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Nota di contenuto	Data Analysis in Forensic Science; Contents; Foreword; Preface; I The Foundations of Inference and Decision in Forensic Science; 1 Introduction; 1.1 The Inevitability of Uncertainty; 1.2 Desiderata in Evidential Assessment; 1.3 The Importance of the Propositional Framework and the Nature of Evidential Assessment; 1.4 From Desiderata to Applications; 1.5 The Bayesian Core of Forensic Science; 1.6 Structure of the Book; 2 Scientific Reasoning and Decision Making; 2.1 Coherent Reasoning Under Uncertainty; 2.1.1 A rational betting policy; 2.1.2 A rational policy for combining degrees of belief 2.1.3 A rational policy for changing degrees of belief2.2 Coherent Decision Making Under Uncertainty; 2.2.1 A method for measuring the value of consequences; 2.2.2 The consequences of rational preferences; 2.2.3 Intermezzo: some more thoughts about rational preferences; 2.2.4 The implementation of coherent decision making under uncertainty: Bayesian networks; 2.2.5 The connection between pragmatic and epistemic standards of reasoning; 2.3 Scientific Reasoning as Coherent Decision Making; 2.3.1 Bayes' theorem; 2.3.2 The theories' race; 2.3.3 Statistical reasoning: the models' race 2.3.4 Probabilistic model building: betting on random quantities2.4

Forensic Reasoning as Coherent Decision Making; 2.4.1 Likelihood ratios and the 'weight of evidence'; 2.4.2 The expected value of information; 2.4.3 The hypotheses' race in the law; 3 Concepts of Statistical Science and Decision Theory; 3.1 Random Variables and Distribution Functions; 3.1.1 Univariate random variables; 3.1.2 Measures of location and variability; 3.1.3 Multiple random variables; 3.2 Statistical Inference and Decision Theory; 3.2.1 Utility theory; 3.2.2 Maximizing expected utility; 3.2.3 The loss function; 3.3 The Bayesian Paradigm; 3.3.1 Sequential use of Bayes' theorem; 3.3.2 Principles of rational inference in statistics; 3.3.3 Prior distributions; 3.3.4 Predictive distributions; 3.3.5 Markov Chain Monte Carlo methods (MCMC); 3.4 Bayesian Decision Theory; 3.4.1 Optimal decisions; 3.4.2 Standard loss functions; 3.5 R Code; II Forensic Data Analysis; 4 Point Estimation; 4.1 Introduction; 4.2 Bayesian Decision for a Proportion; 4.2.1 Estimation when there are zero occurrences in a sample; 4.2.2 Prior probabilities; 4.2.3 Prediction; 4.2.4 Inference for 0 in the presence of background data on the number of successes; 4.2.5 Multinomial variables; 4.3 Bayesian Decision for a Poisson Mean; 4.3.1 Inference about the Poisson parameter in the absence of background events; 4.3.2 Inference about the Poisson parameter in the presence of background events; 4.3.3 Forensic inference using graphical models; 4.4 Bayesian Decision for Normal Mean; 4.4.1 Case with known variance; 4.4.2 Case with unknown variance; 4.4.3 Estimation of the mean in the presence of background data; 4.5 R Code; 5 Credible Intervals; 5.1 Introduction; 5.2 Credible Intervals and Lower Bounds

Sommario/riassunto

This is the first text to examine the use of statistical methods in forensic science and Bayesian statistics in combination. The book is split into two parts: Part One concentrates on the philosophies of statistical inference. Chapter One examines the differences between the frequentist, the likelihood and the Bayesian perspectives, before Chapter Two explores the Bayesian decision-theoretic perspective further, and looks at the benefits it carries. Part Two then introduces the reader to the practical aspects involved: the application, interpretation, summary and presentation of data analysis.
