13-942699-X

*Сверхбольшие
интегральные схемы
и современная
обработка сигналов*

*VLSI and Modern
Signal Processing*

И СОВРЕМЕННАЯ ОБРАБОТКА СИГНАЛОВ

VLSI SIGNAL PROCESSING, II

Edited by
Sun-Yuan Kung
Robert E. Owen
J. Greg Nash



**IEEE
PRESS**

Published under the sponsorship of the
IEEE Acoustics, Speech, and Signal Processing Society.

MULTIMEDIA IMAGE and VIDEO PROCESSING

Edited by
Ling Guan
Sun-Yuan Kung
Jan Larsen

MULTIMEDIA IMAGE and VIDEO PROCESSING

Multimedia stands as one of the most challenging and exciting aspects of the information era. Although there are other books that deal with various facets of multimedia, the field has urgently needed a comprehensive look at recent developments in the systems, processing, and applications of image and video data in a multimedia environment.

Multimedia Image and Video Processing fills that need. Beginning with existing standards and their impact on multimedia image and video processing, experts from around the world address a broad spectrum of topics in a clear, tutorial style. Their authoritative contributions cover the pros and cons of current and new architectures, conventional and intelligent image processing techniques, new developments in the compression and coding of video and images, and content-based image and video retrieval. The book's final chapters examine new results in multimedia applications, including transcoding for multipoint video conferencing, distance education, video-on-demand, and telemedicine.

The extremely rapid growth of this field means that other books may offer information that is already obsolete. *Multimedia Image and Video Processing* presents not only state-of-the-art research and developments, but does so in a way that provides a solid introduction to each topic and builds a foundation for future study.

Features

- Systematically addresses all aspects of image and video processing at both the algorithmic and systematic levels
- Presents existing multimedia standards, discusses their impact on multimedia image and video processing, and points out possible directions for new standards
- Discusses new developments in transform/motion-based algorithms in the compressed domain, content/object-based algorithms, and rate-distortion-based encoding
- Explores current and emerging applications

3492

ISBN 0-8493-3492-6

90000



9 780849 334924