Geographically Weighted Regression A Method For Exploring

Geographical Weighted Regression (GWR) is a new local modelling technique for analysing spatial analysis. This technique allows local as opposed to global models of relationships to be measured and mapped. This is the first and only book on this technique, offering comprehensive coverage on this new 'hot' topic in spatial analysis. * Provides step-by-step examples of how to use the GWR model using data sets and examples on issues such as house price determinants, educational attainment levels and school performance statistics * Contains a broad discussion of and basic concepts on GWR through to ideas on statistical inference for GWR models * uniquely features accompanying author-written software that allows users to undertake sophisticated and complex forms of GWR within a user-friendly, Windows-based, front-end (see book for details).

The Encyclopedia of GIS provides a comprehensive and authoritative guide, contributed by experts and peer-reviewed for accuracy, and alphabetically arranged for convenient access. The entries explain key software and processes used by geographers and computational scientists. Major overviews are provided for nearly 200 topics: Geoinformatics, Spatial Cognition, and Location-Based Services and more. Shorter entries define specific terms and concepts. The reference will be published as a print volume with abundant black and white art, and simultaneously as an XML online reference with hyperlinked citations, cross-references, four-color art, links to web-based maps, and other interactive features.

This book expands the current frame of reference of remote sensing and geographic information specialists to include an array of socio-economic and related planning issues. Using remotely sensed data, the project explores the efficacy and policy implications of new approaches toward analyzing data, integrates approaches from human geography and explores the utility of employing geo-technologies to further the politics of local growth and smart growth coalitions, as in green space programs.

An introductory overview of spatial analysis and statistics through GIS, including worked examples and critical analysis of results.

Geographically Weighted RegressionThe Analysis of Spatially Varying RelationshipsJohn Wiley & Sons

The widespread use of Geographical Information Systems (GIS) has significantly increased the demand for knowledge about spatial analytical techniques across a range of disciplines. As growing numbers of researchers realise they are dealing with spatial data, the demand for specialised statistical and mathematical methods designed to deal with spatial data is undergoing a rapid increase. Responding to this demand, The Handbook of Spatial Analysis is a comprehensive and authoritative discussion of issues and techniques in the field of Spatial Data Analysis. Its principal focus is on: • why the analysis of spatial data needs separate treatment • the main areas of spatial analysis • the key debates within spatial analysis • examples of the application of various spatial analytical techniques • problems in spatial analysis • areas for future research Aimed at an international audience of academics, The Handbook of Spatial Analysis will also prove essential to graduate level students and researchers in government agencies and the private sector.

This book examines statistical methods and models used in the fields of global health and epidemiology. It includes methods such as innovative probability sampling, data harmonization and encryption, and advanced descriptive, analytical and monitory methods. Program codes using R are included as well as real data examples. Contemporary global health and epidemiology involves a myriad of medical and health challenges, including inequality of treatment, the HIV/AIDS epidemic and its subsequent control, the flu, cancer, tobacco control, drug

use, and environmental pollution. In addition to its vast scales and telescopic perspective; addressing global health concerns often involves examining resource-limited populations with large geographic, socioeconomic diversities. Therefore, advancing global health requires new epidemiological design, new data, and new methods for sampling, data processing, and statistical analysis. This book provides global health researchers with methods that will enable access to and utilization of existing data. Featuring contributions from both epidemiological and biostatistical scholars, this book is a practical resource for researchers, practitioners, and students in solving global health problems in research, education, training, and consultation.

Abstract: Linear regression modeling is a technique used in several fields for modeling, analyzing, and predicting the relationships between variables. In spatial analysis, regression modeling has been used extensively as a general technique to analyze geographic variables. For example, in spatial epidemiology, this technique has been used to study the spatial distribution of diseases. This thesis explored a regression technique, Geographically Weighted Regression (GWR), which unlike linear regression (ordinary least squares) accounts for spatial non-stationarity. GWR is a way of exploring spatial non-stationarity by calibrating a multiple regression model which allows different relationships to exist at different points in space. This thesis also explored the technique of GWR as a "proper" statistical model and how estimates may be obtained. Local entropy map, a statistical technique in spatial data mining, was explored to examine spatial patterns based on the bivariate relationships between the dependent and each explanatory variable. Data were analyzed to explore the performance of GWR in comparison to OLS and to examine multivariate relationships at local regions using local entropy map.

