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Titolo	Magnetic Resonance Brain Imaging : Modeling and Data Analysis Using R / / by Jörg Polzehl, Karsten Tabelow
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Descrizione fisica	1 online resource (XVIII, 231 p. 77 illus., 48 illus. in color.)
Collana	Use R!, , 2197-5736
Disciplina	519.5
Soggetti	Statistics Radiology Optical data processing Biometry Signal processing Image processing Speech processing systems R (Computer program language) Statistics for Life Sciences, Medicine, Health Sciences Imaging / Radiology Computer Imaging, Vision, Pattern Recognition and Graphics Biostatistics Statistics and Computing/Statistics Programs Signal, Image and Speech Processing
Lingua di pubblicazione	Inglese
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Nota di contenuto	1 Introduction -- 2 Magnetic Resonance Imaging in a nutshell -- 3 Medical imaging data formats -- 4 Functional Magnetic Resonance Imaging -- 5 DiffusionWeighted Imaging -- 6 Multi Parameter Mapping -- Appendix -- References -- Index.
Sommario/riassunto	This book discusses the modeling and analysis of magnetic resonance imaging (MRI) data acquired from the human brain. The data processing pipelines described rely on R. The book is intended for readers from two communities: Statisticians who are interested in

neuroimaging and looking for an introduction to the acquired data and typical scientific problems in the field; and neuroimaging students wanting to learn about the statistical modeling and analysis of MRI data. Offering a practical introduction to the field, the book focuses on those problems in data analysis for which implementations within R are available. It also includes fully worked examples and as such serves as a tutorial on MRI analysis with R, from which the readers can derive their own data processing scripts. The book starts with a short introduction to MRI and then examines the process of reading and writing common neuroimaging data formats to and from the R session. The main chapters cover three common MR imaging modalities and their data modeling and analysis problems: functional MRI, diffusion MRI, and Multi-Parameter Mapping. The book concludes with extended appendices providing details of the non-parametric statistics used and the resources for R and MRI data.The book also addresses the issues of reproducibility and topics like data organization and description, as well as open data and open science. It relies solely on a dynamic report generation with knitr and uses neuroimaging data publicly available in data repositories. The PDF was created executing the R code in the chunks and then running LaTeX, which means that almost all figures, numbers, and results were generated while producing the PDF from the sources.