



Computational statistics, second edition

Isaac Dialsingh

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Risk assessment and decision analysis with Bayesian networks, by N. Fenton and M. Neil, Boca Raton, FL, Chapman and Hall/CRC Press, 2013, xix + 503 pp., £41.99 or US\$79.95 (hardback), ISBN 978-14398-0910-5

In a nutshell, this is a well-written book that is intended to expose non-statistical readers to Bayesian networks using the AgenaRisk software. Bayesian networks have been widely used in areas like medicine and bioinformatics but have also been showing up in non-traditional areas such as national security and environmental assessments. The strength of Bayesian networks lies in their applicability in cases where it is often difficult to determine accurate data and there is a greater reliance on incomplete or very subjective data. Frequentist methods often fail in this arena and reliance must be placed on Bayesian methods.

This book assists the reader in establishing causal relationships through the use of graphical networks. The book exposes the non-statistician to a relatively easy way of understanding causal relationships through a myriad of worked examples and screen shots – making it extremely ‘hands on’. The first 10 chapters cover basic statistics and apply it to Bayesian networks. Chapters 11 and 12 are intended for management experts and cover both operational risk modelling and system reliability modelling.

A free copy of the AgenaRisk software package is available to students who purchase the book. I think the book’s reliance on this package is a limitation and is certainly a deterrent for statisticians purchasing the book. Inclusion of R software would have made it a bit more appealing to statisticians.

I do not see this book on any statistician’s bookshelf, however students of management might find it a rewarding tool for risk assessment. This being said the book is written at the undergraduate level assuming little or no knowledge of either probability or statistics.

Isaac Dialsingh

The University of the West Indies, Trinidad and Tobago

isaac.dialsingh@sta.uwi.edu

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Computational statistics, second edition, by Geof H. Givens and Jennifer A. Hoeting, Hoboken, NJ, Wiley, 2013, xviii+469 pp., £83.50 or US\$125.00 (hardback), ISBN 978-0-470-53331-4

This book is a classic amalgamation of topics in statistical computing that are relevant for any researcher or graduate student wishing to gain a more insightful view of the power of computational statistics. The book has an introductory chapter giving an overview of distribution theory and some basic mathematical techniques like Taylor series expansions. The book then covers five broad areas – Optimisation; Integration and Simulation; Bootstrapping and Density Estimation; and Smoothing. What sets this book apart from others is the authors’ drive to make it accessible to non-statisticians as well as providing an up to date reference section so that even the experienced statistician can pursue materials of interest in a more academic and theoretically demanding way. Probably what makes this stand out from the previous edition is the greater reliance on making Bayesian techniques more accessible to non-statisticians by providing detailed explanations of adaptive Markov Chain Monte Carlo (MCMC), reversible jump MCMC and auxiliary methods. A complete and easy explanation of bootstrapping with the inclusion of bootstrapping-dependent data makes this book almost a ‘one stop shop’ for bootstrapping methods.

A book of this calibre will be useless in today’s world if computer code is not presented for all the techniques covered. A comprehensive associated website with R code and datasets provides a rich

source of materials where students and researchers alike can start their programming adventure. This book will continue to be the book of choice for both undergraduate and graduate courses in statistical computing for some time to come.

Isaac Dialsingh

The University of the West Indies, Trinidad and Tobago

isaac.dialsingh@sta.uwi.edu

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Medical biostatistics, third edition, by Abhaya Indrayan, Boca Raton, FL, Chapman & Hall/CRC Press, 2013, lxi + 962 pp., £82.00 or US\$129.95 (hardback), ISBN 978-1-4398-8414-0

This is an almost literary book based on concepts used in biostatistics and statistics applied to medical uncertainty contexts. With this, the book bases its scientific research on the random observation of data and statistical methods with mathematical explanations but avoiding complicated definitions and mathematical developments.

The book contains 21 chapters with an applied statistical basis: Medical uncertainties, Basics of medical studies, Sampling methods, Designs for observational studies, Medical experiments, Clinical trials, Numerical methods for representing variation, Presentation of variation by figures, Some quantitative aspects of medicine, Clinimetrics and evidence-based medicine, Measurement of community health, Confidence intervals, principles of tests of significance, and sample size, Inference from proportions, Relative risk and odds ratio, Inference from means, Relationships: quantitative data, Relationships: qualitative dependent, Survival analysis, Simultaneous consideration of several variables, Quality considerations and Statistical fallacies. The book has also three appendices: Statistical software, Some statistical tables and Software illustrations.

Two possible ways to improve this book would be (1) The inclusion of mathematical proofs of the suggested methods and (2) The recompilation of philosophical and bioethical essays or master lines and protocols of them for the correct application of statistical methods for human populations taking also into account moral direction.

The author's style uses many examples of medical situations to illustrate the proposed statistical methods. However, the book does not indicate the veracity of these methods in practice with objective philosophical analysis. It provides a classical viewpoint of statistics but without critical considerations of its real utility.

The book exhibits a careful presentation as it is usual in this series. It is an encyclopedic book which informs the reader about some of the classic statistical techniques applied to real health data. Each chapter has a list of references both for the statistical and medical content. Many figures and tables illustrate the explanations.

I recommend this book to all readers interested in the basic classic statistical methods useful in the area of medical biostatistics as an overview of such methods. But to do statistical studies in medicine, the book must be complemented by other additional formation in morals, bioethics, objective inference and sampling of finite populations.

Mariano Ruiz Espejo

Universidad Nacional de Educación a Distancia, Spain

ruizesp@gmail.com

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