Written in recognition of developments in spatial data analysis that focused on differences between places, the first edition of Local Models for Spatial Analysis broke new ground with its focus on local modelling methods. Reflecting the continued growth and increased interest in this area, the second edition describes a wide range of methods which account for local variations in geographical properties. What's new in the Second Edition: Additional material on geographically-weighted statistics and local regression approaches A better overview of local models with reference to recent critical reviews about the subject area Expanded coverage of individual methods and connections between them Chapters have been restructured to clarify the distinction between global and local methods A new section in each chapter references key studies or other accounts that support the book Selected resources provided online to support learning An introduction to the methods and their underlying concepts, the book uses worked examples and case studies to demonstrate how the algorithms work their practical utility and range of application. It provides an overview of a range of different approaches that have been developed and employed within Geographical Information Science (GIScience). Starting with first principles, the author introduces users of GISystems to the principles and application of some widely used local models for the analysis of spatial data, including methods being developed and employed in geography and

cognate disciplines. He discusses the relevant software packages that can aid their implementation and provides a summary list in Appendix A. Presenting examples from a variety of disciplines, the book demonstrates the importance of local models for all who make use of spatial data. Taking a problem driven approach, it provides extensive guidance on the selection and application of local models.

This is a new edition of the accessible and student-friendly 'how to' for anyone using R for the first time, for use in spatial statistical analysis, geocomputation and digital mapping. The authors, once again, take readers from 'zero to hero', updating the now standard text to further enable practical R applications in GIS, spatial analyses, spatial statistics, web-scraping and more. Revised and updated, each chapter includes: example data and commands to explore hands-on; scripts and coding to exemplify specific functionality; self-contained exercises for students to work through; embedded code within the descriptive text. The new edition includes detailed discussion of new and emerging packages within R like sf, ggplot, tmap, making it the go to introduction for all researchers collecting and using data with location attached.

This is the introduction to the use of R for spatial statistical analysis, geocomputation, and GIS for all researchers - regardless of discipline - collecting and using data with location attached.

This book examines current trends and developments in the methods and applications of geospatial analysis and highlights future development prospects. It provides a comprehensive discussion of remote sensing- and geographical information system (GIS)-based data processing techniques, current practices, theories, models, and applications of geospatial analysis. Data acquisition and processing techniques such as remote sensing image selections, classifications, accuracy assessments, models of GIS data, and spatial modeling processes are the focus of the first part of the book. In the second part, theories and methods related to fuzzy sets, spatial weights and prominence, geographically weighted regression, weight of evidence, Markov-cellular automata, artificial neural network, agent-based simulation, multi-criteria evaluation, analytic hierarchy process, and a GIS network model are included. Part three presents selected best practices in geospatial analysis. The chapters, all by expert authors, are arranged so that readers who are new to the field will gain an overview and important insights. Those readers who are already practitioners will gain from the advanced and updated materials and state-of-the-art developments in geospatial analysis.

