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The Dissimilarity Representation for Pattern Recognition -

Statistical Pattern Recognition - Andrew R. Webb 2003-07-25 Statistical pattern recognition is a very active area of study andresearch, which has seen many advances in recent years. New andemerging applications - such as data mining, web searching,multimedia data retrieval, face recognition, and cursivehandwriting recognition - require robust and efficient patternrecognition techniques. Statistical decision making and estimationare regarded as fundamental to the study of pattern recognition. Statistical Pattern Recognition, Second Edition has been fullyupdated with new methods, applications and references. It providesa comprehensive introduction to this vibrant area - with materialdrawn from engineering, statistics, computer science and the socialsciences - and covers many application areas, such as databasedesign, artificial neural networks, and decision supportsystems. * Provides a self-contained introduction to statistical patternrecognition. * Each technique described is illustrated by real examples. * Covers Bayesian methods, neural networks, support vectormachines, and unsupervised classification. * Each section concludes with a description of the applicationsthat have been addressed and with further developments of thetheory. * Includes background material on dissimilarity, parameterestimation, data, linear algebra and probability. * Features a variety of exercises, from 'open-book' questions tomore lengthy projects. The book is aimed primarily at senior undergraduate and graduatestudents studying statistical pattern recognition, patternprocessing, neural networks, and data mining, in both statisticsand engineering departments. It is also an excellent source ofreference for technical professionals working in advancedinformation development environments. For further information on the techniques and applicationsdiscussed in this book please visit ahref="http://www.statistical-pattern-recognition.net/"www.statistical-pattern-recognition.net/a

Pattern Classification and Scene Analysis - Richard O. Duda 1970

Pattern Recognition and Neural Networks - Ludmila Kuncheva 2019

Pattern Classification and Scene Analysis - Richard O. Duda 1973-02-09 Introduction to Mathematical Techniques in Pattern Recognition by

Harry C. Andrews This volume is one of the first cohesive treatments of the use of mathematics for studying interactions between various recognition environments. It brings together techniques previously scattered throughout the literature and provides a concise common notation that will facilitate the understanding and comparison of the many aspects of mathematical pattern recognition. The contents of this volume are divided into five interrelated subject areas: Feature Selection, Distribution Free Classification, Statistical Classification, Nonsupervised Learning, and Sequential Learning. Appendices describing specific aspects of feature selection and extensive reference and bibliographies are included. 1972 253 pp. Threshold Logic and its Applications by Saburo Muroga This is the first in-depth exposition of threshold logic and its applications using linear programming and integer programming as optimization tools. It presents threshold logic as a unified theory of conventional simple gates, threshold gates and their networks. This unified viewpoint explicitly reveals many important properties that were formerly concealed in the framework of conventional switching theory (based essentially on and, or and not gates). 1971 478 pp. Knowing and Guessing A Quantitative Study of Inference and Information By Satosi Watanabe This volume presents a coherent theoretical view of a field now split into different disciplines: philosophy, information science, cybernetics, psychology, electrical engineering, and physics. The target of investigation is the cognitive process of knowing and guessing. In contrast to traditional philosophy, the approach is quantitative rather than qualitative. The study is formal in the sense that the author is not interested in the contents of knowledge or the physiological mechanism of the process of knowing. "The author’s style is lucid, his comments are illuminating. The result is a fascinating book, which will be of interest to scientists in many different fields." — Nature 1969 592 pp.

Support Vector Machines for Pattern Classification - Shigeo Abe 2010-07-23

A guide on the use of SVMs in pattern classification, including a rigorous performance comparison of classifiers and regressors. The book presents architectures for multiclass classification and function approximation problems, as well as evaluation criteria for classifiers and regressors. Features: Clarifies the characteristics of two-class SVMs; Discusses kernel methods for improving the generalization ability of neural networks and fuzzy systems; Contains ample illustrations and examples; Includes performance evaluation using publicly available data sets; Examines Mahalanobis kernels, empirical feature space, and the effect of model selection by cross-validation; Covers sparse SVMs, learning using privileged information, semi-supervised learning, multiple classifier systems, and multiple kernel learning; Explores incremental training based batch training and active-set training methods, and decomposition techniques for linear programming SVMs; Discusses variable selection for support vector regressors.

