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**This book constitutes the
refereed post-conference**

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**proceedings of the 21st
Iberoamerican Congress on
Pattern Recognition, CIARP
2016, held in Lima, Peru, in
November 2016. The 69 papers
presented were carefully
reviewed and selected from**

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131 submissions. The papers feature research results in the areas of pattern recognition, biometrics, image processing, computer vision, speech recognition, and remote sensing. They constitute

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**theoretical as well as applied
contributions in many fields
related to the main topics of
the conference.**

**A far-reaching course in
practical advanced statistics
for biologists using**

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R/Bioconductor, data exploration, and simulation. Amstat News asked three review editors to rate their top five favorite books in the September 2003 issue. Methods of Multivariate

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Analysis was among those chosen. When measuring several variables on a complex experimental unit, it is often necessary to analyze the variables simultaneously, rather than

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isolate them and consider them individually. Multivariate analysis enables researchers to explore the joint performance of such variables and to determine the effect of each variable in the

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**presence of the others. The
Second Edition of
Alvin Rencher's Methods of
Multivariate Analysis provides
students of all statistical
backgrounds with both the
fundamental and**

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**moresophisticated skills
necessary to master the
discipline. To illustrate
multivariate applications, the
author provides examples and
exercises based on fifty-nine
real data sets from a wide**

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variety of scientific fields.

Rencher takes a

"methods" approach to his

subject, with an emphasis on

how students and practitioners

can employ multivariate

analysis in real-life situations.

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The Second Edition contains revised and updated chapters from the critically acclaimed First Edition as well as brand-new chapters on: Cluster analysis Multidimensional scaling Correspondence

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analysis Biplots Each chapter contains exercises, with corresponding answers and hints in the appendix, providing students the opportunity to test and extend their understanding of the

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**subject. Methods
of Multivariate Analysis
provides an authoritative
reference for statistics
students as well as for
practicing scientists
and clinicians.**

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Reporting the state of the art of colour image processing, this monograph fills a gap in the literature on digital signal and image processing. It contains numerous examples and pictures of colour image

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**processing results, plus a
library of algorithms
implemented in C.**

**21st Iberoamerican Congress,
CIARP 2016, Lima, Peru,
November 8–11, 2016,
Proceedings**

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**Ex-vivo and In-vivo Optical
Molecular Pathology
Methods of Multivariate
Analysis
Applied Multivariate Analysis
in SAR and Environmental
Studies**

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An Introduction to Multivariate Statistical Analysis

Thanks to recent advances in sensors, communication and satellite technology, data storage, processing and networking capabilities, satellite image acquisition and mining are now

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on the rise. In turn, satellite images play a vital role in providing essential geographical information. Highly accurate automatic classification and decision support systems can facilitate the efforts of data analysts, reduce human error, and allow the rapid and rigorous analysis of land use and land

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cover information. Integrating Machine Learning (ML) technology with the human visual psychometric can help meet geologists ' demands for more efficient and higher-quality classification in real time. This book introduces readers to key concepts, methods and models for satellite

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image analysis; highlights state-of-the-art classification and clustering techniques; discusses recent developments and remaining challenges; and addresses various applications, making it a valuable asset for engineers, data analysts and researchers in the fields of geographic

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information systems and remote sensing engineering.

The book introduces most of the basic tools of chemometrics including experimental design, signal analysis, statistical methods for analytical chemistry and multivariate methods. It then discusses a number of important

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applications including food chemistry, biological pattern recognition, reaction monitoring, optimisation of processes, medical applications. The book arises from a series of short articles that have been developed over four years on Chemweb (www.chemweb.com).

Advanced Control and Supervision of

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Mineral Processing Plants describes the use of dynamic models of mineral processing equipment in the design of control, data reconciliation and soft-sensing schemes; through examples, it illustrates tools integrating simulation and control system design for comminuting circuits and flotation

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columns. Coverage is given to the design of soft sensors based on either single-point measurements or more complex measurements like images. Issues concerning data reconciliation and its employment in the creation of instrument architecture and fault diagnosis are surveyed. In

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consideration of the widespread use of distributed control and information management systems in mineral processing, the book describes the platforms and toolkits available for implementing such systems.