"Geographically Weighted Regression: The Analysis of Spatially Varying Relationships is based on the premise that relationships between variables measured at different locations might not be constant over space. The prevailing assumption is that such relationships are constant, an assumption that would appear to be the result of convenience rather than of any serious examination of the issues. If relationships do vary significantly over space, then serious questions are raised about the reliability of traditional, global-level analyses. Geographically Weighted Regression, as

part of a broader research area in local modelling, provides a new analytical tool and a different perspective on spatial analysis. Instead of being restricted to simple global analyses in which interesting local variations in relationships are 'averaged away' and unobservable, GWR allows local relationships to be measured and mapped. In many ways the output from GWR is similar to that presented by a microscope: previously unimagined detail suddenly comes into focus. This book challenges many of the global statements of spatial relationships that have been made in the academic literature. Geographically Weighted Regression: The Analysis of Spatially Varying Relationships contains a broad discussion of local models in general and of the details of GWR, and provides many empirical examples on issues such as house price determinants, educational attainment levels and school performance statistics. A unique accompanying feature of this book is the author-written software that allows users to undertake sophisticated and complex forms of GWR within a user-friendly, Windows-based, front-end. This software is readily available from the authors and notes on using the software and an example application are documented in the book itself. Geographically Weighted Regression: The Analysis of Spatially Varying Relationships is an essential resource for quantitative spatial analysts and GIS researchers and students. It will be of interest to researchers in any discipline in which spatial data are used across the broad spectrum of social sciences, medicine, science and engineering. The underlying message is that locality is important and measuring local relationships is vital to understanding spatial processes. 'Stewart Fotheringham and his colleagues have produced a book that will be widely used by geographers and others interested in spatial analysis. Geographically weighted regression is an important method, and the authors have developed and explained it well.' Peter Rogerson, Department of Geography, University at Buffalo, USA 'The realisation that almost any statistic can be made 'local', and that mapping the results almost always leads to greater insight is powering a revolution in spatial analysis. In particular, the localisation of standard regression models, or GWR, has led to important and powerful insights. This book, written by the team that has done most to develop it, makes this approach accessible for the first time under a single cover. It should be required reading for anyone involved with the analysis of spatially referenced data.' David Unwin, School of Geography, Birkbeck College London"--Publisher description.

Wildland fires are becoming one of the most critical environmental factors affecting a wide range of ecosystems worldwide. In Mediterranean ecosystems (including also South-Africa, California, parts of Chile and Australia), wildland fires are recurrent phenomena every summer, following the seasonal drought. As a result of changes in traditional land use practices, and the impact of recent climate warming, fires have more negative impacts in the last years, threatening lives, socio-economic and ecological values. The book describes the ecological context of fires in the Mediterranean ecosystems, and provides methods to observe fire danger conditions and fire impacts using Earth Observation and

Geographic Information System technologies.

Geographical Information Systems is a computer system used to capture, store, analyze and display information related to positions on the Earth's surface. It has the ability to show multiple types of information on multiple geographical locations in a single map, enabling users to assess patterns and relationships between different information points, a crucial component for multiple aspects of modern life and industry. This 3-volumes reference provides an up-to date account of this growing discipline through in-depth reviews authored by leading experts in the field. VOLUME EDITORS Thomas J. Cova The University of Utah, Salt Lake City, UT, United States Ming-Hsiang Tsou San Diego State University, San Diego, CA, United States Georg Bareth University of Cologne, Cologne, Germany Chunqiao Song University of California, Los Angeles, CA, United States Yan Song University of North Carolina at Chapel Hill, Chapel Hill, NC, United States Kai Cao National University of Singapore, Singapore Elisabete A. Silva University of Cambridge, Cambridge, United Kingdom Covers a rapidly expanding discipline, providing readers with a detailed overview of all aspects of geographic information systems, principles and applications Emphasizes the practical, socioeconomic applications of GIS Provides readers with a reliable, one-stop comprehensive guide, saving them time in searching for the information they need from different sources

Space and geography are important aspects of social science research in fields such as criminology, sociology, political science, and public health. Many social scientists are interested in the spatial clustering of various behaviors and events. There has been a rapid development of interest in regression methods for analyzing spatial data over recent years, but little available on the topic that is aimed at graduate students and advanced undergraduate classes in the social sciences (most texts are for the natural sciences, or regional science, or economics, and require a good understanding of advanced statistics and probability theory). Spatial Regression Models for the Social Sciences fills the gap, and focuses on the methods that are commonly used by social scientists. Each spatial regression method is introduced in the same way. Guangqing Chi and Jun Zhu explain what each method is and when and how to apply it, by connecting it to social science research topics. They try to avoid mathematical formulas and symbols as much as possible. Secondly, throughout the book they use the same social science example to demonstrate applications of each method and what the results can tell us. Spatial Regression Models for the Social Sciences provides comprehensive coverage of spatial regression methods for social scientists and introduces the methods in an easy-to-follow manner.