The Puzzle of Granular Computing - Bruno Apolloni 2008-08-20

Rem tene, verba sequentur (Gaius J. Victor, Rome VI century b.c.) The ultimate goal of this book is to bring the fundamental issues of information granularity, inference tools and problem solving procedures into a coherent, unified, and fully operational framework. The objective is to offer the reader a comprehensive, self-contained, and uniform exposure to the subject.The strategy is to isolate some fundamental bricks of Computational Intelligence in terms of key problems and methods, and discuss their implementation and underlying rationale within a well structured and rigorous conceptual framework as well as carefully related to various application facets. The main assumption is that a deep understanding of the key problems will allow the reader to compose into a meaningful mosaic the puzzle pieces represented by the immense varieties of approaches present in the literature and in the computational practice. All in all, the main approach advocated in the monograph consists of a sequence of steps offering solid conceptual fundamentals, presenting a carefully selected collection of design methodologies, discussing a wealth of development guidelines, and exemplifying them with a pertinent, accurately selected illustrative material.

Combining Pattern Classifiers - Ludmila I. Kuncheva 2004-08-20

Covering pattern classification methods, Combining Classifiers: Ideas and Methods focuses on the important and widely studied issue of how to combine several classifiers together in order to achieve improved recognition performance. It is one of the first books to provide unified, coherent, and expansive coverage of the topic and as such will be welcomed by those involved in the area. With case studies that bring the text alive and demonstrate 'real-world' applications it is destined to become essential reading.

Pattern Recognition - Sergios Theodoridis 2003-05-15

Pattern recognition is a scientific discipline that is becoming increasingly important in the age of automation and information handling and retrieval. Patter Recognition, 2e covers the entire spectrum of pattern recognition applications, from image analysis to speech recognition and communications. This book presents cutting-edge material on neural networks, - a set of linked microprocessors that can form associations and uses pattern recognition to "learn" -and enhances student motivation by approaching pattern recognition from the designer's point of view. A direct result of more than 10 years of teaching experience, the text was developed by the authors through use in their own classrooms. *Approaches pattern recognition from the designer's point of view *New edition highlights latest developments in this growing field, including independent components and support vector machines, not available elsewhere *Supplemented by computer examples selected from applications of interest

Kernel Methods for Pattern Analysis - Department of Computer Science Royal Holloway John Shawe-Taylor 2004-06-28

Publisher Description

Computational Intelligence and Pattern Analysis in Biology Informatics - Ujjwal Maulik 2011-03-21

An invaluable tool in Bioinformatics, this unique volume provides both theoretical and experimental results, and describes basic principles of computational intelligence and pattern analysis while deepening the reader's understanding of the ways in which these principles can be used for analyzing biological data in an efficient manner. This book synthesizes current research in the integration of computational intelligence and pattern analysis techniques, either individually or in a hybridized manner. The purpose is to analyze biological data and enable extraction of more meaningful information and insight from it. Biological data for analysis include sequence data, secondary and tertiary structure data, and microarray data. These data types are complex and advanced methods are required, including the use of domain-specific knowledge for reducing search space, dealing with uncertainty, partial truth and imprecision, efficient linear and/or sub-linear scalability, incremental approaches to knowledge discovery, and increased level and intelligence of interactivity with human experts and decision makers Chapters authored by leading researchers in CI in biology informatics. Covers highly relevant topics: rational drug design; analysis of microRNAs and their involvement in human diseases. Supplementary material included: program code and relevant data sets correspond to chapters.

Applications of Pattern Recognition - King-Sun Fu 2019-07-22

This monograph is intended to cover several major applications of pattern recognition. After a brief introduction to pattern recognition in Chapter 1, the two major approaches, statistical approach and syntactic approach, are reviewed in Chapter 2, and 3, respectively. Other topics include the application of pattern recognition to seismic wave interpretation, to system reliability problems, to medical data analysis, as well as character and speech recognition.

