

Advanced R Chapman Hall Crc The R Series

From the Reviews "[This book] contains an excellent blend of both Shiny-specific topics ... and practical advice from software development that fits in nicely with Shiny apps. You will find many nuggets of wisdom sprinkled throughout these chapters...." Eric Nantz, Host of the R-Podcast and the Shiny Developer Series (from the Foreword) "[This] book is a gradual and pleasant invitation to the production-ready shiny apps world. It ...exposes a comprehensive and robust workflow powered by the {golem} package. [It] fills the not yet covered gap between shiny app development and deployment in such a thrilling way that it may be read in one sitting.... In the industry world, where processes robustness is a key toward productivity, this book will indubitably have a tremendous impact." David Granjon, Sr. Expert Data Science, Novartis Presented in full color, Engineering Production-Grade Shiny Apps

helps people build production-grade shiny applications, by providing advice, tools, and a methodology to work on web applications with R. This book starts with an overview of the challenges which arise from any big web application project: organizing work, thinking about the user interface, the challenges of teamwork and the production environment. Then, it moves to a step-by-step methodology that goes from the idea to the end application. Each part of this process will cover in detail a series of tools and methods to use while building production-ready shiny applications. Finally, the book will end with a series of approaches and advice about optimizations for production.

Features Focused on practical matters: This book does not cover Shiny concepts, but practical tools and methodologies to use for production.

Based on experience: This book is a formalization of several years of experience building Shiny applications.

Original content: This book presents new methodologies and tooling, not just a review of what already exists.

Engineering Production-

Grade Shiny Apps covers medium to advanced content about Shiny, so it will help people that are already familiar with building apps with Shiny, and who want to go one step further. Computational statistics and statistical computing are two areas that employ computational, graphical, and numerical approaches to solve statistical problems, making the versatile R language an ideal computing environment for these fields. One of the first books on these topics to feature R, *Statistical Computing with R* covers the traditiona

In this age of information, the manipulation, analysis, and interpretation of data have become a fundamental part of professional life; nowhere more so than in the delivery of healthcare. From the understanding of disease and the development of new treatments, to the diagnosis and management of individual patients, the use of data and technology is now an integral part of the business of healthcare. Those working in healthcare interact daily with data, often without realising it. The conversion of this

avalanche of information to useful knowledge is essential for high-quality patient care. R for Health Data Science includes everything a healthcare professional needs to go from R novice to R guru. By the end of this book, you will be taking a sophisticated approach to health data science with beautiful visualisations, elegant tables, and nuanced analyses. Features Provides an introduction to the fundamentals of R for healthcare professionals Highlights the most popular statistical approaches to health data science Written to be as accessible as possible with minimal mathematics Emphasises the importance of truly understanding the underlying data through the use of plots Includes numerous examples that can be adapted for your own data Helps you create publishable documents and collaborate across teams With this book, you are in safe hands – Prof. Harrison is a clinician and Dr. Pius is a data scientist, bringing 25 years' combined experience of using R at the coal face. This content has been taught to hundreds of individuals from a variety of backgrounds, from rank beginners to

experts moving to R from other platforms.

The second edition of a bestselling textbook, *Using R for Introductory Statistics* guides students through the basics of R, helping them overcome the sometimes steep learning curve. The author does this by breaking the material down into small, task-oriented steps. The second edition maintains the features that made the first edition so popular, while updating data, examples, and changes to R in line with the current version. See *What's New in the Second Edition*: Increased emphasis on more idiomatic R provides a grounding in the functionality of base R.

Discussions of the use of RStudio helps new R users avoid as many pitfalls as possible. Use of knitr package makes code easier to read and therefore easier to reason about. Additional information on computer-intensive approaches motivates the traditional approach. Updated examples and data make the information current and topical. The book has an accompanying package, *UsingR*, available from CRAN, R's repository of user-contributed

packages. The package contains the data sets mentioned in the text (`data(package="UsingR")`), answers to selected problems (`answers()`), a few demonstrations (`demo()`), the errata (`errata()`), and sample code from the text. The topics of this text line up closely with traditional teaching progression; however, the book also highlights computer-intensive approaches to motivate the more traditional approach. The authors emphasize realistic data and examples and rely on visualization techniques to gather insight. They introduce statistics and R seamlessly, giving students the tools they need to use R and the information they need to navigate the sometimes complex world of statistical computing.

R Markdown is a powerful tool for combining analysis and reporting into the single document in the spirit of literate programming and reproducible research. Since the birth of the `rmarkdown` package in early 2014, R Markdown has grown substantially from a package that supports a few output formats (such as HTML, PDF, and Word)

to an extensive and diverse ecosystem that enables the creation of books, blogs, scientific articles, websites, and more. Due to its rapid success, this ecosystem is hard to learn completely meaning that R Markdown users, from novices to advanced users, likely do not know all that these packages have to offer. The R Markdown Cookbook confronts this gap by showcasing short, practical examples of wide-ranging tips and tricks to get the most out of these tools. After reading this book, you will learn how to:

- Enhance your R Markdown content with diagrams, citations, and dynamically generated text
- Streamline your workflow with child documents, code chunk references, and caching
- Control the formatting and layout with Pandoc markdown syntax or by writing custom HTML and LaTeX templates
- Utilize chunk options and hooks to fine-tune how your code is processed
- Switch between different language engines to seamlessly incorporate python, D3, and more into your analysis

A Tour of Statistical Software Design
Import, Tidy, Transform, Visualize, and

Model Data

Engineering Production-Grade Shiny Apps

Metaprogramming in R

Advanced R Statistical Programming and Data Models

Math + R + Data

Reproducible Finance with R: Code Flows and Shiny Apps for Portfolio Analysis is a unique introduction to data science for investment management that explores the three major R/finance coding paradigms, emphasizes data visualization, and explains how to build a cohesive suite of functioning Shiny applications. The full source code, asset price data and live Shiny applications are available at reproduciblefinance.com. The ideal reader works in finance or wants to work in finance and has a desire to learn R code and Shiny through simple, yet practical real-world examples. The book begins with the first step in data science: importing and wrangling data, which in the investment context means importing asset prices, converting to returns, and constructing a portfolio. The next section covers risk and tackles descriptive statistics such as standard deviation, skewness, kurtosis, and their rolling histories. The third section focuses on portfolio theory, analyzing the Sharpe Ratio, CAPM, and Fama French models. The book concludes with applications for finding individual asset contribution to risk and for running Monte Carlo simulations. For each of these tasks, the three major coding paradigms are explored and the work is wrapped into interactive Shiny dashboards.