Applications of the techniques described in real plants are used to

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highlight their benefits; information for all of the examples, together with supporting MATLAB® code can be found at

www.springer.com/978-1-84996-105-9

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With the widespread availability of satellite and aircraft remote sensing

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image data in digital form, and the ready access most remote sensing practitioners have to computing systems for image interpretation, there is a need to draw together the range of digital image processing procedures and methodologies commonly used in this field into a single treatment. It is

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the intention of this book to provide such a function, at a level meaningful to the non-specialist digital image analyst, but in sufficient detail that algorithm limitations, alternative procedures and current trends can be appreciated. Often the applications specialist in remote sensing wishing to

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make use of digital processing procedures has had to depend upon either the mathematically detailed treatments of image processing found in the electrical engineering and computer science literature, or the sometimes necessarily superficial treatments given in general texts on

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remote sensing. This book seeks to redress that situation. Both image enhancement and classification techniques are covered making the material relevant in those applications in which photointerpretation is used for information extraction and in those wherein information is obtained by

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classification.

Exploratory Multivariate Analysis by
Example Using R

Introduction to Multivariate Statistical
Analysis in Chemometrics

Linear and Nonlinear Modeling

Multivariate Analysis of Quality

Applied Chemometrics for Scientists

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*Freeze Drying of
Pharmaceutical Products
provides an overview of the
most recent and cutting-edge
developments and
technologies in the field,
focusing on formulation*

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developments and process monitoring and considering new technologies for process development. This book contains case studies from freeze dryer manufacturers and pharmaceutical companies

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*for readers in industry and
academia. It was contributed
to by lyophilization experts to
create a detailed analysis of
the subject matter, organically
presenting recent
advancements in freeze-drying*

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research and technology. It discusses formulation design, process optimization and control, new PAT-monitoring tools, multivariate image analysis, process scale-down and development using small-

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scale freeze-dryers, use of CFD for equipment design, and development of continuous processes. This book is for industry professionals, including chemical engineers and pharmaceutical scientists.

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Analysis Wiley*

*Analyzing observed or
measured data is an important
step in applied sciences. The
recent increase in computer
capacity has resulted in a*

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revolution both in data collection and data analysis. An increasing number of scientists, researchers and students are venturing into statistical data analysis; hence the need for more guidance in

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this field, which was previously dominated mainly by statisticians. This handbook fills the gap in the range of textbooks on data analysis. Written in a dictionary format, it will serve as a

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*comprehensive reference book
in a rapidly growing field.*

*However, this book is more
structured than an ordinary
dictionary, where each entry is
a separate, self-contained
entity. The authors provide not*

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only definitions and short descriptions, but also offer an overview of the different topics. Therefore, the handbook can also be used as a companion to textbooks for undergraduate or graduate

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courses. 1700 entries are given in alphabetical order grouped into 20 topics and each topic is organized in a hierarchical fashion.

Additional specific entries on a topic can be easily found by

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following the cross-references in a top-down manner. Several figures and tables are provided to enhance the comprehension of the topics and a list of acronyms helps to locate the full terminologies. The

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*bibliography offers
suggestions for further
reading.*

*Computer Vision Technology
for Food Quality Evaluation,
Second Edition continues to be
a valuable resource to*

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engineers, researchers, and technologists in research and development, as well as a complete reference to students interested in this rapidly expanding field. This new edition highlights the most

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*recent developments in
imaging processing and
analysis techniques and
methodology, captures cutting-
edge developments in
computer vision technology,
and pinpoints future trends in*

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research and development for food quality and safety evaluation and control. It is a unique reference that provides a deep understanding of the issues of data acquisition and image analysis and offers

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techniques to solve problems and further develop efficient methods for food quality assessment. Thoroughly explains what computer vision technology is, what it can do, and how to apply it for food

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quality evaluation Includes a wide variety of computer vision techniques and applications to evaluate a wide variety of foods Describes the pros and cons of different techniques for quality