Speechreading by Humans and Machines - David G. Stork 2013-11-11

This book is one outcome of the NATO Advanced Studies Institute (ASI) Workshop, "Speechreading by Man and Machine," held at the Chateau de Bonas, Castera-Verduzan (near Auch, France) from August 28 to Septem ber 8, 1995 - the first interdisciplinary meeting devoted the subject of speechreading ("lipreading"). The forty-five attendees from twelve countries covered the gamut of speechreading research, from brain scans of humans processing bi-modal stimuli, to psychophysical experiments and illusions, to statistics of comprehension by the normal and deaf communities, to models of human perception, to computer vision and learning algorithms and hardware for automated

speechreading machines. The first week focussed on speechreading by humans, the second week by machines, a general organization that is preserved in this volume. After the in evitable difficulties in clarifying language and terminology across disciplines as diverse as human neurophysiology, audiology, psychology, electrical en gineering, mathematics, and computer science, the participants engaged in lively discussion and debate. We think it is fair to say that there was an atmosphere of excitement and optimism for a field that is both fascinating and potentially lucrative. Of the many general results that can be taken from the workshop, two of the key ones are these: • The ways in which humans employ visual image for speech recogni tion are manifold and complex, and depend upon the talker-perceiver pair, severity and age of onset of any hearing loss, whether the topic of conversation is known or unknown, the level of noise, and so forth.

Surveillance of Environmental Pollution and Resources by Electromagnetic Waves - T. Lund 2012-12-06

These proceedings contain lectures, research papers and working group reports from the NATO Advanced Study Institute on "Surveillance of environmental pollution and resources by electromagnetic waves", held at Spatind, Norway, April 9-19, 1978. Remote sensing of the environment has developed into a very complex multidisciplinary field. It encompasses a huge range of different instrumental techniques and analytical methods, designed to provide information about a vast number of environmental parameters. Nevertheless, the approach to solve specific problems and the ways of handling the collected information are to a large extent the same or similar. This commonality is the basis for the Advanced Study Institute. To provide the best possible background, both tutoria11y and for a fruitful exchange of research ideas and results, a number of outstanding scientists were invited to review some major fields. The material presented in these proceedings is certainly not complete in the sense that it covers all aspects of the subject. The selection is deliberately due to the program committee and the editor. The program committee would like to express their gratitude to Dr. Ti10 Kester, head of the NATO Advanced Study Institute Program, NATO Scientific Affairs Division, for his support and encouragement during the organization of the Institute. Oslo, June 1978.

PATTERN RECOGNITION: STATISTICAL, STRUCTURAL AND NEURAL APPROACHES - Schalkoff 2007-09

About The Book: This book explores the heart of pattern recognition concepts, methods and applications using statistical, syntactic and neural approaches. Divided into four sections, it clearly demonstrates the similarities and differences among the three approaches. The second part deals with the statistical pattern recognition approach, starting with a simple example and finishing with unsupervised learning through clustering. Section three discusses the syntactic approach and explores such topics as the capabilities of string grammars and parsing; higher dimensional representations and graphical approaches. Part four presents an excellent overview of the emerging neural approach including an examination of pattern associations and feedforward nets. Along with examples, each chapter provides the reader with pertinent literature for a more in-depth study of specific topics.

Empirical Methods for Exploiting Parallel Texts - Dan I.. Melamed 2001

This book lays out the theory and the practical techniques for discovering and applying translational equivalence at the lexical level. Parallel texts (bitexts) are a goldmine of linguistic knowledge, because the translation of a text into another language can be viewed as a detailed annotation of what that text means. Knowledge about translational equivalence, which can be gleaned from bitexts, is of central importance for applications such as manual and machine translation, cross-language information retrieval, and corpus linguistics. The availability of bitexts has increased dramatically since the advent of the Web, making their study an exciting new area of research in natural language processing. This book lays out the theory and the practical techniques for discovering and applying translational equivalence at the lexical level. It is a start-to-finish guide to designing and evaluating many translingual applications.