Advanced R helps you understand how R works at a fundamental level. It is designed for R programmers who want to deepen their understanding of the language, and programmers experienced in other languages who want to

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understand what makes R different and special. This book will teach you the foundations of R; three fundamental programming paradigms (functional, object-oriented, and metaprogramming); and powerful techniques for debugging and optimising your code. By reading this book, you will learn: The difference between an object and its name, and why the distinction is important The important vector data structures, how they fit together, and how you can pull them apart using subsetting The fine details of functions and environments The condition system, which powers messages, warnings, and errors The powerful functional programming paradigm, which can replace many for loops The three most important OO systems: S3, S4, and R6 The tidy eval toolkit for metaprogramming, which allows you to manipulate code and control evaluation Effective debugging techniques that you can deploy, regardless of how your code is run How to find and remove performance bottlenecks The second edition is a comprehensive update: New foundational chapters: "Names and values," "Control flow," and "Conditions" comprehensive coverage of object oriented programming with chapters on S3, S4, R6, and how to choose between them Much deeper coverage of metaprogramming, including the new tidy evaluation framework use of new package like rlang (<http://rlang.r-lib.org>), which provides a clean interface to low-level operations, and purrr (<http://purrr.tidyverse.org/>) for functional programming Use of color in code chunks and figures Hadley Wickham is Chief Scientist at RStudio, an Adjunct Professor at Stanford University and the University of Auckland, and a member of the R Foundation. He is the lead developer of the tidyverse, a collection of R packages, including ggplot2 and dplyr, designed to support data science. He is also the author of R for Data Science (with Garrett Grolemund), R Packages, and ggplot2: Elegant

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Graphics for Data Analysis.

Advanced R, Second Edition CRC Press

Statistical Rethinking: A Bayesian Course with Examples in R and Stan builds readers' knowledge of and confidence in statistical modeling. Reflecting the need for even minor programming in today's model-based statistics, the book pushes readers to perform step-by-step calculations that are usually automated. This unique computational approach ensures that readers understand enough of the details to make reasonable choices and interpretations in their own modeling work. The text presents generalized linear multilevel models from a Bayesian perspective, relying on a simple logical interpretation of Bayesian probability and maximum entropy. It covers from the basics of regression to multilevel models. The author also discusses measurement error, missing data, and Gaussian process models for spatial and network autocorrelation. By using complete R code examples throughout, this book provides a practical foundation for performing statistical inference. Designed for both PhD students and seasoned professionals in the natural and social sciences, it prepares them for more advanced or specialized statistical modeling. Web Resource The book is accompanied by an R package (rethinking) that is available on the author's website and GitHub. The two core functions (map and map2stan) of this package allow a variety of statistical models to be constructed from standard model formulas.

Learn how to write R code with fewer bugs. The problem with programming is that you are always one typo away from writing something silly. Likewise with data analysis, a small mistake in your model can lead to a big mistake in your results. Combining the two disciplines means that it is all too easy for a missed minus sign to generate a false prediction that you don't spot until it's too late. Testing is

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the only way to be sure that your code, and your results, are correct. Testing R Code teaches you how to perform development-time testing using the testthat package, allowing you to ensure that your code works as intended. The book also teaches run-time testing using the assertive package; enabling your users to correctly run your code. After beginning with an introduction to testing in R, the book explores more advanced cases such as integrating tests into R packages; testing code that accesses databases; testing C++ code with Rcpp; and testing graphics. Each topic is explained with real-world examples, and has accompanying exercises for readers to practise their skills — only a small amount of experience with R is needed to get started!

Surrogates

Hands-On Machine Learning with R

Advanced Spatial Modeling with Stochastic Partial

Differential Equations Using R and INLA

R for Everyone

Advanced Analytics and Graphics

Using R for Introductory Statistics

Providing a much-needed bridge between elementary statistics courses and advanced research methods courses, Understanding Advanced Statistical Methods helps students grasp the fundamental assumptions and machinery behind sophisticated statistical topics, such as logistic regression, maximum likelihood, bootstrapping, nonparametrics, and Bayesian methods. The book teaches students how to

properly model, think critically, and design their own studies to avoid common errors. It leads them to think differently not only about math and statistics but also about general research and the scientific method. With a focus on statistical models as producers of data, the book enables students to more easily understand the machinery of advanced statistics. It also downplays the "population" interpretation of statistical models and presents Bayesian methods before frequentist ones. Requiring no prior calculus experience, the text employs a "just-in-time" approach that introduces mathematical topics, including calculus, where needed. Formulas throughout the text are used to explain why calculus and probability are essential in statistical modeling. The authors also intuitively explain the theory and logic behind real data analysis, incorporating a range of application examples from the social, economic, biological, medical, physical, and engineering sciences. Enabling your students to answer the why behind statistical methods, this

text teaches them how to successfully draw conclusions when the premises are flawed. It empowers them to use advanced statistical methods with confidence and develop their own statistical recipes. Ancillary materials are available on the book's website.