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evaluation

13th Scandinavian

Conference, Scia 2003,

Halmstad, Sweden, June

29-July 2, 2003 : Proceedings

Learning by Examples

Multivariate Image Analysis

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*Process Imaging for Automatic
Control*

*Sources, Applications and
Health Benefits*

The majority of data sets collected
by researchers in all disciplines are
multivariate, meaning that several

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measurements, observations, or recordings are taken on each of the units in the data set. These units might be human subjects, archaeological artifacts, countries, or a vast variety of other things. In a few cases, it may be sensible to

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isolate each variable and study it separately, but in most instances all the variables need to be examined simultaneously in order to fully grasp the structure and key features of the data. For this purpose, one or another method of multivariate

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analysis might be helpful, and it is with such methods that this book is largely concerned. Multivariate analysis includes methods both for describing and exploring such data and for making formal inferences about them. The aim of all the

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techniques is, in general sense, to display or extract the signal in the data in the presence of noise and to find out what the data show us in the midst of their apparent chaos. An Introduction to Applied Multivariate Analysis with R explores the correct

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application of these methods so as to extract as much information as possible from the data at hand, particularly as some type of graphical representation, via the R software. Throughout the book, the authors give many examples of R

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code used to apply the multivariate techniques to multivariate data.

Data analysis is a vital part of science today, and in assessing quality, multivariate analysis is often necessary in order to avoid loss of essential information.

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Martens provides a powerful and versatile methodology that enables researchers to design their investigations and analyse data effectively and safely, without the need for formal statistical training. *

Offers an introductory explanation

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of multivariate analysis by graphical
'soft modelling' * Minimises
mathematics, providing all technical
details in the appendix * Presents
itself in an accessible style with
cartoons, self-assessment questions
and a wide range of practical

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examples * Demonstrates the methodology for various types of quality assessment, ranging from human quality perception via industrial quality monitoring to environmental quality and its molecular basis All data sets

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available FREE online on

"Chemometrics World" (<http://www.wiley.co.uk/wileychi/chemometrics>)

Color perception plays an important role in object recognition and scene understanding both for humans and

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intelligent vision systems. Recent advances in digital color imaging and computer hardware technology have led to an explosion in the use of color images in a variety of applications including medical imaging, content-based image

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retrieval, biometrics, watermarking, digital inpainting, remote sensing, visual quality inspection, among many others. As a result, automated processing and analysis of color images has become an active area of research, to which the large number

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of publications of the past two decades bears witness. The multivariate nature of color image data presents new challenges for researchers and practitioners as the numerous methods developed for single channel images are often not

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directly applicable to multichannel ones. The goal of this volume is to summarize the state-of-the-art in the early stages of the color image processing pipeline.

This book contains the refereed proceedings of the 11th International

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Symposium on Mathematical
Morphology, ISMM 2013 held in
Uppsala, Sweden, in May 2013. The
41 revised full papers presented
together with 3 invited papers were
carefully reviewed and selected
from 52 submissions. The papers are

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organized in topical sections on theory; trees and hierarchies; adaptive morphology; colour; manifolds and metrics; filtering; detectors and descriptors; and applications.

Mathematical and Statistical

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Methods in Food Science and
Technology

Computer Analysis of Images and
Patterns

Resistant Starch

Chemometrics in Food Chemistry

Advances in Low-Level Color

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Image Processing

Mathematical and Statistical Approaches in Food Science and Technology offers an accessible guide to applying statistical and mathematical technologies in the food science field whilst also addressing the theoretical foundations. Using clear examples and case-studies by way of

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practical illustration, the book is more than just a theoretical guide for non-statisticians, and may therefore be used by scientists, students and food industry professionals at different levels and with varying degrees of statistical skill.