In recent years, spatial analysis has become an increasingly active field, as evidenced by the establishment of educational and research programs at many universities. Its popularity is due mainly to new technologies and the development of spatial data infrastructures. This book illustrates some recent developments in spatial analysis,

behavioural modelling, and computational intelligence. World renown spatial analysts explain and demonstrate their new and insightful models and methods. The applications are in areas of societal interest such as the spread of infectious diseases, migration behaviour, and retail and agricultural location strategies. In addition, there is emphasis on the uses of new technologoies for the analysis of spatial data through the application of neural network concepts.

"Founded by the British Cartographic Society (BCS) and first published in June 1964, The Cartographic Journal was the first general distribution English language journal in cartography. This volume of classic papers and accompanying invited reflections brings together some of the key papers to celebrate 50 years of publication. It is a celebration of The Cartographic Journal and of the work that scholars, cartographers and map-makers have published which have made it the foremost international journal of cartography. The intention here is to bring a flavor of the breadth of the journal in one volume spanning the history to date. As a reference work it highlights some of the very best work and, perhaps, allows readers to discover or re-discover a paper from the annals. As we constantly strive for new work and new insights we mustn't ignore the vast repository of material that has gone before. It is this that has shaped cartography as it exists today and as new research contributes to the discipline, which will continue to do so."

Geocomputation is essentially the follow-on revolution from Geographic Information Science and is expected to gather speed and momentum in the first decade of the 21st century. It comes into use once a GIS database has been set up, with a digital data library, and expanded and linked to a global geographical two or three dimensional co-ordinate system. It exploits developments in IT and new data gathering and earth observing technologies, and takes the notion of GIS beyond data and towards its analysis, modelling, and use in problem solving. This book provides pointers on how to harness these technologies in tandem and in the context of multiple different subjects and problem areas. It seeks to establish the principles and set the foundations for subsequent growth. L

The Handbook is written for academics, researchers, practitioners and advanced graduate students. It has been designed to be read by those new or starting out in the field of spatial analysis as well as by those who are already familiar with the field. The chapters have been written in such a way that readers who are new to the field will gain important overview and insight. At the same time, those readers who are already practitioners in the field will gain through the advanced and/or updated tools and new materials and state-of-the-art developments included. This volume provides an accounting of the diversity of current and emergent approaches, not available elsewhere despite the many excellent journals and te- books that exist. Most of the chapters are original, some few are reprints from the Journal of Geographical Systems, Geographical Analysis, The Review of Regional Studies and Letters of Spatial and Resource Sciences. We let our contributors - velop, from their particular perspective and insights, their own strategies for m- ping

the part of terrain for which they were responsible. As the chapters were submitted, we became the first consumers of the project we had initiated. We gained from depth, breadth and distinctiveness of our contributors' insights and, in particular, the presence of links between them.

The importance of Geographic Information Systems (GIS) can hardly be overemphasized in today's academic and professional arena. More professionals and academics have been using GIS than ever – urban

Statistics and computing share many close relationships. Computing now permeates every aspect of statistics, from pure description to the development of statistical theory. At the same time, the computational methods used in statistical work span much of computer science. Elements of Statistical Computing covers the broad usage of computing in statistics. It provides a comprehensive account of the most important computational statistics. Included are discussions of numerical analysis, numerical integration, and smoothing. The author give special attention to floating point standards and numerical analysis; iterative methods for both linear and nonlinear equation, such as Gauss-Seidel method and successive over-relaxation; and computational methods for missing data, such as the EM algorithm. Also covered are new areas of interest, such as the Kalman filter, projection-pursuit methods, density estimation, and other computer-intensive techniques.

