

## Geospatial And Open Source Software In The 21st Century Lecture Notes In Geoinformation And Cartography

This book is mainly focused on two themes: transportation and smart city applications. Open geospatial science and technology is an increasingly important paradigm that offers the opportunity to promote the democratization of geographical information, the transparency of governments and institutions, as well as social, economic and urban opportunities. During the past decade, developments in the area of open geospatial data have greatly increased. The open source GIS research community believes that combining free and open software, open data, as well as open standards, leads to the creation of a sustainable ecosystem for accelerating new discoveries to help solve global cross-disciplinary urban challenges. The vision of this book is to enrich the existing literature on this topic, and act one step towards more sustainable cities through employment of open source GIS solutions that are reproducible. Various contributions are provided and practically implemented in several urban use cases. Therefore, apart from researchers, lecturers and students in the geography/urbanism domain, crowdsourcing and VGI domain, as well as open source GIS domain, it is believed the specialists and mentors in municipalities and urban planning departments as well as professionals in private companies would be interested to read this book.

In today's world, deep learning source codes and a plethora of open access geospatial images are readily available and easily accessible. However, most people are missing the educational tools to make use of this resource. Deep Learning for Remote Sensing Images with Open Source Software is the first practical book to introduce deep learning techniques using free open source tools for processing real world remote sensing images. The approaches detailed in this book are generic and can be adapted to suit many different applications for remote sensing image processing, including landcover mapping, forestry, urban studies, disaster mapping, image restoration, etc. Written with practitioners and students in mind, this book helps link together the theory and practical use of existing tools and data to apply deep learning techniques on remote sensing images and data. Specific Features of this Book: The first book that explains how to apply deep learning techniques to public, free available data (Spot-7 and Sentinel-2 images, OpenStreetMap vector data), using open source software (QGIS, Orfeo ToolBox, TensorFlow) Presents approaches suited for real world images and data targeting large scale processing and GIS applications Introduces state of the art deep learning architecture families that can be applied to remote sensing world, mainly for landcover mapping, but also for generic approaches (e.g. image restoration) Suited for deep learning beginners and readers with some GIS knowledge. No coding knowledge is required to learn practical skills. Includes deep learning techniques through many step by step remote sensing data processing exercises.

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.

The role open-source geospatial software plays in data handling within the spatial information technology industry is the overarching theme of the book. It also examines new tools and applications for those already using OS approaches to software development.

Get started with QGIS with this introduction covering everything needed to get you going. This tutorial, based on the 3.16 LTR version, introduces you to major concepts and techniques to get you started with viewing data, analysis, and creating maps and reports. With this book you'll learn about: The QGIS interface Creating, editing, and analyzing vector data Working with raster (image) data Using plugins The QGIS Processing Toolbox Georeferencing Creating map and reports Resources for further help and study The book includes a link to all the data you'll need to follow along with each chapter.

Learning GIS Using Open Source Software An Applied Guide for Geo-Spatial Analysis Routledge Chapman & Hall

This book presents a new type of modeling environment where users interact with geospatial simulations using 3D physical models of studied landscapes. Multiple users can alter the physical model by hand during scanning, thereby providing input for simulation of geophysical processes in this setting. The authors have developed innovative techniques and software that couple this hardware with open source GRASS GIS, making the system instantly applicable to a wide range of modeling and design problems. Since no other literature on this topic is available, this Book fills a gap for this new technology that continues to grow. Tangible Modeling with Open Source GIS will appeal to advanced-level students studying geospatial science, computer science and earth science such as landscape architecture and natural resources. It will also benefit researchers and professionals working in geospatial modeling applications, computer graphics, hazard risk management, hydrology, solar energy, coastal and fluvial flooding, fire spread, landscape, park design and computer games.

Decision makers, such as government officials, need to better understand human activity in order to make informed decisions. With the ability to measure and explore geographic space through the use of geospatial intelligence data sources including imagery and mapping data, they are better able to measure factors affecting the human population. As a broad field of study, geospatial research has applications in a variety of fields including military science, environmental science, civil engineering, and space exploration. Geospatial Intelligence: Concepts, Methodologies, Tools, and Applications explores multidisciplinary applications of geographic information systems to describe, assess, and visually depict physical features and to gather data, information, and knowledge regarding human activity. Highlighting a range of topics such as geovisualization, spatial analysis, and landscape mapping, this multi-volume book is ideally designed for data scientists, engineers, government agencies, researchers, and graduate-level students in GIS programs.

