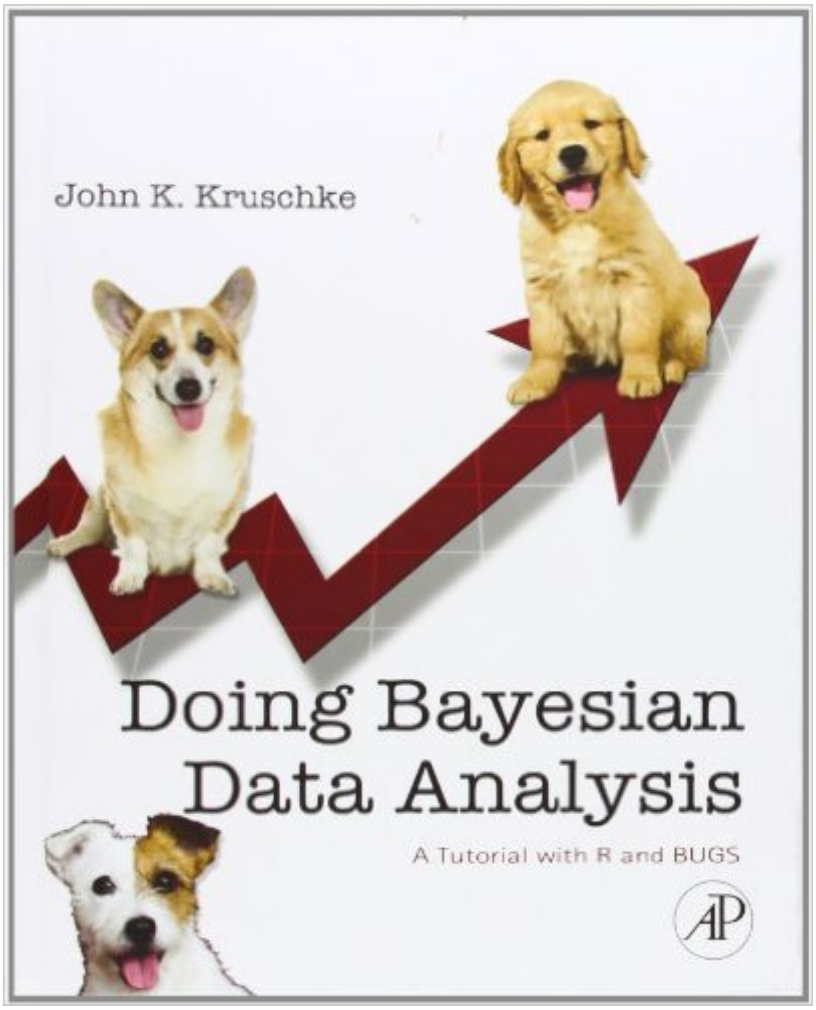
Doing Bayesian Data Analysis: A Tutorial With R And BUGS



Synopsis

There is an explosion of interest in Bayesian statistics, primarily because recently created computational methods have finally made Bayesian analysis tractable and accessible to a wide audience. Doing Bayesian Data Analysis, A Tutorial Introduction with R and BUGS, is for first year graduate students or advanced undergraduates and provides an accessible approach, as all mathematics is explained intuitively and with concrete examples. It assumes only algebra and â ˆrustyâ ™ calculus. Unlike other textbooks, this book begins with the basics, including essential concepts of probability and random sampling. The book gradually climbs all the way to advanced hierarchical modeling methods for realistic data. The text provides complete examples with the R programming language and BUGS software (both freeware), and begins with basic programming examples, working up gradually to complete programs for complex analyses and presentation graphics. These templates can be easily adapted for a large variety of students and their own research needs.The textbook bridges the students from their undergraduate training into modern Bayesian methods.-Accessible, including the basics of essential concepts of probability and random sampling -Examples with R programming language and BUGS software -Comprehensive coverage of all scenarios addressed by non-bayesian textbooks- t-tests, analysis of variance (ANOVA) and comparisons in ANOVA, multiple regression, and chi-square (contingency table analysis). -Coverage of experiment planning -R and BUGS computer programming code on website -Exercises have explicit purposes and guidelines for accomplishment

Book Information

Hardcover: 672 pages

Publisher: Academic Press; 1 edition (November 10, 2010)

Language: English

ISBN-10: 0123814855

ISBN-13: 978-0123814852

Product Dimensions: 7.6 x 1.3 x 9.3 inches

Shipping Weight: 2.8 pounds (View shipping rates and policies)

Average Customer Review: 4.8 out of 5 starsÂ Â See all reviewsÂ (57 customer reviews)

Best Sellers Rank: #117,420 in Books (See Top 100 in Books) #6 inÂ Books > Computers & Technology > Programming > Languages & Tools > Debugging #58 inÂ Books > Science & Math > Mathematics > Mathematical Analysis #408 inÂ Books > Textbooks > Science & Mathematics > Mathematics > Statistics

Customer Reviews

I have reviewed a number of statistics texts for academic journals over the years, and have authored published reviews of some six books specifically devoted to Bayesian analysis. I consider John Kruschke’s "Doing Bayesian Data Analysis" to be the best text available for learning this branch of statistics.Learning how to craft meaningful statistical tests and models based on Bayesian methods is not an easy task. Nor is it an easy task to write a comprehensive basic text on the subject -- one that actually guides the reader through the various Bayesian concepts and mathematical operations so that they have a solid working ability to develop their own Bayesian-based analyses.There are now quite a few texts to choose from in this area, and some are quite good. But Kruschke’s text, in my opinion, is the most useful one available. It is very well written, the concepts unique to the Bayesian approach are clearly presented, and there is an excellent instructors manual for professors who have adopted the book for their classes. Kruschke uses R and WinBUGS for showing examples of the methods he describes, and provides all of the code so that the reader can adapt the methods for their own projects."Doing Bayesian Data Analysis" is not just an excellent text for the classroom, but also -- and I think foremost -- it is just the text one would want to work through in order to learn how to employ Bayesian methods for oneself.Joseph Hilbe