The Handbook of Regional Science is a multi-volume reference work providing a state-of-the-art knowledge on regional science composed by renowned scientists in the field. The Handbook is intended to serve the academic needs of graduate students, and junior and senior scientists in regional science and related fields, with an interest in studying local and regional socio-economic issues. The multi-volume handbook seeks to cover the field of regional science comprehensively, including areas such as regional housing and labor markets, regional economic growth, innovation and regional economic development, new and evolutionary economic geography, location and interaction, the environment and natural resources, spatial analysis and geo-computation as well as spatial statistics and econometrics.

Spatial Regression Models illustrates the use of spatial analysis in the social sciences within a regression framework and is accessible to readers with no prior background in spatial analysis. The text covers different modeling-related topics for continuous dependent variables, including mapping data on spatial units, creating data from maps, analyzing exploratory spatial data, working with regression models that have spatially dependent regressors, and estimating regression models with spatially correlated error structures. Using social science examples based on real data, the authors illustrate the concepts discussed, and show how to obtain and interpret relevant results. The examples are presented along with the relevant code to replicate all the analysis using the R package for statistical computing. Users can download both the data and computer code to work through all the examples found in the text. New to the Second Edition is a chapter on mapping as data exploration and its role in the research process, updates to all chapters based on substantive and methodological work, as well as software updates, and information on estimation of time-series, cross-sectional spatial models. Available with Perusall—an eBook that makes it easier to prepare for class Perusall is an award-winning eBook platform featuring social annotation tools that allow students and instructors to collaboratively mark up and discuss their SAGE textbook. Backed by research and supported by technological innovations

developed at Harvard University, this process of learning through collaborative annotation keeps your students engaged and makes teaching easier and more effective. Learn more.

Applied Spatial Data Analysis with R, second edition, is divided into two basic parts, the first presenting R packages, functions, classes and methods for handling spatial data. This part is of interest to users who need to access and visualise spatial data. Data import and export for many file formats for spatial data are covered in detail, as is the interface between R and the open source GRASS GIS and the handling of spatio-temporal data. The second part showcases more specialised kinds of spatial data analysis, including spatial point pattern analysis, interpolation and geostatistics, areal data analysis and disease mapping. The coverage of methods of spatial data analysis ranges from standard techniques to new developments, and the examples used are largely taken from the spatial statistics literature. All the examples can be run using R contributed packages available from the CRAN website, with code and additional data sets from the book's own website. Compared to the first edition, the second edition covers the more systematic approach towards handling spatial data in R, as well as a number of important and widely used CRAN packages that have appeared since the first edition. This book will be of interest to researchers who intend to use R to handle, visualise, and analyse spatial data. It will also be of interest to spatial data analysts who do not use R, but who are interested in practical aspects of implementing software for spatial data analysis. It is a suitable companion book for introductory spatial statistics courses and for applied methods courses in a wide range of subjects using spatial data, including human and physical geography, geographical information science and geoinformatics, the environmental sciences, ecology, public health and disease control, economics, public administration and political science. The book has a website where complete code examples, data sets, and other support material may be found: http://www.asdar-book.org. The authors have taken part in writing and maintaining software for spatial data handling and analysis with R in concert since 2003.

World-renowned experts in spatial statistics and spatial econometrics present the latest advances in specification and estimation of spatial econometric models. This includes information on the development of tools and software, and various applications. The text introduces new tests and estimators for spatial regression models, including discrete choice and simultaneous equation models. The performance of techniques is demonstrated through simulation results and a wide array of applications related to economic growth, international trade, knowledge externalities, population-employment dynamics, urban crime, land use, and environmental issues. An exciting new text for academics with a theoretical interest in spatial statistics and econometrics, and for practitioners looking for modern and up-to-date techniques.