The high-level language of R is recognized as one of the most powerful and flexible statistical software environments, and is rapidly becoming the standard setting for quantitative analysis, statistics and graphics. R provides free access to unrivalled coverage and cutting-edge applications, enabling the user to apply numerous statistical methods ranging from simple regression to time series or multivariate analysis. Building on the success of the author's bestselling *Statistics: An Introduction using R*, *The R Book* is packed with worked examples, providing an all inclusive guide to R, ideal for novice and more accomplished users alike. The book assumes no background in statistics or computing and introduces the advantages of the R environment, detailing its

applications in a wide range of disciplines. Provides the first comprehensive reference manual for the R language, including practical guidance and full coverage of the graphics facilities. Introduces all the statistical models covered by R, beginning with simple classical tests such as chi-square and t-test. Proceeds to examine more advance methods, from regression and analysis of variance, through to generalized linear models, generalized mixed models, time series, spatial statistics, multivariate statistics and much more. The R Book is aimed at undergraduates, postgraduates and professionals in science, engineering and medicine. It is also ideal for students and professionals in statistics, economics, geography and the social sciences.

This book is a fresh approach to a calculus based, first course in probability and statistics, using R throughout to give a central role to data and simulation. The book introduces probability with Monte Carlo simulation as an essential tool. Simulation makes challenging

probability questions quickly accessible and easily understandable. Mathematical approaches are included, using calculus when appropriate, but are always connected to experimental computations. Using R and simulation gives a nuanced understanding of statistical inference. The impact of departure from assumptions in statistical tests is emphasized, quantified using simulations, and demonstrated with real data. The book compares parametric and non-parametric methods through simulation, allowing for a thorough investigation of testing error and power. The text builds R skills from the outset, allowing modern methods of resampling and cross validation to be introduced along with traditional statistical techniques. Fifty-two data sets are included in the complementary R package fosdata. Most of these data sets are from recently published papers, so that you are working with current, real data, which is often large and messy. Two central chapters use powerful tidyverse tools (dplyr, ggplot2, tidyr, stringr) to wrangle data and produce meaningful

visualizations. Preliminary versions of the book have been used for five semesters at Saint Louis University, and the majority of the more than 400 exercises have been classroom tested.

From a review of the first edition:

"Modern Data Science with R... is rich with examples and is guided by a strong narrative voice. What's more, it presents an organizing framework that makes a convincing argument that data science is a course distinct from applied statistics" (The American Statistician). Modern Data Science with R is a comprehensive data science textbook for undergraduates that incorporates statistical and computational thinking to solve real-world data problems. Rather than focus exclusively on case studies or programming syntax, this book illustrates how statistical programming in the state-of-the-art R/RStudio computing environment can be leveraged to extract meaningful information from a variety of data in the service of addressing compelling questions. The second edition is updated to reflect the growing influence of the tidyverse

set of packages. All code in the book has been revised and styled to be more readable and easier to understand. New functionality from packages like `sf`, `purrr`, `tidymodels`, and `tidytext` is now integrated into the text. All chapters have been revised, and several have been split, re-organized, or re-imagined to meet the shifting landscape of best practice.

Probability and Statistics for Data Science: Math + R + Data covers "math stat"-distributions, expected value, estimation etc.-but takes the phrase "Data Science" in the title quite seriously: * Real datasets are used extensively. * All data analysis is supported by R coding. * Includes many Data Science applications, such as PCA, mixture distributions, random graph models, Hidden Markov models, linear and logistic regression, and neural networks. * Leads the student to think critically about the "how" and "why" of statistics, and to "see the big picture." * Not "theorem/proof"-oriented, but concepts and models are stated in a mathematically precise manner.

Prerequisites are calculus, some matrix algebra, and some experience in programming. Norman Matloff is a professor of computer science at the University of California, Davis, and was formerly a statistics professor there. He is on the editorial boards of the Journal of Statistical Software and The R Journal. His book Statistical Regression and Classification: From Linear Models to Machine Learning was the recipient of the Ziegel Award for the best book reviewed in Technometrics in 2017. He is a recipient of his university's Distinguished Teaching Award.

ggplot2

As a Language

R Packages

Geocomputation with R

The Definitive Guide

Statistical Computing with R

Learn how to use R to turn raw data into insight, knowledge, and understanding. This book introduces you to R, RStudio, and the tidyverse, a collection of R packages designed to work together to make data science fast, fluent, and fun. Suitable for readers with no previous programming experience, R for Data Science is designed to get you doing data science as quickly as possible. Authors Hadley Wickham and Garrett Grolemund

guide you through the steps of importing, wrangling, exploring, and modeling your data and communicating the results. You ' ll get a complete, big-picture understanding of the data science cycle, along with basic tools you need to manage the details. Each section of the book is paired with exercises to help you practice what you ' ve learned along the way. You ' ll learn how to: Wrangle—transform your datasets into a form convenient for analysis Program—learn powerful R tools for solving data problems with greater clarity and ease Explore—examine your data, generate hypotheses, and quickly test them Model—provide a low-dimensional summary that captures true "signals" in your dataset Communicate—learn R Markdown for integrating prose, code, and results

Modeling spatial and spatio-temporal continuous processes is an important and challenging problem in spatial statistics. *Advanced Spatial Modeling with Stochastic Partial Differential Equations Using R and INLA* describes in detail the stochastic partial differential equations (SPDE) approach for modeling continuous spatial processes with a Mat é rn covariance, which has been implemented using the integrated nested Laplace approximation (INLA) in the R-INLA package. Key concepts about modeling spatial processes and the SPDE approach are explained with examples using simulated data and real applications. This book has been authored by leading experts in spatial statistics, including the main developers of the INLA and SPDE methodologies and the R-INLA package. It also includes a wide range of applications: * Spatial and spatio-temporal models for continuous outcomes * Analysis of spatial and spatio-temporal point patterns * Coregionalization spatial and spatio-temporal models * Measurement error spatial

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models * Modeling preferential sampling * Spatial and spatio-temporal models with physical barriers * Survival analysis with spatial effects * Dynamic space-time regression * Spatial and spatio-temporal models for extremes * Hurdle models with spatial effects * Penalized Complexity priors for spatial models
All the examples in the book are fully reproducible. Further information about this book, as well as the R code and datasets used, is available from the book website at <http://www.r-inla.org/spde-book>. The tools described in this book will be useful to researchers in many fields such as biostatistics, spatial statistics, environmental sciences, epidemiology, ecology and others. Graduate and Ph.D. students will also find this book and associated files a valuable resource to learn INLA and the SPDE approach for spatial modeling.

