An Introduction to R for Spatial Analysis and Mapping

By Chris Brunsdon, Lex Comber

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"In an age of big data, data journalism and with a wealth of quantitative information around us, it is not enough for students to be taught only 100 year old statistical methods using 'out of the box' software. They need to have 21st-century analytical skills too. This is an excellent and student-friendly text from two of the world leaders in the teaching and development of spatial analysis. It shows clearly why the open source software R is not just an alternative to commercial GIS, it may actually be the better choice for mapping, analysis and for replicable research. Providing practical tips as well as fully working code, this is a practical 'how to' guide ideal for undergraduates as well as those using R for the first time. It will be required reading on my own courses."
- *Richard Harris, Professor of Quantitative Social Science, University of Bristol*

R is a powerful open source computing tool that supports geographical analysis and mapping for the many geography and 'non-geography' students and researchers interested in spatial analysis and mapping.

This book provides an introduction to the use of R for spatial statistical analysis, geocomputation and the analysis of geographical information for researchers collecting and using data with location attached, largely through increased GPS functionality.

Brunsdon and Comber take readers from 'zero to hero' in spatial analysis and mapping through functions they have developed and compiled into R packages. This enables practical R applications in GIS, spatial analyses, spatial statistics, mapping, and web-scraping. Each chapter includes:

- Example data and commands for exploring it
- Scripts and coding to exemplify specific functionality
- Advice for developing greater understanding - through functions such as locator(), View(), and alternative coding to achieve the same ends
- Self-contained exercises for students to work through
- Embedded code within the descriptive text.

This is a definitive 'how to' that takes students - of any discipline - from coding to actual applications and uses of R.

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Editorial Review

Review

In an age of big data, data journalism and with a wealth of quantitative information around us, it is not enough for students to be taught only 100 year old statistical methods using 'out of the box' software. They need to have 21st-century analytical skills too. This is an excellent and student-friendly text from two of the world leaders in the teaching and development of spatial analysis. It shows clearly why the open source software R is not just an alternative to commercial GIS, it may actually be the better choice for mapping, analysis and for replicable research. Providing practical tips as well as fully working code, this is a practical 'how to' guide ideal for undergraduates as well as those using R for the first time. It will be required reading on my own courses.
(Richard Harris, Professor of Quantitative Social Science)

Brunsdon and Comber's *An Introduction to R for Spatial Analysis and Mapping* is a timely text for students concerned with the exploration of spatial analysis problems and their solutions. The authors combine extensive expertise and practical experience with a clear and accessible pedagogic style in the presentation of problems in spatial analysis. This volume is not only an excellent resource for students in the spatial sciences but should also find a place on the bookshelves of researchers. (Martin Charlton)

If you are new to R and spatial analysis, then this is the book for you. With plenty of examples that are easy to use and adapt, there's something for everyone as it moves comfortably from mapping and spatial data handling to more advanced topics such as point-pattern analysis, spatial interpolation, and spatially varying parameter estimation. Of course, all of this is "free" because R is open source and allows anyone to use, modify, and add to its superb functionality.

(Scott M. Robeson)

The statistical sections each use "real" data, and each section ends with "Self-Test Questions". Thus the book is suitable not only as a reference for specific spatial data problems, but also for self-study or for training courses, if you want to approach the topic in principle. Overall, the book has a very successful, rounded overview of the analysis and visualization of spatial data. (Dr Thomas Rahlf)

About the Author

Chris Brunsdon is Professor of Geocomputation at the National University of Ireland, Maynooth. He studied Mathematics at the University of Durham and Medical Statistics at the University of Newcastle upon Tyne, and has worked in a number of universities, holding the Chair in Human Geography at Liverpool University before taking up his current position. His research interests are in health, crime and environmental data analysis, and in the development of spatial analytical tools, including Geographically Weighted Regression approach. He also has interests in the software tools used to develop such approaches, including R.

Lex Comber is a Professor of Geographical Information Sciences at the University of Leicester. After studying for a BSc in Plant and Crop Sciences at Nottingham, he did his PhD at the Macaulay Land Use Research Institute (now the Hutton Institute) and the University of Aberdeen. His research covers all areas of

spatial analyses and the application and development of quantitative geographical. These have been applied across topic areas that straddle both the social and environmental and include accessibility analyses, land cover / land use monitoring and handling uncertainty in geographic information and spatial data.

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