The result of a unique collaboration between clinicians, chemists and physicists,

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this book provides an unparalleled overview of a new generation of diagnostic tools in clinical pathology. The introductory chapters cover the present status and limitations of currently used methods, followed by an outline of promising novel spectroscopy-based technologies either under development or

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recently available on the market. The input from both technologists developing these new methods as well as routine clinicians familiar with practical aspects and medical relevance guarantees that this practical work is a valuable asset for a wide audience, including technical personnel and decision makers in treatment centers,

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experts working in companies developing diagnostic devices, and clinicians specializing in advanced diagnostic methods. Since basic researchers are increasingly adopting novel diagnostic tools developed for human use as well, this will also be of interest for biomedical research institutions with large animal

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facilities.

Statistical investigation into technology not only provides a better understanding of the intrinsic features of the technology (analysis), but also leads to an improved design of the technology (synthesis).

Physical principles and mathematical procedures of medical imaging

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technologies have been extensively studied during past decades. However, less work has been done on the statistical aspects of these techniques. Statistics of Medical Imaging fills this gap and provides a theoretical framework for statistical investigation into medical imaging technologies. Features Describes physical

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principles and mathematical procedures of two medical imaging techniques: X-ray CT and MRI Presents statistical properties of imaging data (measurements) at each stage in the imaging processes of X-ray CT and MRI Demonstrates image reconstruction as a transform from a set of random variables (imaging data) to

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another set of random variables (image data) Presents statistical properties of image data (pixel intensities) at three levels: a single pixel, any two pixels, and a group of pixels (a region) Provides two stochastic models for X-ray CT and MR image in terms of their statistics and two model-based statistical image analysis

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methods Evaluates statistical image analysis methods in terms of their detection, estimation, and classification performances Indicates that X-ray CT, MRI, PET and SPECT belong to a category of imaging: the non-diffraction computed tomography Rather than offering detailed descriptions of statistics of

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basic imaging protocols of X-ray CT and MRI, this book provides a method to conduct similar statistical investigations into more complicated imaging protocols. This book provides an introduction to the analysis of multivariate data. It describes multivariate probability distributions, the preliminary analysis of a large -scale set of

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data, principle component and factor analysis, traditional normal theory material, as well as multidimensional scaling and cluster analysis. Introduction to Multivariate Analysis provides a reasonable blend of theory and practice. Enough theory is given to introduce the concepts and to make the topics

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mathematically interesting. In addition the authors discuss the use (and misuse) of the techniques in practice and present appropriate real-life examples from a variety of areas including agricultural research, sociology and criminology. The book should be suitable both for research workers and as a text for students

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taking a course on multivariate analysis.
Computer Vision Technology for Food
Quality Evaluation
The Data Analysis Handbook
Techniques and Applications of
Hyperspectral Image Analysis
Emerging Technologies for Food Quality
and Food Safety Evaluation

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Color Image Processing and Applications
In processing food, hyperspectral imaging, combined with intelligent software, enables digital sorters (or optical sorters) to identify and remove defects and foreign material that are invisible to traditional camera and laser sorters. Hyperspectral Imaging

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Analysis and Applications for Food Quality explores the theoretical and practical issues associated with the development, analysis, and application of essential image processing algorithms in order to exploit hyperspectral imaging for food quality evaluations. It outlines strategies and

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essential image processing routines that are necessary for making the appropriate decision during detection, classification, identification, quantification, and/or prediction processes. Features Covers practical issues associated with the development, analysis, and application

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of essential image processing for food quality applications Surveys the breadth of different image processing approaches adopted over the years in attempting to implement hyperspectral imaging for food quality monitoring Explains the working principles of hyperspectral systems as well as the

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basic concept and structure of hyperspectral data Describes the different approaches used during image acquisition, data collection, and visualization The book is divided into three sections. Section I discusses the fundamentals of Imaging Systems: How can hyperspectral image cube

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acquisition be optimized? Also, two chapters deal with image segmentation, data extraction, and treatment. Seven chapters comprise Section II, which deals with Chemometrics. One explains the fundamentals of multivariate analysis and techniques while in six other

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chapters the reader will find information on and applications of a number of chemometric techniques: principal component analysis, partial least squares analysis, linear discriminant model, support vector machines, decision trees, and artificial neural networks. In the last section,

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Applications, numerous examples are given of applications of hyperspectral imaging systems in fish, meat, fruits, vegetables, medicinal herbs, dairy products, beverages, and food additives.