Praise for previous editions: "Gandrud has written a great outline of how a fully reproducible research project should look from start to finish, with brief explanations of each tool that he uses along the way... Advanced undergraduate students in mathematics, statistics, and similar fields as well as students just beginning their graduate studies would benefit the most from reading this book. Many more experienced R users or second-year graduate students might find themselves thinking, ' I wish I ' d read this book at the start of my studies, when I was first learning R! ' ...This book could be used as the main text for a class on reproducible research ..." (The American Statistician) *Reproducible Research with R and R Studio, Third Edition* brings together the skills and tools needed for doing and presenting computational research. Using straightforward examples, the book takes you through an entire reproducible research workflow. This practical workflow enables you to gather and analyze data as well as dynamically

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present results in print and on the web. Supplementary materials and example are available on the author ' s website. New to the Third Edition Updated package recommendations, examples, URLs, and removed technologies no longer in regular use. More advanced R Markdown (and less LaTeX) in discussions of markup languages and examples. Stronger focus on reproducible working directory tools. Updated discussion of cloud storage services and persistent reproducible material citation. Added discussion of Jupyter notebooks and reproducible practices in industry. Examples of data manipulation with Tidyverse tibbles (in addition to standard data frames) and `pivot_longer()` and `pivot_wider()` functions for pivoting data. Features Incorporates the most important advances that have been developed since the editions were published Describes a complete reproducible research workflow, from data gathering to the presentation of results Shows how to automatically generate tables and figures using R Includes instructions on formatting a presentation document via markup languages Discusses cloud storage and versioning services, particularly Github Explains how to use Unix-like shell programs for working with large research projects Program for data analysis using R and learn practical skills to make your work more efficient. This revised book explores how to automate running code and the creation of reports to share your results, as well as writing functions and packages. It includes key R 4 features such as a new color palette for charts, an enhanced reference counting system, and normalization of matrix and array types where matrix objects now formally inherit from the array class, eliminating inconsistencies. Advanced R 4 Data Programming and the Cloud is not designed to teach advanced R programming nor to teach the

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theory behind statistical procedures. Rather, it is designed to be a practical guide moving beyond merely using R; it shows you how to program in R to automate tasks. This book will teach you how to manipulate data in modern R structures and includes connecting R to databases such as PostgreSQL, cloud services such as Amazon Web Services (AWS), and digital dashboards such as Shiny. Each chapter also includes a detailed bibliography with references to research articles and other resources that cover relevant conceptual and theoretical topics.

What You Will Learn

- Write and document R functions using R
- 4 Make an R package and share it via GitHub or privately
- Add tests to R code to ensure it works as intended
- Use R to talk directly to databases and do complex data management
- Run R in the Amazon cloud
- Deploy a Shiny digital dashboard
- Generate presentation-ready tables and reports using R

Who This Book Is For

Working professionals, researchers, and students who are familiar with R and basic statistical techniques such as linear regression and who want to learn how to take their R coding and programming to the next level.

Hands-on Machine Learning with R provides a practical and applied approach to learning and developing intuition into today's most popular machine learning methods. This book serves as a practitioner's guide to the machine learning process and is meant to help the reader learn to apply the machine learning stack within R, which includes using various R packages such as glmnet, h2o, ranger, xgboost, keras, and others to effectively model and gain insight from their data. The book favors a hands-on approach, providing an intuitive understanding of machine learning concepts through concrete examples and just a little bit of theory. Throughout this book,

the reader will be exposed to the entire machine learning process including feature engineering, resampling, hyperparameter tuning, model evaluation, and interpretation. The reader will be exposed to powerful algorithms such as regularized regression, random forests, gradient boosting machines, deep learning, generalized low rank models, and more! By favoring a hands-on approach and using real world data, the reader will gain an intuitive understanding of the architectures and engines that drive these algorithms and packages, understand when and how to tune the various hyperparameters, and be able to interpret model results. By the end of this book, the reader should have a firm grasp of R ' s machine learning stack and be able to implement a systematic approach for producing high quality modeling results. Features:

- Offers a practical and applied introduction to the most popular machine learning methods.
- Topics covered include feature engineering, resampling, deep learning and more.
- Uses a hands-on approach and real world data.

Doing Meta-Analysis with R

The R Book

A Fresh Approach Using R

Linear Models with R

Advanced R

The Art of R Programming

Learn how to manipulate functions and expressions to modify how the R language interprets itself. This book is an introduction to metaprogramming in the R language, so you will write

programs to manipulate other programs. Metaprogramming in R shows you how to treat code as data that you can generate, analyze, or modify. R is a very high-level language where all operations are functions and all functions are data that can be manipulated. This book shows you how to leverage R's natural flexibility in how function calls and expressions are evaluated, to create small domain-specific languages to extend R within the R language itself. What You'll Learn Find out about the anatomy of a function in R Look inside a function call Work with R expressions and environments Manipulate expressions in R Use substitutions Who This Book Is For Those with at least some experience with R and certainly for those with experience in other programming languages.

