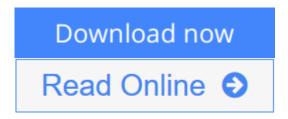# Pattern Recognition, Fourth Edition

By Sergios Theodoridis, Konstantinos Koutroumbas

Pattern Recognition, Fourth Edition By Sergios Theodoridis, Konstantinos Koutroumbas

This book considers classical and current theory and practice, of supervised, unsupervised and semi-supervised pattern recognition, to build a complete background for professionals and students of engineering. The authors, leading experts in the field of pattern recognition, have provided an up-to-date, self-contained volume encapsulating this wide spectrum of information. The very latest methods are incorporated in this edition: semi-supervised learning, combining clustering algorithms, and relevance feedback.

· Thoroughly developed to include many more worked examples to give greater understanding of the various methods and techniques

· Many more diagrams included--now in two color--to provide greater insight through visual presentation

· Matlab code of the most common methods are given at the end of each chapter.

· More Matlab code is available, together with an accompanying manual, via this site

· Latest hot topics included to further the reference value of the text including non-linear dimensionality reduction techniques, relevance feedback, semi-supervised learning, spectral clustering, combining clustering algorithms.

· An accompanying book with Matlab code of the most common methods and algorithms in the book, together with a descriptive summary, and solved examples including real-life data sets in imaging, and audio recognition. The companion book will be available separately or at a special packaged price (ISBN: 9780123744869).

Solutions manual, powerpoint slides, and additional resources are available to faculty using the text for their course. Register at www.textbooks.elsevier.com and search on "Theodoridis" to access resources for instructor.

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Editorial ReviewReview
""This book is an excellent reference for pattern recognition, machine learning, and data mining. It focuses on the problems of classification and clustering, the two most important general problems in these areas. This book has tremendous breadth and depth in its coverage of these topics; it is clearly the best book available on the topic today. The new edition is an excellent up-to-date revision of the book. I have especially enjoyed the new coverage provided in several topics, including new viewpoints on Support Vector Machines, and the complete in-depth coverage of new clustering methods. This is a standout characteristic of this book: the coverage of the topics is solid, deep, and principled throughout. The book is very successful in bringing out the important points in each technique, while containing lots of interesting examples to explain complicated concepts. I believe the section on dimensionality reduction is an excellent exposition on this topic, among the best available, and this is just one example. Combined with a coverage unique in its extend, this makes the book appropriate for use as a reference, as a textbook for upper level undergraduate or graduate classes, and for the practitioner that wants to apply these techniques in practice. I am a professor in Computer Science. Although pattern recognition is not my main focus, I work in the related fields of data mining and databases. I have used this book for my own research and, very successfully, as teaching material. I would strongly recommend this book to both the academic student and the professional.""-Dimitrios Gunopoulos, University of California, Riverside, USA.nbsp;""I cut my pattern recognition teeth on a draft version of Duda and Hart (1973). Over subsequent decades, I consistently did two things: (i) recommended Duda and Hart as the best book available on pattern recognition; and (ii) wanted to write the next best book on this topic.nbsp; nbsp;I stopped (i) when the first edition ofnbsp;S. Theodoridis andnbsp;K. Koutroumbas'nbsp;book appeared, and it supplanted the need for (ii) It was, and is, the best book that has been written on the subject since Duda and Hart's seminal original text. Buy it - you'll be happy you did."" - **Jim Bezdek, University of West Florida and Senior Fellow, U. of Melbourne (Australia).**""I consider the fourth edition of the book Pattern Recognition, by S. Theodoridis and K. Koutroumbas as the ""Bible of Pattern Recognition""- **Simon Haykin, McMaster University, Canada**""I have taught a graduate course on statistical pattern recognition for more than twenty five years during which I have used many books with different levels of satisfaction. Recently, I adopted the book by Theodoridis and Koutroumbas (4th edition) for my graduate course on statistical pattern recognition at University of Maryland. This course is taken by students from electrical engineering, computer science, linguistics and applied mathematics. The comprehensive book by Thedoridis and Koutroumbas covers both traditional and modern topics in statistical pattern recognition in a lucid manner, without compromising rigor. This book elegantly addresses the needs of graduate students from the different disciplines mentioned above. This is the only book that does justice to both supervised and unsupervised (clustering) techniques. Every student, researcher and instructor who is interested in any and all aspects of statistical pattern recognition will find this book extremely satisfying. I recommend it very highly."" **-Rama Chellappa, University of Maryland**""The book Pattern Recognition, by Profs. Sergios Theodoridis and Konstantinos Koutroumbas, has rapidly become the ""bible"" for teaching and learning the ins and outs of pattern recognition technology.nbsp; In my own teaching, I have utilized the material in the first four chapters of the book (from basics to Bayes Decision Theory to Linear Classifiers and finally to Nonlinear Classifiers) in my class on fundamentals of speech recognition and have found the material to be presented in a clear and easily understandable manner, with excellent problems and ideas for projects.nbsp; My students have all learned the basics of pattern recognition from this book and I highly recommend it to any serious student in this area."" **-Prof. Lawrence Rabiner**From the Back Cover
A classic -- offering comprehensive and unified coverage with a balance between theory and practice!