This edited book presents the recent developments in partial least squares-

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path modeling (PLS-PM) and provides a comprehensive overview of the current state of the most advanced research related to PLS-PM. The first section of this book emphasizes the basic concepts and extensions of the PLS-PM method. The second section discusses the methodological issues

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that are the focus of the recent development of the PLS-PM method. The third part discusses the real world application of the PLS-PM method in various disciplines. The contributions from expert authors in the field of PLS focus on topics such as the factor-based PLS-PM, the perfect match

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between a model and a mode, quantile composite-based path modeling (QC-PM), ordinal consistent partial least squares (OrdPLSc), non-symmetrical composite-based path modeling (NSCPM), modern view for mediation analysis in PLS-PM, a multi-method approach for identifying and treating

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unobserved heterogeneity, multigroup analysis (PLS-MGA), the assessment of the common method bias, non-metric PLS with categorical indicators, evaluation of the efficiency and accuracy of model misspecification and bootstrap parameter recovery in PLS-PM, CB-SEM, and the Bollen-

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Stine methods and importance-performance map analysis (IPMA) for nonlinear relationships. This book will be useful for researchers and practitioners interested in the latest advances in PLS-PM as well as master and Ph.D. students in a variety of disciplines using the PLS-PM

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method for their projects.

The two volume set LNCS 8047 and 8048 constitutes the refereed proceedings of the 15th International Conference on Computer Analysis of Images and Patterns, CAIP 2013, held in York, UK, in August 2013. The 142 papers presented were carefully

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reviewed and selected from 243 submissions. The scope of the conference spans the following areas: 3D TV, biometrics, color and texture, document analysis, graph-based methods, image and video indexing and database retrieval, image and video processing, image-based

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modeling, kernel methods, medical imaging, mobile multimedia, model-based vision approaches, motion analysis, natural computation for digital imagery, segmentation and grouping, and shape representation and analysis.

Select the Optimal Model for

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Interpreting Multivariate Data

Introduction to Multivariate Analysis:
Linear and Nonlinear Modeling shows
how multivariate analysis is widely
used for extracting useful information
and patterns from multivariate data
and for understanding the structure of
random phenomena. Along with the

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basic concepts of various procedures in traditional multivariate analysis, the book covers nonlinear techniques for clarifying phenomena behind observed multivariate data. It primarily focuses on regression modeling, classification and discrimination, dimension reduction, and clustering. The text

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thoroughly explains the concepts and derivations of the AIC, BIC, and related criteria and includes a wide range of practical examples of model selection and evaluation criteria. To estimate and evaluate models with a large number of predictor variables, the author presents regularization

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methods, including the L1 norm regularization that gives simultaneous model estimation and variable selection. For advanced undergraduate and graduate students in statistical science, this text provides a systematic description of both traditional and newer techniques in

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multivariate analysis and machine learning. It also introduces linear and nonlinear statistical modeling for researchers and practitioners in industrial and systems engineering, information science, life science, and other areas.

15th International Conference, CAIP

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2013, York, UK, August 27-29, 2013,
Proceedings, Part I
Introduction to Image Processing
Using R

Resolving Spectral Mixtures
An Introduction

The excellently received call for

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papers of the 13th Scandinavian Conference on Image Analysis, June 29–July 2 (SCIA 2003) resulted in the selected articles of this proceedings. Additionally the volume also contains invited contributions from – Ivar Austvoll,

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Stavanger University College (NO),
– Lars B? a? ath, Halmstad
University (SE), – Ewert
Bengtsson, Uppsala University (SE),
– Rasmus Larsen, Technical
University of Denmark (DK), –
Jussi Parkkinen, University of

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Joensuu (FI), – Pietro Perona,
California Institute of Technology
(US) which brings the total number
of articles to 152. The theme of the
papers are dominated by the
categories – Feature extraction –
Depth and surface – Medical

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image processing – Shape analysis
– Segmentation and spatial
grouping – Coding and
representation – Motion analysis
– Texture analysis – Color
analysis – Indexing and
categorization which also represent

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the topical groupings of this book. The particularly strong response to the feature extraction, depth and surface, and medical image processing themes makes us believe that these areas are currently expansive, partly because of

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the rich set of problems which remain to be addressed.