Turn your R code into packages that others can easily download and use. This practical book shows you how to bundle reusable R functions, sample data, and documentation together by applying author Hadley Wickham's package development philosophy. In the process, you'll work with devtools, roxygen, and

testthat, a set of R packages that automate common development tasks. **Devtools** encapsulates best practices that Hadley has learned from years of working with this programming language. Ideal for developers, data scientists, and programmers with various backgrounds, this book starts you with the basics and shows you how to improve your package writing over time. You'll learn to focus on what you want your package to do, rather than think about package structure. Learn about the most useful components of an R package, including vignettes and unit tests Automate anything you can, taking advantage of the years of development experience embodied in devtools Get tips on good style, such as organizing functions into files Streamline your development process with devtools Learn the best way to submit your package to the Comprehensive R Archive Network (CRAN) Learn from a well-respected member of the R community who created 30 R packages, including ggplot2, dplyr, and tidyr Little known to many, R works just as well with JavaScript—this book delves

into the various ways both languages can work together. The ultimate aim of this work is to put the reader at ease with inviting JavaScript in their data science workflow. In that respect the book is not teaching one JavaScript but rather we show how little JavaScript can greatly support and enhance R code. Therefore, the focus is on integrating external JavaScript libraries and no prior knowledge of JavaScript is required. Key Features: ● Easy to pick up. ● An entry way to learning JavaScript for R. ● Covers topics not covered anywhere else. ● Easy to follow along.

R Markdown: The Definitive Guide is the first official book authored by the core R Markdown developers that provides a comprehensive and accurate reference to the R Markdown ecosystem. With R Markdown, you can easily create reproducible data analysis reports, presentations, dashboards, interactive applications, books, dissertations, websites, and journal articles, while enjoying the simplicity of Markdown and the great power of R and other languages. In this book, you will learn Basics: Syntax of Markdown and R code

**chunks, how to generate figures and tables, and how to use other computing languages Built-in output formats of R Markdown:
PDF/HTML/Word/RTF/Markdown documents and ioslides/Slidy/Beamer/PowerPoint presentations Extensions and applications: Dashboards, Tufte handouts, xaringan/reveal.js presentations, websites, books, journal articles, and interactive tutorials
Advanced topics: Parameterized reports, HTML widgets, document templates, custom output formats, and Shiny documents. Yihui Xie is a software engineer at RStudio. He has authored and co-authored several R packages, including knitr, rmarkdown, bookdown, blogdown, shiny, xaringan, and animation. He has published three other books, Dynamic Documents with R and knitr, bookdown: Authoring Books and Technical Documents with R Markdown, and blogdown: Creating Websites with R Markdown. J.J. Allaire is the founder of RStudio and the creator of the RStudio IDE. He is an author of several packages in the R Markdown ecosystem including**

rmarkdown, flexdashboard, learnr, and radix. Garrett Golemund is the co-author of R for Data Science and author of Hands-On Programming with R. He wrote the lubridate R package and works for RStudio as an advocate who trains engineers to do data science with R and the Tidyverse.

Statistical Computation for Programmers, Scientists, Quants, Excel Users, and Other Professionals Using the open source R language, you can build powerful statistical models to answer many of your most challenging questions. R has traditionally been difficult for non-statisticians to learn, and most R books assume far too much knowledge to be of help. R for Everyone, Second Edition, is the solution. Drawing on his unsurpassed experience teaching new users, professional data scientist Jared P. Lander has written the perfect tutorial for anyone new to statistical programming and modeling. Organized to make learning easy and intuitive, this guide focuses on the 20 percent of R functionality you'll need to accomplish 80 percent of modern data tasks. Lander's self-contained chapters start

with the absolute basics, offering extensive hands-on practice and sample code. You'll download and install R; navigate and use the R environment; master basic program control, data import, manipulation, and visualization; and walk through several essential tests. Then, building on this foundation, you'll construct several complete models, both linear and nonlinear, and use some data mining techniques. After all this you'll make your code reproducible with LaTeX, RMarkdown, and Shiny. By the time you're done, you won't just know how to write R programs, you'll be ready to tackle the statistical problems you care about most. Coverage includes Explore R, RStudio, and R packages Use R for math: variable types, vectors, calling functions, and more Exploit data structures, including data.frames, matrices, and lists Read many different types of data Create attractive, intuitive statistical graphics Write user-defined functions Control program flow with if, ifelse, and complex checks Improve program efficiency with group manipulations Combine and reshape multiple datasets Manipulate strings

using R's facilities and regular expressions Create normal, binomial, and Poisson probability distributions Build linear, generalized linear, and nonlinear models Program basic statistics: mean, standard deviation, and t-tests Train machine learning models Assess the quality of models and variable selection Prevent overfitting and perform variable selection, using the Elastic Net and Bayesian methods Analyze univariate and multivariate time series data Group data via K-means and hierarchical clustering Prepare reports, slideshows, and web pages with knitr Display interactive data with RMarkdown and htmlwidgets Implement dashboards with Shiny Build reusable R packages with devtools and Rcpp Register your product at informit.com/register for convenient access to downloads, updates, and corrections as they become available.