Progress in Pattern Recognition 1 - L.N. Kanal 2014-06-28

Progress in Pattern Recognition 1

Digital Image Processing and Pattern Recognition - Pakhira Malay K. 2011

Speech Recognition and Understanding - Pietro Laface 2012-12-06
The book collects the contributions to the NATO Advanced Study Institute on "Speech Recognition and Understanding: Recent Advances, Trends and Applications", held in Cetraro, Italy, during the first two weeks of July 1990. This Institute focused on three topics that are considered of particular interest and rich of i'p.novation by researchers in the fields of speech recognition and understanding: Advances in Hidden Markov modeling, connectionist approaches to speech and language modeling, and linguistic processing including language and dialogue modeling. The purpose of any ASI is that of encouraging scientific communications between researchers of NATO countries through advanced tutorials and presentations: excellent tutorials were offered by invited speakers that present in this book 15 papers which sum marize or detail the topics covered in their lectures. The lectures were complemented by discussions, panel sections and by the presentation of related works carried on by some of the attending researchers: these presentations have been collected in 42 short contributions to the Proceedings. This volume, that the reader can find useful for an overview, although incomplete, of the state of the art in speech understanding, is divided into 6 Parts.
Digital Pattern Recognition - K. S. Fu 2013-03-08
During the past fifteen years there has been a considerable growth of interest in problems of pattern recognition. Contributions to the blossom of this area have come from many disciplines, including statistics, psychology, linguistics, computer science, biology, taxonomy, switching theory, communication theory, control theory, and operations research. Many different approaches have been proposed and a number of books have been published. Most books published so far deal with the decision-theoretic (or statistical) approach or the syntactic (or linguistic) approach. Since the area of pattern recognition is still far from its maturity, many new research results, both in theory and in applications, are continuously produced. The purpose of this monograph is to provide a concise summary of the major recent developments in pattern recognition. The five main chapters (Chapter 2-6) in this book can be divided into two parts. The first three chapters concern primarily with basic techniques in pattern recognition. They include statistical techniques, clustering analysis and syntactic techniques. The last two chapters deal with applications; namely, picture recognition, and speech recognition and understanding. Each chapter is written by one or two distinguished experts on that subject. The editor has not attempted to impose upon the contributors to this volume a uniform notation and terminol ogy, since such notation and terminology does not as yet exist in pattern recognition.
Computational Science and Its Applications - ICCSA 2003 - Vipin Kumar 2003-08-03
The three-volume set, LNCS 2667, LNCS 2668, and LNCS 2669, constitutes the refereed proceedings of the International Conference on Computational Science and Its Applications, ICCSA 2003, held in Montreal, Canada, in May 2003.The three volumes present more than 300 papers and span the whole range of computational science from foundational issues in computer science and mathematics to advanced applications in virtually all sciences making use of computational techniques. The proceedings give a unique account of recent results in computational science.
Introduction to Machine Learning - Ethem Alpaydin 2014-08-22
Introduction -- Supervised learning -- Bayesian decision theory -- Parametric methods -- Multivariate methods -- Dimensionality reduction -- Clustering -- Nonparametric methods -- Decision trees -- Linear discrimination -- Multilayer perceptrons -- Local models -- Kernel machines -- Graphical models -- Brief contents -- Hidden markov models -- Bayesian estimation -- Combining multiple learners -- Reinforcement learning -- Design and analysis of machine learning experiments.
Introduction to Pattern Recognition - Menahem Friedman 1999
This book is an introduction to pattern recognition, meant for undergraduate and graduate students in computer science and related

fields in science and technology. Most of the topics are accompanied by detailed algorithms and real world applications. In addition to statistical and structural approaches, novel topics such as fuzzy pattern recognition and pattern recognition via neural networks are also reviewed. Each topic is followed by several examples solved in detail. The only prerequisites for using this book are a one-semester course in discrete mathematics and a knowledge of the basic preliminaries of calculus, linear algebra and probability theory.

The Quest for Artificial Intelligence - Nils J. Nilsson 2009-10-30

Artificial intelligence (AI) is a field within computer science that is attempting to build enhanced intelligence into computer systems. This book traces the history of the subject, from the early dreams of eighteenth-century (and earlier) pioneers to the more successful work of today's AI engineers. AI is becoming more and more a part of everyone's life. The technology is already embedded in face-recognizing cameras, speech-recognition software, Internet search engines, and health-care robots, among other applications. The book's many diagrams and easy-to-understand descriptions of AI programs will help the casual reader gain an understanding of how these and other AI systems actually work. Its thorough (but unobtrusive) end-of-chapter notes containing citations to important source materials will be of great use to AI scholars and researchers. This book promises to be the definitive history of a field that has captivated the imaginations of scientists, philosophers, and writers for centuries.