The quantity of visual information encountered experimentally by scientists across a wide range of fields has grown dramatically in recent years. As a result, the

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importance of dealing with multivariate data (data obtained by measuring a number of different quantities simultaneously) present in images has become much more important, and the requirement for techniques which are able to

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manage and analyse these data has become crucial for the practising scientist in many diverse disciplines. Multivariate Image Analysis gives the reader a sound understanding of the importance of, and the principles behind,

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multivariate image analysis. A short introduction to the image and its perception is followed by a discussion of some popular techniques of multivariate image formation, taken from fields such as microscopy, remote sensing and

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medical imaging. The principles behind one of the key multivariate techniques, principal components analysis, are thoroughly explained without going too far into the theory: The important concepts of residual visualization and local

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modelling are explained.

Throughout, the power of the techniques discussed is demonstrated with the use of simple worked examples to illustrate the concepts, and more complex examples to indicate to

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the reader how a complete analysis would be carried out. The book is richly illustrated with colour images. Multivariate Image Analysis is of great interest to all those involved in the analysis of data contained in complex images.

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The techniques discussed are widely applicable, and are finding use in fields such as microscopy, satellite remote sensing, medical imaging, radiology, analytical chemistry, spectroscopy and astronomy.

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Techniques and Applications of Hyperspectral Image Analysis gives an introduction to the field of image analysis using hyperspectral techniques, and includes definitions and instrument descriptions. Other imaging topics

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that are covered are segmentation, regression and classification. The book discusses how high quality images of large data files can be structured and archived. Imaging techniques also demand accurate calibration, and are covered in

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sections about multivariate calibration techniques. The book explains the most important instruments for hyperspectral imaging in more technical detail. A number of applications from medical and chemical imaging are

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presented and there is an emphasis on data analysis including modeling, data visualization, model testing and statistical interpretation.

The issues related to food science and authentication are of particular

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importance for researchers, consumers and regulatory entities. The need to guarantee quality foodstuff – where the word "quality" encompasses many different meanings, including e.g. nutritional value, safety of use,

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absence of alteration and adulterations, genuineness, typicalness, etc. – has led researchers to look for increasingly effective tools to investigate and deal with food chemistry problems. As even the simplest food is a

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complex matrix, the way to investigate its chemistry cannot be other than multivariate. Therefore, chemometrics is a necessary and powerful tool for the field of food analysis and control. For food science in general and food

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analysis and control in particular, there are several problems for which chemometrics are of utmost importance. Traceability, i.e. the possibility of verifying the animal/botanical, geographical and/or productive origin of a

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foodstuff, is, for instance, one area where the use of chemometric techniques is not only recommended but essential: indeed, at present no specific chemical and/or physico-chemical markers have been identified that

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can be univocally linked to the origin of a foodstuff and the only way of obtaining reliable traceability is by means of multivariate classification applied to experimental fingerprinting results. Another area where

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chemometrics is of particular importance is in building the bridge between consumer preferences, sensory attributes and molecular profiling of food: by identifying latent structures among the data tables, bilinear modeling

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techniques (such as PCA, MCR, PLS and its various evolutions) can provide an interpretable and reliable connection among these domains. Other problems include process control and monitoring, the possibility of using RGB or

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hyperspectral imaging techniques
to nondestructively check food
quality, calibration of
multidimensional or hyphenated
instruments etc.

