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Nota di contenuto	Statistical Analysis in Forensic Science; Contents; Preface; 1 Physicochemical data obtained in forensic science laboratories; 1.1 Introduction; 1.2 Glass; 1.2.1 SEM-EDX technique; 1.2.2 GRIM technique; 1.3 Flammable liquids: ATD-GC/MS technique; 1.4 Car paints: Py-GC/MS technique; 1.5 Fibres and inks: MSP-DAD technique; References; 2 Evaluation of evidence in the form of physicochemical data; 2.1 Introduction; 2.2 Comparison problem; 2.2.1 Two-stage approach; 2.2.2 Likelihood ratio approach; 2.2.3 Difference between an application of two-stage approach and likelihood ratio approach 2.3 Classification problem2.3.1 Chemometric approach; 2.3.2 Likelihood ratio approach; 2.4 Likelihood ratio and Bayes' theorem; References; 3 Continuous data; 3.1 Introduction; 3.2 Data transformations; 3.3 Descriptive statistics; 3.3.1 Measures of location; 3.3.2 Dispersion: Variance estimation; 3.3.3 Data distribution; 3.3.4 Correlation; 3.3.5 Continuous probability distributions; 3.4 Hypothesis testing; 3.4.1 Introduction; 3.4.2 Hypothesis test for a population mean

for samples with known variance from a normal distribution
3.4.3 Hypothesis test for a population mean for small samples with unknown variance from a normal distribution3.4.4 Relation between tests and confidence intervals; 3.4.5 Hypothesis test based on small samples for a difference in the means of two independent populations with unknown variances from normal distributions; 3.4.6 Paired comparisons; 3.4.7 Hotelling's test; 3.4.8 Significance test for correlation coefficient; 3.5 Analysis of variance; 3.5.1 Principles of ANOVA; 3.5.2 Feature selection with application of ANOVA; 3.5.3 Testing of the equality of variances; 3.6 Cluster analysis
3.6.1 Similarity measurements3.6.2 Hierarchical cluster analysis; 3.7 Dimensionality reduction; 3.7.1 Principal component analysis; 3.7.2 Graphical models; References; 4 Likelihood ratio models for comparison problems; 4.1 Introduction; 4.2 Normal between-object distribution; 4.2.1 Multivariate data; 4.2.2 Univariate data; 4.3 Between-object distribution modelled by kernel density estimation; 4.3.1 Multivariate data; 4.3.2 Univariate data; 4.4 Examples; 4.4.1 Univariate research data - normal between-object distribution - R software
4.4.2 Univariate casework data - normal between-object distribution - Bayesian network4.4.3 Univariate research data - kernel density estimation - R software; 4.4.4 Univariate casework data - kernel density estimation - calcuLatoR software; 4.4.5 Multivariate research data - normal between-object distribution - R software; 4.4.6 Multivariate research data - kernel density estimation procedure - R software; 4.4.7 Multivariate casework data - kernel density estimation - R software; 4.5 R Software; 4.5.1 Routines for casework applications; 4.5.2 Routines for research applications; References
5 Likelihood ratio models for classification problems

Sommario/riassunto

A practical guide for determining the evidential value of physicochemical data Microtraces of various materials (e.g. glass, paint, fibres, and petroleum products) are routinely subjected to physicochemical examination by forensic experts, whose role is to evaluate such physicochemical data in the context of the prosecution and defence propositions. Such examinations return various kinds of information, including quantitative data. From the forensic point of view, the most suitable way to evaluate evidence is the likelihood ratio. This book provides a collection of recent approaches t