Syntactic Methods in Pattern Recognition - 1974-11-15

In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank matrix approximations; hybrid methods based on a combination of iterative procedures and best operator approximation; and methods for information compression and filtering under condition that a filter model should satisfy restrictions associated with causality and different types of memory. As a result, the book represents a blend of new methods in general computational analysis, and specific, but also generic, techniques for study of systems theory ant its particular branches, such as optimal filtering and information compression. - Best operator approximation, - Non-Lagrange interpolation, - Generic Karhunen-Loeve transform - Generalised low-rank matrix approximation - Optimal data compression - Optimal nonlinear filtering

Correlation Pattern Recognition - B. V. K. Vijaya Kumar 2005-11-24

Correlation is a robust and general technique for pattern recognition and is used in many applications, such as automatic target recognition, biometric recognition and optical character recognition. The design, analysis and use of correlation pattern recognition algorithms requires background information, including linear systems theory, random variables and processes, matrix/vector methods, detection and estimation theory, digital signal processing and optical processing. This book provides a needed review of this diverse background material and develops the signal processing theory, the pattern recognition metrics, and the practical application know-how from basic premises. It shows both digital and optical implementations. It also contains technology presented by the team that developed it and includes case studies of significant interest, such as face and fingerprint recognition. Suitable for graduate students taking courses in pattern recognition theory, whilst reaching technical levels of interest to the professional practitioner.

Pattern Recognition - Sankar K. Pal 2001

This volume, containing contributions by experts from all over the world, is a collection of 21 articles which present review and research material describing the evolution and recent developments of various pattern recognition methodologies, ranging from statistical, syntactic/linguistic, fuzzy-set-theoretic, neural, genetic-algorithmic and rough-set-theoretic to hybrid soft computing, with significant real-life applications. In addition,

the book describes efficient soft machine learning algorithms for data mining and knowledge discovery. With a balanced mixture of theory, algorithms and applications, as well as up-to-date information and an extensive bibliography, Pattern Recognition: From Classical to Modern Approaches is a very useful resource. Contents: Pattern Recognition: Evolution of Methodologies and Data Mining (A Pal & S K Pal); Adaptive Stochastic Algorithms for Pattern Classification (M A L Thathachar & P S Sastry); Shape in Images (K V Mardia); Decision Trees for Classification: A Review and Some New Results (R Kothari & M Dong); Syntactic Pattern Recognition (A K Majumder & A K Ray); Fuzzy Sets as a Logic Canvas for Pattern Recognition (W Pedrycz & N Pizzi); Neural Network Based Pattern Recognition (V David Sanchez A); Networks of Spiking Neurons in Data Mining (K Cios & D M Sala); Genetic Algorithms, Pattern Classification and Neural Networks Design (S Bandyopadhyay et al.); Rough Sets in Pattern Recognition (A Skowron & R Swiniarski); Automated Generation of Qualitative Representations of Complex Objects by Hybrid Soft-Computing Methods (E H Ruspini & I S Zwir); Writing Speed and Writing Sequence Invariant On-line Handwriting Recognition (S-H Cha & S N Srihari); Tongue Diagnosis Based on Biometric Pattern Recognition Technology (K Wang et al.); and other papers. Readership: Graduate students, researchers and academics in pattern recognition.

Markov Models for Pattern Recognition - Gernot A. Fink 2014-01-14

This thoroughly revised and expanded new edition now includes a more detailed treatment of the EM algorithm, a description of an efficient approximate Viterbi-training procedure, a theoretical derivation of the perplexity measure and coverage of multi-pass decoding based on n-best search. Supporting the discussion of the theoretical foundations of Markov modeling, special emphasis is also placed on practical algorithmic solutions. Features: introduces the formal framework for Markov models; covers the robust handling of probability quantities; presents methods for the configuration of hidden Markov models for specific application areas; describes important methods for efficient processing of Markov models, and the adaptation of the models to different tasks; examines algorithms for searching within the complex solution spaces that result from the joint application of Markov chain and hidden Markov models; reviews key applications of Markov models.