Pattern recognition is integral to a wide spectrum of scientific disciplines and technologies including image analysis, speech recognition and audio classification, communications, computer-aided diagnosis, data

mining. The authors, leading experts in the field of pattern recognition, have once again provided an up-to-date, self-contained volume encapsulating this wide spectrum of information.

Each chapter is designed to begin with basics of theory progressing to advanced topics and then discusses cutting-edge techniques. Problems and exercises are present at the end of each chapter with a solutions manual provided via a companion website where a number of demonstrations are also available to aid the reader in gaining practical experience with the theories and associated algorithms.

This edition includes discussion of Bayesian classification, Bayesian networks, linear and nonlinear classifier design (including neural networks and support vector machines), dynamic programming and hidden Markov models for sequential data, feature generation (including wavelets, principal component analysis, independent component analysis and fractals), feature selection techniques, basic concepts from learning theory, and clustering concepts and algorithms. This book considers classical and current theory and practice, of both supervised and unsupervised pattern recognition, to build a complete background for professionals and students of engineering.

Key Features:
* Up-to-date results on support vector machines including í-SVM's and their geometric interpretation
* Classifier combinations including the Boosting approach
* Feature generation for image analysis, speech recognition and audio classification
* Up-to-date material for clustering algorithms tailored for large data sets and/or high dimensional data, as required by applications such as web-mining and bioinformatics
* Coverage of diverse applications such as image analysis, optical character recognition, channel equalization, speech recognition and audio classification

About the Authors:
Sergios Theodoridis acquired a Physics degree with honors from the University of Athens, Greece in 1973 and a MSc and a Ph.D. degree in Signal Processing and Communications from the University of Birmingham, UK in 1975 and 1978 respectively. Since 1995 he has been a Professor with the Department of Informatics and Communications at the University of Athens.

Konstantinos Koutroumbas acquired a degree from the University of Patras, Greece in Computer Engineering and Informatics in 1989, a MSc in Computer Science from the Queen Mary and Westfield College of the University of London, UK in 1990, and a Ph.D. degree from the Department of Informatics and Telecommunications of the University of Athens in 1995. Since 2001 he has been with the Institute for Space Applications and Remote Sensing of the National Observatory of Athens. About the Author Sergios Theodoridis is Professor of Signal Processing and Machine Learning in the Department of Informatics and Telecommunications of the University of Athens. He is the co-author of the bestselling book, Pattern Recognition, and the co-author of Introduction to Pattern Recognition: A MATLAB Approach. He serves as Editor-in-Chief for the IEEE Transactions on Signal Processing, and he is the co-Editor in Chief with Rama Chellapa for the Academic Press Library in Signal Processing. He has received a number of awards including the 2014 IEEE Signal Processing Magazine Best Paper Award, the 2009 IEEE Computational Intelligence Society Transactions on Neural Networks Outstanding Paper Award, the 2014 IEEE Signal Processing Society Education Award, the EURASIP 2014 Meritorious Service Award, and he has served as a Distinguished Lecturer for the IEEE Signal Processing Society and the IEEE Circuits and Systems Society. He is a Fellow of EURASIP and a Fellow of IEEE.

Konstantinos Koutroumbas acquired a degree from the University of Patras, Greece in Computer Engineering and Informatics in 1989, a MSc in Computer Science from the University of London, UK in

1990, and a Ph.D. degree from the University of Athens in 1995. Since 2001 he has been with the Institute for Space Applications and Remote Sensing of the National Observatory of Athens.

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Agnes Figueroa:Spent a free time and energy to be fun activity to do! A lot of people spent their leisure time with their family, or all their friends. Usually they performing activity like watching television, likely to beach, or picnic inside the park. They actually doing ditto every week. Do you feel it? Will you something different to fill your current free time/ holiday? Could be reading a book is usually option to fill your cost-free time/ holiday. The first thing that you'll ask may be what kinds of publication that you should read. If you want to attempt look for book, may be the publication untitled Pattern Recognition, Fourth Edition can be excellent book to read. May be it could be best activity to you.

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