11th International Symposium,
ISMM 2013, Uppsala, Sweden, May

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27-29, 2013, Proceedings

Hyperspectral Imaging Analysis
and Applications for Food Quality

Modern Statistics for Modern
Biology

Basic Concepts, Methodological
Issues and Applications

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Freeze Drying of Pharmaceutical Products

**This book introduces the
statistical software R to
the image processing
community in an intuitive
and practical manner. R
brings interesting**

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statistical and graphical tools which are important and necessary for image processing techniques. Furthermore, it has been proved in the literature that R is among the most reliable, accurate and

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portable statistical
software available. Both the
theory and practice of R
code concepts and techniques
are presented and explained,
and the reader is encouraged
to try their own
implementation to develop

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faster, optimized programs. Those who are new to the field of image processing and to R software will find this work a useful introduction. By reading the book alongside an active R session, the reader will

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experience an exciting
journey of learning and
programming.

Using formal descriptions,
graphical illustrations,
practical examples, and R
software tools, Introduction
to Multivariate Statistical

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Analysis in Chemometrics
presents simple yet thorough
explanations of the most
important multivariate
statistical methods for
analyzing chemical data. It
includes discussions of
various statistical methods,

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such as principal component analysis, regression analysis, classification methods, and clustering.

Written by a chemometrician and a statistician, the book reflects the practical approach of chemometrics and

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the more formally oriented one of statistics. To enable a better understanding of the statistical methods, the authors apply them to real data examples from chemistry. They also examine results of the different

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methods, comparing traditional approaches with their robust counterparts. In addition, the authors use the freely available R package to implement methods, encouraging readers to go through the examples

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and adapt the procedures to their own problems. Focusing on the practicality of the methods and the validity of the results, this book offers concise mathematical descriptions of many multivariate methods and

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employs graphical schemes to visualize key concepts. It effectively imparts a basic understanding of how to apply statistical methods to multivariate scientific data.

Resolving Spectral Mixtures:

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With Applications from
Ultrafast Time-Resolved
Spectroscopy to
Superresolution Imaging
offers a comprehensive look
into the most important
models and frameworks
essential to resolving the

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spectral unmixing
problem—from multivariate
curve resolution and multi-
way analysis to Bayesian
positive source separation
and nonlinear unmixing.
Unravelling total spectral
data into the contributions

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from individual unknown components with limited prior information is a complex problem that has attracted continuous interest for almost four decades. Spectral unmixing is a topic of interest in

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statistics, chemometrics,
signal processing, and image
analysis. For decades,
researchers from these
fields were often unaware of
the work in other
disciplines due to their
different scientific and

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technical backgrounds and interest in different objects or samples. This led to the development of quite different approaches to solving the same problem. This multi-authored book will bridge the gap between

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disciplines with contributions from a number of well-known and strongly active chemometric and signal processing research groups. Among chemists, multivariate curve resolution methods are

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preferred to extract information about the nature, amount, and location in time (process) and space (imaging and microscopy) of chemical constituents in complex samples. In signal processing, assumptions are

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usually around statistical independence of the extracted components.

However, the chapters include the complexity of the spectral data to be unmixed as well as dimensionality and size of

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the data sets. Advanced spectroscopy is the key thread linking the different chapters. Applications cover a large part of the electromagnetic spectrum. Time-resolution ranges from femtosecond to second in

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process spectroscopy and
spatial resolution covers
the submicronic to
macroscopic scale in
hyperspectral imaging.
Demonstrates how and why
data analysis, signal
processing, and chemometrics

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are essential to the
spectral unmixing problem
Guides the reader through
the fundamentals and details
of the different methods
Presents extensive plots,
graphical representations,
and illustrations to help

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readers understand the features of different techniques and to interpret results Bridges the gap between disciplines with contributions from a number of well-known and highly active chemometric and

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signal processing research
groups

Full of real-world case
studies and practical
advice, *Exploratory*

*Multivariate Analysis by
Example Using R*, Second
Edition focuses on four

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fundamental methods of
multivariate exploratory
data analysis that are most
suitable for applications.
It covers principal
component analysis (PCA)
when variables are
quantitative, correspondence

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analysis (CA) a
Satellite Image Analysis:
Clustering and
Classification
Image Analysis
Dynamics and Control of
Process Systems 2004
TRAC: Trends in Analytical