Pattern Recognition and Image Processing in C++ - Dietrich Paulus 2012-12-06

Parts of this text were used for several years by students in a one~term under graduate course in computer science. The students had to prepare projects in small groups (2~4 students).1 This book emphasizes practical experience with image processing. It offers a comprehensive study of • image processing and image analysis, • basics of speech processing, • object~oriented programming, • software design, • and programming in C++. The book is divided into four parts. In the first part we introduce image processing, image analysis, programming tools, and the basics of C++. In the second part we describe object~oriented programming in general and the possible applications of object~oriented concepts in C++. Several appli cations of object~oriented programming for image processing are discussed as well. The new features of C++ are introduced entirely through the use of examples. We cover the proper representation of the data that is a result of pattern analysis as well. The third part describes a complete system for image segmentation. Some of the material covered refers to the exercises found in the first and second parts: this verifies our belief that an image segmentation system of programs can be developed while simultaneously acquainting others to C++. We combine the data representation described in the second part with the algorithms that use and manipulate them here in the third part.

Pattern Recognition and Machine Learning - Christopher M. Bishop 2016-08-23

This is the first textbook on pattern recognition to present the Bayesian viewpoint. The book presents approximate inference algorithms that permit fast approximate answers in situations where exact answers are not feasible. It uses graphical models to describe probability distributions when no other books apply graphical models to machine learning. No previous knowledge of pattern recognition or machine learning concepts is assumed. Familiarity with multivariate calculus and basic linear algebra is required, and some experience in the use of

probabilities would be helpful though not essential as the book includes a self-contained introduction to basic probability theory.
Structural Pattern Recognition - T. Pavlidis 2013-12-21

Introduction to Statistical Pattern Recognition - Keinosuke Fukunaga 2013-10-22
This completely revised second edition presents an introduction to statistical pattern recognition. Pattern recognition in general covers a wide range of problems: it is applied to engineering problems, such as character readers and wave form analysis as well as to brain modeling in biology and psychology. Statistical decision and estimation, which are the main subjects of this book, are regarded as fundamental to the study of pattern recognition. This book is appropriate as a text for introductory courses in pattern recognition and as a reference book for workers in the field. Each chapter contains computer projects as well as exercises.
Pattern Classification Using Ensemble Methods - Lior Rokach 2010
Researchers from various disciplines such as pattern recognition, statistics, and machine learning have explored the use of ensemble methodology since the late seventies. Thus, they are faced with a wide variety of methods, given the growing interest in the field. This book aims to impose a degree of order upon this diversity by presenting a coherent and unified repository of ensemble methods, theories, trends, challenges and applications. The book describes in detail the classical methods, as well as the extensions and novel approaches developed recently. Along with algorithmic descriptions of each method, it also explains the circumstances in which this method is applicable and the consequences and the trade-offs incurred by using the method.
Pattern Classification - Richard O. Duda 2012-11-09
The first edition, published in 1973, has become a classicreference in the field. Now with the second edition, readers willfind information on key new topics such as neural networks andstatistical pattern recognition, the theory of machine learning,and the theory of invariances. Also included are worked examples,comparisons between different methods, extensive graphics, expandedexercises and computer project topics. An Instructor's Manual presenting detailed solutions to all theproblems in the book is available from the Wiley editorialdepartment.
Computer Methods in Image Analysis - J.K. Aggarwal 1977

