1.	Record Nr.	UNINA9910139536203321
	Autore	Livingstone D (David)
	Titolo	A practical guide to scientific data analysis [[electronic resource] /] / David Livingstone
	Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2009
	ISBN	1-282-47203-8
		9786612472039
		0-470-01791-0
		0-470-68481-X
	Descrizione fisica	1 online resource (359 p.)
	Disciplina	519.57
		540.72
	Soggetti	Science - Statistical methods
		Experimental design
		Electronic books.
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Note generali	Description based upon print version of record.
	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	A Practical Guide toScientific Data Analysis; Contents; Preface; Abbreviations; 1 Introduction: Data and Its Properties, Analytical Methods and Jargon; 1.1 Introduction; 1.2 Types of Data; 1.3 Sources of Data; 1.3.1 Dependent Data; 1.3.2 Independent Data; 1.4 The Nature of Data; 1.4.1 Types of Data and Scales of Measurement; 1.4.2 Data Distribution; 1.4.3 Deviations in Distribution; 1.5 Analytical Methods; 1.6 Summary; References; 2 Experimental Design - Experiment and Set Selection; 2.1 What is Experimental Design?; 2.2 Experimental Design Techniques; 2.2.1 Single-factor Design Methods
		2.2.2 Factorial Design (Multiple-factor Design)2.2.3 D-optimal Design; 2.3 Strategies for Compound Selection; 2.4 High Throughput Experiments; 2.5 Summary; References; 3 Data Pre-treatment and Variable Selection; 3.1 Introduction; 3.2 Data Distribution; 3.3 Scaling; 3.4 Correlations; 3.5 Data Reduction; 3.6 Variable Selection; 3.7 Summary; References; 4 Data Display; 4.1 Introduction; 4.2 Linear Methods; 4.3 Nonlinear Methods; 4.3.1 Nonlinear Mapping; 4.3.2 Self-organizing Map; 4.4 Faces, Flowerplots and Friends; 4.5 Summary;

References; 5 Unsupervised Learning; 5.1 Introduction

5.2 Nearest-neighbour Methods5.3 Factor Analysis; 5.4 Cluster Analysis; 5.5 Cluster Significance Analysis; 5.6 Summary; References; 6 Regression Analysis; 6.1 Introduction; 6.2 Simple Linear Regression; 6.3 Multiple Linear Regression; 6.3.1 Creating Multiple Regression Models; 6.3.1.1 Forward Inclusion; 6.3.1.2 Backward Elimination; 6.3.1.3 Stepwise Regression; 6.3.1.4 All Subsets; 6.3.1.5 Model Selection by Genetic Algorithm; 6.3.2 Nonlinear Regression Models; 6.3.3 Regression with Indicator Variables

6.4 Multiple Regression: Robustness, Chance Effects, the Comparison of Models and Selection Bias6.4.1 Robustness (Cross-validation); 6.4.2 Chance Effects; 6.4.3 Comparison of Regression Models; 6.4.4 Selection Bias; 6.5 Summary; References; 7 Supervised Learning; 7.1 Introduction; 7.2 Discriminant Techniques; 7.2.1 Discriminant Analysis; 7.2.2 SIMCA; 7.2.3 Confusion Matrices; 7.2.4 Conditions and Cautions for Discriminant Analysis; 7.3 Regression on Principal Components and PLS; 7.3.1 Regression on Principal Components; 7.3.2 Partial Least Squares; 7.3.3 Continuum Regression

7.4 Feature Selection7.5 Summary; References; 8 Multivariate Dependent Data; 8.1 Introduction; 8.2 Principal Components and Factor Analysis; 8.3 Cluster Analysis; 8.4 Spectral Map Analysis; 8.5 Models with Multivariate Dependent and Independent Data; 8.6 Summary; References; 9 Artificial Intelligence and Friends; 9.1 Introduction; 9.2 Expert Systems; 9.2.1 Log P Prediction; 9.2.2 Toxicity Prediction; 9.2.3 Reaction and Structure Prediction; 9.3 Neural Networks; 9.3.1 Data Display Using ANN; 9.3.2 Data Analysis Using ANN; 9.3.3 Building ANN Models; 9.3.4 Interrogating ANN Models

9.4 Miscellaneous AI Techniques

Sommario/riassunto	Inspired by the author's need for practical guidance in the processes of data analysis, A Practical Guide to Scientific Data Analysis has been written as a statistical companion for the working scientist. This handbook of data analysis with worked examples focuses on the application of mathematical and statistical techniques and the interpretation of their results. Covering the most common statistical methods for examining and exploring relationships in data, the text includes extensive examples from a variety of scientific disciplines. The chapters are organised logically, from pl