Table of contents

Kernel smoothing refers to a general methodology for recovery of underlying structure in data sets. The basic principle is that local averaging or smoothing is performed with respect to a kernel function. This book provides uninitiated readers with a feeling for the principles, applications, and analysis of kernel smoothers. This is facilitated by the authors' focus on the simplest settings, namely density estimation and nonparametric regression. They pay particular attention to the problem of choosing the smoothing parameter of a kernel smoother, and also treat the multivariate case in detail. Kernal Smoothing is self-contained and assumes only a basic knowledge of statistics, calculus, and matrix algebra. It is an invaluable introduction to the main ideas of kernel estimation for students and researchers from other discipline and provides a comprehensive reference for those familiar with the topic.

Trends and Changes in Hydroclimatic Variables: Links to Climate Variability and Change discusses the change detection and trend analysis

methods used to assess hydroclimatic variables in a changing climate. Changes and trends in hydroclimatic variables are assessed using state-of-the-art methods, such as non-linear trend estimation (including spline smoothing and local regression) and handling persistence (or serial auto-correlation in data) for assessing trends in different hydroclimatic variables (e.g. pre-whitening methods). This book offers a variety of real-life case studies and problem-solving techniques for a field that is rapidly evolving. Users will find methods to evaluate points where time series characteristics change and non-homogeneity in time series. In addition, it covers the subject of climate variability and change in an immense level of detail, including changes on precipitation, streamflow and sea levels. Examines statistical methods for trend analysis, providing an excellent reference book for scholars, scientists, students and professionals Offers an exhaustive treatment of several hydroclimatic variables in one book, providing readers with a comprehensive understanding of changes in hydroclimatic variables over time and space Presents case studies dealing with changes in hydroclimatic variables in different geographical regions of the world Focuses on climate variability and change, including an extensive assessment of trends and their associated links to climate variability and change Geocomputation is the use of software and computing power to solve complex spatial problems. It is gaining increasing importance in the era of the 'big data' revolution, of 'smart cities', of crowdsourced data, and of associated applications for viewing and managing data geographically - like Google Maps. This student focused book: Provides a selection of practical examples of geocomputational techniques and 'hot topics' written by world leading practitioners. Integrates supporting materials in each chapter, such as code and data, enabling readers to work through the examples themselves. Chapters provide highly applied and practical discussions of: Visualisation and exploratory spatial data analysis Space time modelling Spatial algorithms Spatial regression and statistics Enabling interactions through the use of neogeography All chapters are uniform in design and each includes an introduction, case studies, conclusions - drawing together the generalities of the introduction and specific findings from the case study application – and guidance for further reading. This accessible text has been specifically designed for those readers who are new to Geocomputation as an area of research, showing how complex real-world problems can be solved through the integration of technology, data, and geocomputational methods. This is the applied primer for Geocomputation in the social sciences. Publisher Description The Space between Us brings the connection between geography, psychology, and politics to life. By going into the neighborhoods of real cities, Enos shows how our perceptions of racial, ethnic, and religious groups are intuitively shaped by where these groups live and interact daily. Through the lens of numerous examples across the globe and drawing on a compelling combination of research techniques including field and laboratory experiments, big data analysis, and small-scale interactions, this timely book provides a new understanding of how geography shapes politics and how members of groups think about each other. Enos' analysis is punctuated with personal accounts from the field. His rigorous research unfolds in accessible writing that will appeal to specialists and non-specialists alike, illuminating the

profound effects of social geography on how we relate to, think about, and politically interact across groups in the fabric of our daily lives.