Patterns, Predictions, and Actions: Foundations of Machine Learning - Moritz Hardt 2022-08-23
An authoritative, up-to-date graduate textbook on machine learning that highlights its historical context and societal impacts Patterns, Predictions, and Actions introduces graduate students to the essentials of machine learning while offering invaluable perspective on its history and social implications. Beginning with the foundations of decision making, Moritz Hardt and Benjamin Recht explain how representation, optimization, and generalization are the constituents of supervised learning. They go on to provide self-contained discussions of causality, the practice of causal inference, sequential decision making, and reinforcement learning, equipping readers with the concepts and tools they need to assess the consequences that may arise from acting on statistical decisions. Provides a modern introduction to machine learning, showing how data patterns support predictions and consequential actions Pays special attention to societal impacts and fairness in decision making Traces the development of machine learning from its origins to today Features a novel chapter on machine learning benchmarks and datasets Invites readers from all backgrounds, requiring some experience with probability, calculus, and linear algebra An essential textbook for students and a guide for researchers
Syntactic and Structural Pattern Recognition - Gabriel Ferrate 2012-12-06
Thirty years ago pattern recognition was dominated by the learning machine concept: that one could automate the process of going from the raw data to a classifier. The derivation of numerical features from the input image was not considered an important step. One could present all possible features to a program which in turn could find which ones would be useful for pattern recognition. In spite of significant improvements in statistical inference techniques, progress was slow. It became clear that

feature derivation was a very complex process that could not be automated and that features could be symbolic as well as numerical. Furthennore the spatial relationship amongst features might be important. It appeared that pattern recognition might resemble language analysis since features could play the role of symbols strung together to form a word. This led. to the genesis of syntactic pattern recognition, pioneered in the middle and late 1960's by Russel Kirsch, Robert Ledley, Nararimhan, and Allan Shaw. However the thorough investigation of the area was left to King-Sun Fu and his students who, until his untimely death, produced most of the significant papers in this area. One of these papers (syntactic recognition of fingerprints) received the distinction of being selected as the best paper published that year in the IEEE Transaction on Computers. Therefore syntactic pattern recognition has a long history of active research and has been used in industrial applications.

AI 2003: Advances in Artificial Intelligence - Tamas D. Gedeon 2003-11-24

This book constitutes the refereed proceedings of the 16th Australian Conference on Artificial Intelligence, AI 2003, held in Perth, Australia in December 2003. The 87 revised full papers presented together with 4 keynote papers were carefully reviewed and selected from 179 submissions. The papers are organized in topical sections on ontologies, problem solving, knowledge discovery and data mining, expert systems, neural network applications, belief revision and theorem proving, reasoning and logic, machine learning, AI applications, neural computing, intelligent agents, computer vision, medical applications, machine learning and language, AI and business, soft computing, language understanding, and theory.

Image Processing, Analysis and Machine Vision - Milan Sonka 2013-11-11

Image Processing, Analysis and Machine Vision represent an exciting part of modern cognitive and computer science. Following an explosion of inter est during the Seventies, the Eighties were characterized by the maturing of the field and the significant growth of active applications; Remote Sensing, Technical Diagnostics, Autonomous Vehicle Guidance and Medical Imaging are the most rapidly developing areas. This progress can be seen in an in creasing number of software and hardware products on the market as well as in a number of digital image processing and machine vision courses offered at universities world-wide. There are many texts available in the areas we cover - most (indeed, all of which we know) are referenced somewhere in this book. The subject suffers, however, from a shortage of texts at the 'elementary' level - that appropriate for undergraduates beginning or completing their studies of the topic, or for Master's students - and the very rapid developments that have taken and are still taking place, which quickly age some of the very good text books produced over the last decade or so. This book reflects the authors' experience in teaching one and two semester undergraduate and graduate courses in Digital Image Processing, Digital Image Analysis, Machine Vision, Pattern Recognition and Intelligent Robotics at their respective institutions.

Orthogonal Image Moments for Human-Centric Visual Pattern Recognition - S. M. Mahbubur Rahman 2019-10-11

Instead of focusing on the mathematical properties of moments, this book is a compendium of research that demonstrates the effectiveness of orthogonal moment-based features in face recognition, expression recognition, fingerprint recognition and iris recognition. The usefulness of moments and their invariants in pattern recognition is well known. What is less well known is how orthogonal moments may be applied to specific problems in human-centric visual pattern recognition. Unlike previous books, this work highlights the fundamental issues involved in moment-based pattern recognition, from the selection of discriminative features in a high-dimensional setting, to addressing the question of how to classify a large number of patterns based on small training samples. In addition to offering new concepts that illustrate the use of statistical methods in addressing some of these issues, the book presents recent results and provides guidance on implementing the methods. Accordingly, it will be of interest to researchers and graduate students working in the broad areas of computer vision and visual pattern

recognition.