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Chemistry

Mathematical Morphology and
Its Applications to Signal
and Image Processing

**This book contains the
thoroughly refereed
proceedings of the 12th**

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**International Symposium
on Mathematical
Morphology, ISMM 2015
held in Reykjavik,
Iceland, in May 2015. The
62 revised full papers
were carefully reviewed**

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**and selected from 72
submissions. The papers
are organized in topical
sections on evaluations
and applications;
hierarchies; color,
multivalued and**

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**orientation fields;
optimization, differential
calculus and
probabilities; topology
and discrete geometry;
and algorithms and
implementation.**

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Perfected over three editions and more than forty years, this field- and classroom-tested reference: * Uses the method of maximum likelihood to a large

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**extent to ensure
reasonable, and in some
cases optimal
procedures. * Treats all
the basic and important
topics in multivariate
statistics. * Adds two new**

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**chapters, along with a
number of new sections. ***
**Provides the most
methodical, up-to-date
information on MV
statistics available.**
The discovery of resistant

**starch is considered one
of the
major developments in
our understanding of the
importance
of carbohydrates for
health in the past twenty**

**years. Resistant starch,
which is resistant to
digestion and absorption
in the human small
intestine with complete
or partial fermentation in
the large intestine, is**

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**naturally present in
foods. Resistant Starch:
Sources, Applications and
Health Benefits covers the
intrinsic and extrinsic
sources of resistant
starch in foods, and**

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**compares different
methods of measuring
resistant starch and their
strengths and limitations.
Applications in different
food categories are fully
covered, with**

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**descriptions of how
resistantstarch performs
in bakery, dairy, snack,
breakfast cereals,
pasta,noodles,
confectionery, meat,
processed food and**

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**beverageproducts.
Even though the
perception of food quality
may depend on its
hedonic and often
subjective attributes, it is
essential to**

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**quantitatively evaluate
its quality and safety.
Fortunately, the advent
of sophisticated systems,
including nondestructive
testing techniques, has
made it possible to**

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**definitively evaluate food
quality. Reflecting these
advances,
Progress in Pattern
Recognition, Image
Analysis, Computer
Vision, and Applications**

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**Introduction to
Multivariate Analysis
An Introduction to
Applied Multivariate
Analysis with R
Advanced Control and
Supervision of Mineral**

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**Processing Plants
12th International
Symposium, ISMM 2015,
Reykjavik, Iceland, May
27-29, 2015. Proceedings
*Using formal
descriptions, graphical***

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illustrations, practical examples, and R software tools, this text presents simple yet thorough explanations of the most important multivariate statistical methods for

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***analyzing chemical data.
TRAC: Trends in
Analytical Chemistry,
Volume 11 presents
relevant topics in global
analytical chemistry
research. This book***

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***discusses the
fundamental principle of
competitive
immunoassays. Organized
into 27 chapters, this
volume begins with an
overview of the general***

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and important contributions relating to the presentation of forensic evidence to courts of law. This text then discusses the importance of the

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***analysis of scanned
measuring quantities.
Other chapters consider
the advantages as well as
the drawbacks of coupled
chromatographic
methods. This book***

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***discusses as well the
status of analytical
chemistry within the
broader scientific arena
as a practical rather than
fundamentally oriented
discipline. The final***

***chapter deals with the
properly functioning
process control system in
manufacturing insulin by
reversed-phase high-
performance liquid
chromatography***

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***(RP-HPLC). This book is a
valuable resource for
analytical, organic,
clinical, and regulatory
chemists.***

***Electrochemists,
scientists, students,***

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***engineers, researcher
workers, and other
practitioners will also
find this book extremely
useful.***

***Based on the Lectures
given during the***

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***Eurocourse on 'Applied
Multivariate Analysis in
SAR and Environmental
Studies' held at the Joint
Research Centre, Ispra,
Italy, June 24-28, 1991
Remote Sensing Digital***

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***Image Analysis
Partial Least Squares
Path Modeling
With Applications from
Ultrafast Time-Resolved
Spectroscopy to Super-
Resolution Imaging***

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***Statistics of Medical
Imaging
5-6 November 2000,
Boston, USA***