Javascript for R

Data Science and Machine Learning

Code Flows and Shiny Apps for Portfolio Analysis

Understanding Advanced Statistical Methods

Analysis, Machine Learning, and Visualization R Markdown

Computer simulation experiments are essential to modern scientific discovery, whether that be in physics, chemistry, biology, epidemiology, ecology, engineering, etc. Surrogates are meta-models of computer simulations, used to solve mathematical models that are too intricate to be worked by hand. Gaussian process (GP) regression is a supremely flexible tool for the analysis of computer simulation experiments. This book presents an applied introduction to GP regression for modelling and optimization of computer simulation experiments. Features:

- Emphasis on methods, applications, and reproducibility.*
- R code is integrated throughout for application of the methods.*
- Includes more than 200 full colour figures.*
- Includes many exercises to supplement understanding, with separate solutions available from the author.*
- Supported by a website with full code available to reproduce all methods and examples. The book is primarily designed as a textbook for postgraduate students studying GP regression from mathematics, statistics, computer science, and engineering. Given the breadth of examples, it could also be used by researchers from these fields, as well as from economics, life science, social science, etc.*

An Essential Reference for Intermediate and Advanced R Programmers *Advanced R* presents useful tools and techniques for attacking many types of R programming problems, helping you avoid mistakes and dead ends. With more than ten years of experience programming in R, the author illustrates the elegance, beauty, and flexibility at the heart of R. The book develops the necessary skills to produce quality code that can be used in a variety of circumstances. You will learn: The fundamentals of R, including standard data types and functions Functional programming as a useful framework for solving wide classes of

problems The positives and negatives of metaprogramming How to write fast, memory-efficient code This book not only helps current R users become R programmers but also shows existing programmers what's special about R. Intermediate R programmers can dive deeper into R and learn new strategies for solving diverse problems while programmers from other languages can learn the details of R and understand why R works the way it does. Learning a computer language like R can be either frustrating, fun, or boring. Having fun requires challenges that wake up the learner's curiosity but also provide an emotional reward on overcoming them. This book is designed so that it includes smaller and bigger challenges, in what I call playgrounds, in the hope that all readers will enjoy their path to R fluency. Fluency in the use of a language is a skill that is acquired through practice and exploration. Although rarely mentioned separately, fluency in a computer programming language involves both writing and reading. The parallels between natural and computer languages are many, but differences are also important. For students and professionals in the biological sciences, humanities, and many applied fields, recognizing the parallels between R and natural languages should help them feel at home with R. The approach I use is similar to that of a travel guide, encouraging exploration and describing the available alternatives and how to reach them. The intention is to guide the reader through the R landscape of 2020 and beyond. Features R as it is currently used Few prescriptive rules—mostly the author's preferences together with alternatives Explanation of the R grammar emphasizing the "R way of doing things" Tutoring for "programming in the small" using scripts The grammar of graphics and the grammar of data described as grammars Examples of data exchange between R and the foreign world using common file formats Coaching for becoming an independent R user, capable of both writing original code and solving future challenges What makes this book different from others: Tries to break the ice and help readers from

all disciplines feel at home with R Does not make assumptions about what the reader will use R for Attempts to do only one thing well: guide readers into becoming fluent in the R language Pedro J. Aphalo is a PhD graduate from the University of Edinburgh, and is currently a lecturer at the University of Helsinki. A plant biologist and agriculture scientist with a passion for data, electronics, computers, and photography, in addition to plants, Dr. Aphalo has been a user of R for 25 years. He first organized an R course for MSc students 18 years ago, and is the author of 13 R packages currently in CRAN.

R is the world's most popular language for developing statistical software: Archaeologists use it to track the spread of ancient civilizations, drug companies use it to discover which medications are safe and effective, and actuaries use it to assess financial risks and keep economies running smoothly. The Art of R Programming takes you on a guided tour of software development with R, from basic types and data structures to advanced topics like closures, recursion, and anonymous functions. No statistical knowledge is required, and your programming skills can range from hobbyist to pro. Along the way, you'll learn about functional and object-oriented programming, running mathematical simulations, and rearranging complex data into simpler, more useful formats. You'll also learn to: –Create artful graphs to visualize complex data sets and functions –Write more efficient code using parallel R and vectorization –Interface R with C/C++ and Python for increased speed or functionality –Find new R packages for text analysis, image manipulation, and more –Squash annoying bugs with advanced debugging techniques Whether you're designing aircraft, forecasting the weather, or you just need to tame your data, The Art of R Programming is your guide to harnessing the power of statistical computing.

Carry out a variety of advanced statistical analyses including generalized additive models, mixed effects models, multiple imputation, machine learning, and missing data techniques using

*R. Each chapter starts with conceptual background information about the techniques, includes multiple examples using R to achieve results, and concludes with a case study. Written by Matt and Joshua F. Wiley, **Advanced R Statistical Programming and Data Models** shows you how to conduct data analysis using the popular R language. You'll delve into the preconditions or hypothesis for various statistical tests and techniques and work through concrete examples using R for a variety of these next-level analytics. This is a must-have guide and reference on using and programming with the R language. **What You'll Learn** Conduct advanced analyses in R including: generalized linear models, generalized additive models, mixed effects models, machine learning, and parallel processing Carry out regression modeling using R data visualization, linear and advanced regression, additive models, survival / time to event analysis Handle machine learning using R including parallel processing, dimension reduction, and feature selection and classification Address missing data using multiple imputation in R Work on factor analysis, generalized linear mixed models, and modeling intraindividual variability **Who This Book Is For** Working professionals, researchers, or students who are familiar with R and basic statistical techniques such as linear regression and who want to learn how to use R to perform more advanced analytics. Particularly, researchers and data analysts in the social sciences may benefit from these techniques. Additionally, analysts who need parallel processing to speed up analytics are given proven code to reduce time to result(s).*

Advanced R 4 Data Programming and the Cloud

Extending R

R Markdown Cookbook

Testing R Code

Probability and Statistics for Data Science

R Graphics, Third Edition

Text data is important for many domains, from healthcare to marketing to the digital humanities, but specialized approaches are necessary to create features for machine learning from language. Supervised Machine Learning for Text Analysis in R explains how to preprocess text data for modeling, train models, and evaluate model performance using tools from the tidyverse and tidymodels ecosystem. Models like these can be used to make predictions for new observations, to understand what natural language features or characteristics contribute to differences in the output, and more. If you are already familiar with the basics of predictive modeling, use the comprehensive, detailed examples in this book to extend your skills to the domain of natural language processing. This book provides practical guidance and directly applicable knowledge for data scientists and analysts who want to integrate unstructured text data into their modeling pipelines. Learn how to use text data for both regression and classification tasks, and how to apply more straightforward algorithms like regularized regression or support vector machines as well as deep learning approaches. Natural language must be dramatically transformed to be ready for computation, so we explore typical text preprocessing and feature engineering steps like tokenization and word embeddings from the ground up. These steps influence model results in ways we can measure, both in terms of model metrics and other tangible consequences such as how fair or

appropriate model results are.