Of related interest. Nonlinear Regression Analysis and its Applications Douglas M. Bates and Donald G. Watts ".an extraordinary presentation of concepts and methods concerning the use and analysis of nonlinear regression models.highly recommend[ed].for anyone needing to use and/or understand issues concerning the analysis of nonlinear regression models." --Technometrics This book provides a balance between theory and practice supported by extensive displays of instructive geometrical constructs. Numerous in-depth case studies illustrate the use of nonlinear regression analysis--with all data sets real. Topics include: multi-response parameter estimation; models defined by systems of differential equations; and improved methods for presenting inferential results of nonlinear analysis. 1988 (0-471-81643-4) 365 pp. Nonlinear Regression G. A. F. Seber and C. J. Wild ".[a] comprehensive and scholarly work.impressively thorough with attention given to every aspect of the modeling process." --Short Book Reviews of the International Statistical Institute In this introduction to nonlinear modeling, the authors examine a wide range of estimation techniques including least squares, quasi-likelihood, and Bayesian methods, and discuss some of the problems associated with estimation. The book presents new and important material relating to the concept of curvature and its growing role in statistical inference. It also covers three useful classes of models --growth, compartmental, and multiphase --and emphasizes the limitations involved in fitting these models. Packed with examples and graphs, it offers statisticians, statistical consultants, and statistically oriented research scientists up-to-date access to their fields. 1989 (0-471-61760-1) 768 pp. Mathematical Programming in Statistics T. S. Arthanari and Yadolah Dodge "The authors have achieved their stated intention.in an outstanding and useful manner for both students and researchers.Contains a superb synthesis of references linked to the special topics and formulations by a succinct set of bibliographical notes.Should be in the hands of all system analysts and computer system architects." --Computing Reviews This unique book brings together most of the available results on applications of mathematical programming in statistics, and also develops the necessary statistical and programming theory and methods. 1981 (0-471-08073-X) 413 pp.

This book explores the role of cities and the urban–rural linkages in spurring innovation embedded in spatial planning, strategic and economic planning, and decision support systems. In particular, the contributions examine the complexity of the current transitional phase towards achieving smart, inclusive and sustainable growth, and investigate the post-2020 UE cohesion policy.The main topics include: Innovation dynamics and smart cities; Urban regeneration – community-led and PPP; Inland and urban area development; Mobility, accessibility, infrastructures; Heritage, landscape and Identity; and Risk management, Environment and Energy.The book includes a selection of articles accepted for presentation and

discussion at the 3rd International Symposium New Metropolitan Perspectives (ISTH2020), held at the University of Reggio Calabria, Italy on 22–25 May 2018. The symposium, which addressed the challenge of local knowledge and innovation dynamics towards territory attractiveness, hosted the final event of the MAPS-LED project under Horizon2020 – MSCA RISE.

Understanding spatial statistics requires tools from applied and mathematical statistics, linear model theory, regression, time series, and stochastic processes. It also requires a mindset that focuses on the unique characteristics of spatial data and the development of specialized analytical tools designed explicitly for spatial data analysis. Statistical Methods for Spatial Data Analysis answers the demand for a text that incorporates all of these factors by presenting a balanced exposition that explores both the theoretical foundations of the field of spatial statistics as well as practical methods for the analysis of spatial data. This book is a comprehensive and illustrative treatment of basic statistical theory and methods for spatial data analysis, employing a model-based and frequentist approach that emphasizes the spatial domain. It introduces essential tools and approaches including: measures of autocorrelation and their role in data analysis; the background and theoretical framework supporting random fields; the analysis of mapped spatial point patterns; estimation and modeling of the covariance function and semivariogram; a comprehensive treatment of spatial analysis in the spectral domain; and spatial prediction and kriging. The volume also delivers a thorough analysis of spatial regression, providing a detailed development of linear models with uncorrelated errors, linear models with spatially-correlated errors and generalized linear mixed models for spatial data. It succinctly discusses Bayesian hierarchical models and concludes with reviews on simulating random fields, non-stationary covariance, and spatio-temporal processes. Additional material on the CRC Press website supplements the content of this book. The site provides data sets used as examples in the text, software code that can be used to implement many of the principal methods described and illustrated, and updates to the text itself.

Quantitative Geography is a comprehensive and accessible discussion of the diversity of recent thinking on the use of quantitative methods in spatial data analysis.

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