1. Record Nr. UNINA9910751383603321

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Titolo	Magnetic Resonance Brain Imaging [[electronic resource]] : Modelling and Data Analysis Using R / / by Jörg Polzehl, Karsten Tabelow
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2023
ISBN	3-031-38949-2
Edizione	[2nd ed. 2023.]
Descrizione fisica	1 online resource (268 pages)
Collana	Use R!, , 2197-5744
Altri autori (Persone)	TabelowKarsten
Disciplina	616.8047548
Soggetti	Biometry Radiology Image processing - Digital techniques Computer vision Mathematical statistics - Data processing Signal processing Biostatistics Computer Imaging, Vision, Pattern Recognition and Graphics Statistics and Computing Signal, Speech and Image Processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
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Sommario/riassunto

This book discusses modelling and analysis of Magnetic Resonance Imaging (MRI) data of the human brain. For the data processing pipelines we rely on R, the software environment for statistical computing and graphics. The book is intended for readers from two communities: Statisticians, who are interested in neuroimaging and look for an introduction to the acquired data and typical scientific problems in the field and neuroimaging students, who want to learn about the statistical modeling and analysis of MRI data. Being a practical introduction, the book focuses on those problems in data analysis for which implementations within R are available. By providing full worked-out examples the book thus serves as a tutorial for MRI analysis with R, from which the reader can derive its own data processing scripts. The book starts with a short introduction into MRI. The next chapter considers the process of reading and writing common neuroimaging data formats to and from the R session. The main chapters then cover four common MR imaging modalities and their data modeling and analysis problems: functional MRI, diffusion MRI, Multi-Parameter Mapping and Inversion Recovery MRI. The book concludes with extended Appendices on details of the utilize non-parametric statistics and on resources for R and MRI data. The book also addresses the issues of reproducibility and topics like data organization and description, open data and open science. It completely relies on a dynamic report generation with knitr: The books R-code and intermediate results are available for reproducibility of the examples.

2. Record Nr. UNINA9910830556503321

Titolo	Uncertainty in remote sensing and GIS [[electronic resource] /] / edited by Giles M. Foody and Peter M. Atkinson
Pubbl/distr/stampa	Chichester ; ; Hoboken, NJ, : Wiley, c2002
ISBN	1-280-27108-6 9786610271085 0-470-29911-8 0-470-03526-9 0-470-85924-5
Descrizione fisica	1 online resource (327 p.)
Altri autori (Persone)	FoodyGiles M AtkinsonPeter M
Disciplina	550.28 910/.285
Soggetti	Remote sensing Geographic information systems Uncertainty (Information theory)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Uncertainty in Remote Sensing and GIS; Contents; List of Contributors; Foreword; Preface; 1 Uncertainty in Remote Sensing and GIS: Fundamentals; 2 Uncertainty in Remote Sensing; 3 Toward a Comprehensive View of Uncertainty in Remote Sensing Analysis; 4 On the Ambiguity Induced by a Remote Sensor's PSF; 5 Pixel Unmixing at the Sub-pixel Scale Based on Land Cover Class Probabilities: Application to Urban Areas; 6 Super-resolution Land Cover Mapping from Remotely Sensed Imagery using a Hopfield Neural Network 7 Uncertainty in Land Cover Mapping from Remotely Sensed Data using Textural Algorithm and Artificial Neural Networks8 Remote Monitoring of the Impact of ENSO-related Drought on Sabah Rainforest using NOAA AVHRR Middle Infrared Reflectance: Exploring Emissivity Uncertainty; 9 Land Cover Map 2000 and Meta-data at the Land Parcel Level; 10 Analysing Uncertainty Propagation in GIS: Why is it not that Simple?; 11 Managing Uncertainty in a Geospatial Model of Biodiversity

12 The Effects of Uncertainty in Deposition Data on Predicting Exceedances of Acidity Critical Loads for Sensitive UK Ecosystems13 Vertical and Horizontal Spatial Variation of Geostatistical Prediction; 14 Geostatistical Prediction and Simulation of the Lateral and Vertical Extent of Soil Horizons; 15 Increasing the Accuracy of Predictions of Monthly Precipitation in Great Britain using Kriging with an External Drift; 16 Conditional Simulation Applied to Uncertainty Assessment in DTMs; 17 Current Status of Uncertainty Issues in Remote Sensing and GIS; Index

Sommario/riassunto

Remote sensing and geographical information science (GIS) have advanced considerably in recent years. However, the potential of remote sensing and GIS within the environmental sciences is limited by uncertainty, especially in connection with the data sets and methods used. In many studies, the issue of uncertainty has been incompletely addressed. The situation has arisen in part from a lack of appreciation of uncertainty and the problems it can cause as well as of the techniques that may be used to accommodate it.This book provides general overviews on uncertainty in remote sensing and GIS