Up-to-Date Guidance from One of the Foremost Members of the R Core Team Written by John M. Chambers, the leading developer of the original S software, Extending R covers key concepts and techniques in R to support analysis and research projects. It presents the core ideas of R, provides programming guidance for projects of all scales, and introduces new, valuable techniques that extend R. The book first describes the fundamental characteristics and background of R, giving readers a foundation for the remainder of the text. It next discusses topics relevant to programming with R, including the apparatus that supports extensions. The book then extends R's data structures through object-oriented programming, which is the key technique for coping with complexity. The book also incorporates a new structure for interfaces applicable to a variety of languages. A reflection of what R is today, this guide explains how to design and organize extensions to R by correctly using objects, functions, and interfaces. It enables current and future users to add their own contributions and packages to R. A 2017 Choice Outstanding Academic Title

"This textbook is a well-rounded, rigorous, and informative work presenting the mathematics behind modern machine learning techniques. It hits all the right notes: the choice of topics is up-to-date and perfect for a course on data science for mathematics students at the advanced undergraduate or early

graduate level. This book fills a sorely-needed gap in the existing literature by not sacrificing depth for breadth, presenting proofs of major theorems and subsequent derivations, as well as providing a copious amount of Python code. I only wish a book like this had been around when I first began my journey!" -Nicholas Hoell, University of Toronto

"This is a well-written book that provides a deeper dive into data-scientific methods than many introductory texts. The writing is clear, and the text logically builds up regularization, classification, and decision trees. Compared to its probable competitors, it carves out a unique niche. -Adam Loy, Carleton College

The purpose of Data Science and Machine Learning: Mathematical and Statistical Methods is to provide an accessible, yet comprehensive textbook intended for students interested in gaining a better understanding of the mathematics and statistics that underpin the rich variety of ideas and machine learning algorithms in data science. Key Features: Focuses on mathematical understanding. Presentation is self-contained, accessible, and comprehensive. Extensive list of exercises and worked-out examples. Many concrete algorithms with Python code. Full color throughout. The Authors: Dirk P. Kroese, PhD, is a Professor of Mathematics and Statistics at The University of Queensland. He has published over 120 articles and five books in a wide range of areas in mathematics, statistics, data science, machine learning, and Monte Carlo methods. He is a pioneer

of the well-known Cross-Entropy method—an adaptive Monte Carlo technique, which is being used around the world to help solve difficult estimation and optimization problems in science, engineering, and finance. Zdravko Botev, PhD, is an Australian Mathematical Science Institute Lecturer in Data Science and Machine Learning with an appointment at the University of New South Wales in Sydney, Australia. He is the recipient of the 2018 Christopher Heyde Medal of the Australian Academy of Science for distinguished research in the Mathematical Sciences. Thomas Taimre, PhD, is a Senior Lecturer of Mathematics and Statistics at The University of Queensland. His research interests range from applied probability and Monte Carlo methods to applied physics and the remarkably universal self-mixing effect in lasers. He has published over 100 articles, holds a patent, and is the coauthor of Handbook of Monte Carlo Methods (Wiley). Radislav Vaisman, PhD, is a Lecturer of Mathematics and Statistics at The University of Queensland. His research interests lie at the intersection of applied probability, machine learning, and computer science. He has published over 20 articles and two books. A Hands-On Way to Learning Data Analysis Part of the core of statistics, linear models are used to make predictions and explain the relationship between the response and the predictors. Understanding linear models is crucial to a broader competence in the practice of statistics. Linear Models with R, Second Edition explains how to use linear models

***Doing Meta-Analysis with R: A Hands-On Guide* serves as an accessible introduction on how meta-analyses can be conducted in R. Essential steps for meta-analysis are covered, including calculation and pooling of outcome measures, forest plots, heterogeneity diagnostics, subgroup analyses, meta-regression, methods to control for publication bias, risk of bias assessments and plotting tools.**

Advanced but highly relevant topics such as network meta-analysis, multi-three-level meta-analyses, Bayesian meta-analysis approaches and SEM meta-analysis are also covered. A companion R package, dmetar, is introduced at the beginning of the guide. It contains data sets and several helper functions for the meta and metafor package used in the guide. The programming and statistical background covered in the book are kept at a non-expert level, making the book widely accessible. Features • Contains two introductory chapters on how to set up an R environment and do basic imports/manipulations of meta-analysis data, including exercises • Describes statistical concepts clearly and concisely before applying them in R • Includes step-by-step guidance through the coding required to perform meta-analyses, and a companion R package for the book
Advanced Statistical Programming for Data Science, Analysis and Finance

Advanced Survival Models

Elegant Graphics for Data Analysis

R for Data Science

A Hands-On Guide

Supervised Machine Learning for Text Analysis in R

This book offers solutions to all 284 exercises in Advanced R, Second Edition. All the solutions have been carefully documented and made to be as clear and accessible as possible. Working through the exercises and their solutions will give you a deeper understanding of a variety of programming challenges, many of which are relevant to everyday work. This will expand your set of tools on a technical and conceptual level. You will be able to transfer many of the specific programming schemes directly and will discover far more elegant solutions to everyday problems.