I highly recommend this book to two audiences: (a) instructors looking to construct a strong course on "introduction to social science statistics" from a Bayesian perspective; and (b) social science researchers who have been educated in a classical framework and wish to learn the foundational knowledge of a Bayesian approach, without a refresher in differential calculus. (I expect it would also of interest to many physical science and engineering researchers whose methods are not highly divergent from social science (e.g., biologists, operations engineers) but I can’t speak authoritatively about that.)I’m a practicing social science researcher and have wanted for years to learn Bayesian methods deeply - I’ve used them in applied settings but without complete understanding. My quest to learn Bayesian methods more rigorously has been persistently stymied by texts that demand analytic solutions to prior/posterior estimation, that are excruciatingly focused on specific problems with little attention to generalization, or that skip huge areas of exposition to leap from a toy problem to a complex one with little clue of the path between them. Dr. Kruschke’s text avoids all of those problems. It is remarkable for building intuition from basic principles, for avoiding page-after-page of integrals, and for having extremely clear application.The book starts by laying out the core intuitions of Bayes’s rule - instead of merely stating it (and don’t we all think we

know it by now?), it leads the reader through some applied examples with frequency tables. Simple? Yes; but also valuable to force oneself through. It then builds upon this knowledge systematically, going through the requisite coin toss examples - but unlike most texts, connecting them clearly to real-world examples of binomial problems. And it proceeds from there, ending up with Bayesian versions of ANOVA-type problems and logistic regression.There are two other salient and important features of the book. First, the exercises are particularly well-chosen to reinforce the key points and demonstrate applications. I strongly recommend to work your way through them. In my case, for instance, they forced me to confront understanding of things like the "prior likelihood of the data" - a core concept that I thought I understood but really didn't until I had to solve some actual problems.Second, the book is closely linked to the R statistics environment - surely the most popular tool used by Bayesian statisticians - and has sample programs that are illustrative, useful, and actually work. If you do Bayesian work, you're probably going to use R, and these examples will help immensely to build the set of tools you'll need.Finally, and just to make clear, I have a disrecommendation for one audience: if you're looking for a highly mathematical treatment of Bayesian methods, it is not the right book. It is a didactic text, not a reference manual or set of derivations.Good luck to you as a reader, and thank you to the author!

As far as I am concerned, if you write a book this good, you get to put whatever you like on the cover - puppies, Angelina Jolie, even members of the metal band "Das Kruschke". While reading "DBDA" - reading *and* stepping through the code examples - will not make you a "Bayesian black-belt", it's impressive how much information it *will* give you - the book is almost 700 pages, after all - and you don't need (but it helps) to have tried to get the hang of the "Bayesian stuff" with other books to appreciate how friendly and effective this one is. (The author's explanation of the Metropolis algorithm is a good example). At the risk of sounding grandiose, the book just might do for Bayesian methods what Apple's original Mac did for the personal computer; here's hoping.PS. Three worthwhile related (more technical) books:"Data analysis using regression and multilevel/hierarchical models" by Gelman and Hill. (A very nice book, like "DBDA", but intentionally not-especially-Bayesian)."Bayesian statistical modeling" by Congdon. (A survey of Bayesian applications)."Dynamic linear models with R" by Petris et al. Prado and West. (A nice introduction to Bayesian approach to time series).UPDATE. There is a new kid on the block - "Bayesian modeling using WinBUGS" by Ntzoufras. Although I am still a fan of "DBDA", I think that Ntzoufras's book would be a better bet for many people. Starting with "DBDA", and moving on to that book, may be best.

Doing Bayesian Data Analysis: A Tutorial with R and BUGS Analytics: Data Science, Data Analysis and Predictive Analytics for Business (Algorithms, Business Intelligence, Statistical Analysis, Decision Analysis, Business Analytics, Data Mining, Big Data) Data Analytics: Practical Data Analysis and Statistical Guide to Transform and Evolve Any Business. Leveraging the Power of Data Analytics, Data ... (Hacking Freedom and Data Driven) (Volume 2) Data Analytics: What Every Business Must Know About Big Data And Data Science (Data Analytics for Business, Predictive Analysis, Big Data) How Many Bugs in a Box?: A Pop-up Counting Book (David Carter's Bugs) Servlet, JSP and Spring MVC: A Tutorial (A Tutorial series) Servlet & JSP: A Tutorial (A Tutorial series) Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (Data-Centric Systems and Applications) Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking Bayesian Reasoning and Machine Learning Modeling and Reasoning with Bayesian Networks Bayesian Speech and Language Processing A First Course in Bayesian Statistical Methods (Springer Texts in Statistics) Learning Bayesian Networks Bayesian Computation with R (Use R!) Data Analysis and Data Mining using Microsoft Business Intelligence Tools: Excel 2010, Access 2010, and Report Builder 3.0 with SQL Server Analytics: Data Science, Data Analysis and Predictive Analytics for Business Unsupervised Machine Learning in Python: Master Data Science and Machine Learning with Cluster Analysis, Gaussian Mixture Models, and Principal Components Analysis JDBC(TM) API Tutorial and Reference: Universal Data Access for the Java(TM) 2 Platform (2nd Edition)