BOOK REVIEW

Bayesian methods for data analysis, third edition, by B.P. Carlin and T.A. Louis, Boca Raton, Chapman and Hall/CRC Press, 2008, xv + 535 pp., £38.99 or US$69.95 (hardback), ISBN 978-1-58488-697-6

This is a textbook on Bayesian methods for biostatistics. With the apparent name change over the still popular second edition, the third edition has more of a Bayesian flavor with a comprehensive coverage of computational Bayesian statistics including new additions of BUGS and R code throughout the book and reorganization or expansion of several chapters. The basics of Bayesian statistics are covered in the first three chapters, including Bayesian computation (Chapter 3), and a nice Appendix section on decision theory at the end of the book. Chapter 4 covers recent Bayesian developments on model criticism and selection. Chapter 5 gives a concise and broad account of the empirical Bayes approach. It should be pointed out that the empirical Bayes approach was originally developed by Herbert Robbins in the 1950s for the classical estimation problem of many means and it is not a truly Bayesian approach since it does not produce a posterior distribution or even interval estimates until much later developments and connections were made with distinctive Bayesian flavor such as using hierarchical prior models. The reader is encouraged to consult [3] for still the best book on empirical Bayes methods. The original design of experiments material has been expanded into a new chapter, Chapter 6: Bayesian design, with emphasis on Bayesian clinical trials. Though the book has an awfully similar title and appearance to another popular book from the same series [2], it has more in-depth coverage of many biostatistical problems, especially in Chapters 7 and 8, and it is at a slightly higher statistical level with enough materials to choose from for a course at either the intermediate level or advanced research level.

The most exciting development in Bayesian statistics in the last 20 years is probably Bayesian computation using Markov chain Monte Carlo. The availability of Bayesian software such as BUGS [4] and R has popularized the Bayesian approach to mainstream statistics users and has greatly facilitated implementation of Bayesian solutions to many complex statistical problems. Recently, we are not only seeing more general-purpose Bayesian statistics books like this one, but also more specialized Bayesian books for specific applications such as ecology and social sciences. The strength of the book is the coverage of many biostatistical problems, sometimes at the research level. The weakness is that, after reading this book, a practical worker may still find himself or herself bewildered as to how to choose a prior distribution in a given problem and what approaches one should take, now given we have several different Bayesian approaches. Of course, this may be an unfair criticism, for it takes more than reading a statistics book, or even many statistics books, to grasp the art of statistical practice. It takes a long apprenticeship working with real data and real problems, and a good understanding of the pros and cons of Bayesian statistics such as those expressed in [1] to really appreciate the true challenges of applying Bayesian methods or any statistical methods to real problems. Astonishingly, statistical practice is not a simple turn-key exercise in running software after all! Back to the book itself, I

am glad to see that the software code and examples have also been made available on the website http://www.biostat.umn.edu/~brad/dataCL3.html so that users can truly enjoy easy access and convenience in reproducing the computations in the book.

In summary, I think this is a very worthy edition and I highly recommend it as a textbook, and for people who deal with biostatistics problems regularly as a good introduction into the literature. Libraries which have the second edition are encouraged to buy this edition as well.

References

[1] J.O. Berger, *Statistical Decision Theory and Bayesian Analysis, 2nd ed.*, Springer-Verlag, New York, 1985.
[2] A. Gelman, J.B. Carlin, H.S. Stern, and D.B. Rubin, *Bayesian Data Analysis, 2nd ed.*, Chapman and Hall/CRC Press, Boca Raton, 2004.
[3] J.S. Maritz and T. Lwin, *Empirical Bayes Methods, 2nd ed.*, Chapman and Hall, London, 1989.
[4] D.J. Spiegelhalter, N.G. Best, A. Thomas, and D.J. Lunn, *Bayesian Analysis using BUGS: A Practical Introduction*, Chapman and Hall/CRC Press, Boca Raton, 2008.

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