Features: When R creates copies, and how it affects memory usage and code performance
Everything you could ever want to know about functions
The differences between calling and exiting handlers
How to employ functional programming to solve modular tasks
The motivation, mechanics, usage, and limitations of R's highly pragmatic S3 OO system
The R6 OO system, which is more like OO programming in other languages
The rules that R uses to parse and evaluate expressions
How to use metaprogramming to generate HTML or LaTeX with elegant R code
How to identify and resolve performance bottlenecks

Survival data analysis is a very broad field of statistics, encompassing a large variety of methods used in a wide range of applications, and in particular in medical research. During the

last twenty years, several extensions of "classical" survival models have been developed to address particular situations often encountered in practice. This book aims to gather in a single reference the most commonly used extensions, such as frailty models (in case of unobserved heterogeneity or clustered data), cure models (when a fraction of the population will not experience the event of interest), competing risk models (in case of different types of event), and joint survival models for a time-to-event endpoint and a longitudinal outcome. Features Presents state-of-the art approaches for different advanced survival models including frailty models, cure models, competing risk models and joint models for a longitudinal and a survival outcome Uses consistent notation throughout the book for the different techniques presented Explains in which situation each of these models should be used, and how they are linked to specific research questions Focuses on the understanding of the models, their implementation, and their interpretation, with an appropriate level of methodological development for masters students and applied statisticians Provides references to existing R packages and SAS procedure or macros, and illustrates the use of the main ones on real datasets This book is primarily aimed at applied statisticians and graduate students of statistics and biostatistics. It can also serve as an introductory reference for

methodological researchers interested in the main extensions of classical survival analysis. See How Graphics Reveal Information Graphical Data Analysis with R shows you what information you can gain from graphical displays. The book focuses on why you draw graphics to display data and which graphics to draw (and uses R to do so). All the datasets are available in R or one of its packages and the R code is available at rosuda.org/GDA. Graphical data analysis is useful for data cleaning, exploring data structure, detecting outliers and unusual groups, identifying trends and clusters, spotting local patterns, evaluating modelling output, and presenting results. This book guides you in choosing graphics and understanding what information you can glean from them. It can be used as a primary text in a graphical data analysis course or as a supplement in a statistics course. Colour graphics are used throughout.

Provides both rich theory and powerful applications Figures are accompanied by code required to produce them Full color figures Geocomputation with R is for people who want to analyze, visualize and model geographic data with open source software. It is based on R, a statistical programming language that has powerful data processing, visualization, and geospatial capabilities. The book equips you with the knowledge and skills to tackle a wide range of issues manifested in geographic data, including

those with scientific, societal, and environmental implications. This book will interest people from many backgrounds, especially Geographic Information Systems (GIS) users interested in applying their domain-specific knowledge in a powerful open source language for data science, and R users interested in extending their skills to handle spatial data. The book is divided into three parts: (I) Foundations, aimed at getting you up-to-speed with geographic data in R, (II) extensions, which covers advanced techniques, and (III) applications to real-world problems. The chapters cover progressively more advanced topics, with early chapters providing strong foundations on which the later chapters build. Part I describes the nature of spatial datasets in R and methods for manipulating them. It also covers geographic data import/export and transforming coordinate reference systems. Part II represents methods that build on these foundations. It covers advanced map making (including web mapping), "bridges" to GIS, sharing reproducible code, and how to do cross-validation in the presence of spatial autocorrelation. Part III applies the knowledge gained to tackle real-world problems, including representing and modeling transport systems, finding optimal locations for stores or services, and ecological modeling. Exercises at the end of each chapter give you the skills needed to tackle a range of geospatial problems. Solutions for each chapter and supplementary

materials providing extended examples are available at

<https://geocompr.github.io/geocompkg/articles/>.

Dr. Robin Lovelace is a University Academic Fellow at the University of Leeds, where he has taught R for geographic research over many years, with a focus on transport systems. Dr. Jakub Nowosad is an Assistant Professor in the Department of Geoinformation at the Adam Mickiewicz University in Poznan, where his focus is on the analysis of large datasets to understand environmental processes. Dr. Jannes Muenchow is a Postdoctoral Researcher in the GIScience Department at the University of Jena, where he develops and teaches a range of geographic methods, with a focus on ecological modeling, statistical geocomputing, and predictive mapping. All three are active developers and work on a number of R packages, including stplanr, sabre, and RQGIS.

Mathematical and Statistical Methods

Advanced R Solutions

Gaussian Process Modeling, Design, and

Optimization for the Applied Sciences

Reproducible Finance with R

Organize, Test, Document, and Share Your Code

Learn R

This third edition of Paul Murrell's classic book on using R for graphics represents a major update, with a complete overhaul in focus and scope. It focuses primarily on the two core graphic packages in R - graphics and grid - and has a new section on

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integrating graphics. This section includes three new chapters: importing external images in to R; integrating the graphics and grid systems; and advanced SVG graphics. The emphasis in this third edition is on having the ability to produce detailed and customised graphics in a wide variety of formats, on being able to share and reuse those graphics, and on being able to integrate graphics from multiple systems. This book is aimed at all levels of R users. For people who are new to R, this book provides an overview of the graphics facilities, which is useful for understanding what to expect from R's graphics functions and how to modify or add to the output they produce. For intermediate-level R users, this book provides all of the information necessary to perform sophisticated customizations of plots produced in R. For advanced R users, this book contains vital information for producing coherent, reusable, and extensible graphics functions.

Reproducible Research with R and RStudio

R for Health Data Science

Advanced R, Second Edition

A Bayesian Course with Examples in R and Stan

Statistical Rethinking

Modern Data Science with R