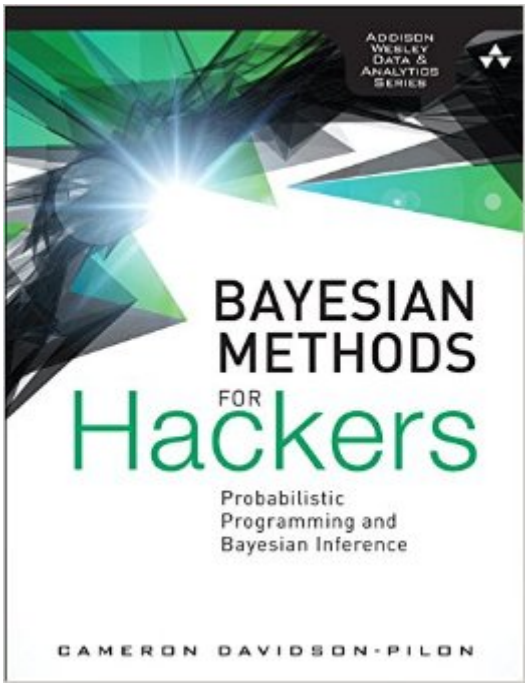
Bayesian Methods For Hackers: Probabilistic Programming And Bayesian Inference (Addison-Wesley Data & Analytics)



Synopsis

Master Bayesian Inference through Practical Examples and Computationâ “Without Advanced Mathematical Analysis Â Bayesian methods of inference are deeply natural and extremely powerful. However, most discussions of Bayesian inference rely on intensely complex mathematical analyses and artificial examples, making it inaccessible to anyone without a strong mathematical background. Now, though, Cameron Davidson-Pilon introduces Bayesian inference from a computational perspective, bridging theory to practiceâ “freeing you to get results using computing power. Â Bayesian Methods for Hackers illuminates Bayesian inference through probabilistic programming with the powerful PyMC language and the closely related Python tools NumPy, SciPy, and Matplotlib. Using this approach, you can reach effective solutions in small increments, without extensive mathematical intervention. Â Davidson-Pilon begins by introducing the concepts underlying Bayesian inference, comparing it with other techniques and guiding you through building and training your first Bayesian model. Next, he introduces PyMC through a series of detailed examples and intuitive explanations that have been refined after extensive user feedback. Youâ ™ll learn how to use the Markov Chain Monte Carlo algorithm, choose appropriate sample sizes and priors, work with loss functions, and apply Bayesian inference in domains ranging from finance to marketing. Once youâ ™ve mastered these techniques, youâ ™ll constantly turn to this guide for the working PyMC code you need to jumpstart future projects. Â Coverage includes Â â ¢ Learning the Bayesian â œstate of mindâ • and its practical implications â ¢ Understanding how computers perform Bayesian inference â ¢ Using the PyMC Python library to program Bayesian analyses â ¢ Building and debugging models with PyMC â ¢ Testing your modelâ ™s â œgoodness of fitâ • â ¢ Opening the â œblack boxâ • of the Markov Chain Monte Carlo algorithm to see how and why it works â ¢ Leveraging the power of the â œLaw of Large Numbersâ • â ¢ Mastering key concepts, such as clustering, convergence, autocorrelation, and thinning â ¢ Using loss functions to measure an estimateâ ™s weaknesses based on your goals and desired outcomes â ¢ Selecting appropriate priors and understanding how their influence changes with dataset size â ¢ Overcoming the â œexploration versus exploitationâ • dilemma: deciding when â œpretty goodâ • is good enough â ¢ Using Bayesian inference to improve A/B testing â ¢ Solving data science problems when only small amounts of data are available Â Cameron Davidson-Pilon has worked in many areas of applied mathematics, from the evolutionary dynamics of genes and diseases to stochastic modeling of financial prices. His contributions to the open source community include lifelines, an implementation of survival analysis in Python. Educated at the University of Waterloo and at the Independent University of Moscow, he currently works with the online commerce leader Shopify.

Book Information

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Customer Reviews

I really like the book, but want to bring up two things neglected by its author.One is acknowledgments. "Bayesian Methods For Hackers" did not appear in a vacuum. I would like to see a hat tip to the creators of PyMC, and at least a mention of BUGS, the still-very-much-alive software which brought Bayesian methods to academic masses and inspired MCMC-engine projects like PyMC. Then there are PyMC’s cousins JAGS and STAN - these can be familiar to the R crowd - and people who wrote popular books on Bayesian analysis, such as John Kruschke, the author of "Doing Bayesian Data Analysis". (I should also mention James Stone, with his "Bayes’ Rule". "Bayesian Modeling Using WinBUGS" by Ioannis Ntzoufras could have had more impact, but its publisher, Wiley, sabotaged the book with greedy pricing and no-frills presentation. Looking into the near future - I see that Manning have their own "probabilistic programming" book in the works, by Avi Pfeiffer). Naming those people, programs and books would provide useful pointers to aspiring "Bayesian hackers".The second reservation is about editorial effort. The very first page (when it used "ascribe" instead of "subscribe") told me that the manuscript had not been proof-read. As I went through the book, I found more unpolished passages, and a handful of lines capable of triggering a facepalm by a statistics professor. Now, this is not a book for statistics professors - they don’t tend to use Python, for starters, while BMH assumes that you have Python installed - and the practical question is whether these issues are going to seriously frustrate or mislead the average

reader. My answer is "not really".

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