The quick growth of computer technology and development of software caused it to be in a constant state of change and advancement. This advancement in software development meant that there would be many types of software developed in order to excel in usability and efficiency. Among these different types of software was open source software, one that grants permission for users to use, study, change, and distribute it freely. Due to its availability, open source software has quickly become a valuable asset to the world of computer technology and across various disciplines including education, business, and library science. The Research Anthology on Usage and Development of Open Source Software presents comprehensive research on the design and development of open source software as well as the ways in which it is used. The text discusses in depth the way in which this computer software has been made into a collaborative effort for the advancement of software technology. Discussing topics such as ISO standards, big data, fault prediction, open collaboration, and software development, this anthology is essential for computer engineers, software developers, IT specialists and consultants, instructors, librarians, managers, executives, professionals, academicians, researchers, and students.

The innovative process of open source software is led in greater part by the end-users; therefore this aspect of open source software remains significant beyond the realm of traditional software development. Open Source Software Dynamics, Processes, and Applications is a multidisciplinary collection of research and approaches on the applications and processes of open source software. Highlighting the development processes performed by software programmers, the motivations of its participants, and the legal and economic issues that have been raised; this book is essential for scholars, students, and practitioners in the fields of software engineering and management as well as sociology.

This is a book about how ecologists can integrate remote sensing and GIS in their daily work. It will allow ecologists to get started with the application of remote sensing and to understand its potential and limitations. Using practical examples, the book covers all necessary steps from planning field campaigns to deriving ecologically relevant information through remote sensing and modelling of species distributions. All practical examples in this book rely on OpenSource software and freely available data sets. Quantum GIS (QGIS) is introduced for basic GIS data handling, and in-depth spatial analytics and statistics are conducted with the software packages R and GRASS. Readers will learn how to apply remote sensing within ecological research projects, how to approach spatial data sampling and how to interpret remote sensing derived products. The authors discuss a wide range of statistical analyses with regard to satellite data as well as specialised topics such as time-series analysis. Extended scripts on how to create professional looking maps and graphics are also provided. This book is a valuable resource for students and scientists in the fields of conservation and ecology interested in learning how to get started in applying remote sensing in ecological research and conservation planning.

This book focuses on the use of open source software for geospatial analysis. It demonstrates the effectiveness of the command line interface for handling both vector, raster and 3D geospatial data. Appropriate open-source tools for data processing are clearly explained and discusses how they can be used to solve everyday tasks. A series of fully worked case studies are presented including vector spatial analysis, remote sensing data analysis, landcover classification and LiDAR processing. A hands-on introduction to the application programming interface (API) of GDAL/OGR in Python/C++ is provided for readers who want to extend existing tools and/or develop their own software.

QGIS is a leading user-friendly, cross-platform, open source, desktop geographic information system (GIS). It provides many useful capabilities and features and their number is continuously growing. More and more private users and companies choose QGIS as their primary GIS software because it is very easy to use, feature-rich, extensible, and has a big and constantly growing community. This book guides you from QGIS installation through data loading, and preparation to performing most common GIS analyses. You will perform different types of GIS analyses including density, visibility, and suitability analysis on practical, real-world data. Finally, you will learn how to become more productive and automate your everyday work with the help of the QGIS Processing framework and by developing your own Python plugins. By the end of this book, you will have all the necessary knowledge about handling and analyzing spatial data.

Presents a fact-based, benefits-focused methodology aimed at ensuring the sustainability of GIS initiatives by demonstrating the success of the investment. This book provides a framework with supplemental case studies, interactive digital tools, and templates.

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

Simply stated, geography studies the locations of things and the explanations that underlie spatial distributions. Profound forces at work throughout the world have made geographical knowledge increasingly important for understanding numerous human dilemmas and our capacities to address them. With more than 1,200 entries, the Encyclopedia of Geography reflects how the growth of geography has propelled a demand for intermediaries between the abstract language of academia and the ordinary language of everyday life. The six volumes of this encyclopedia encapsulate a diverse array of topics to offer a comprehensive and useful summary of the state of the discipline in the early 21st century. Key Features Gives a concise historical sketch of geography's long, rich, and fascinating history, including human geography, physical geography, and GIS Provides succinct summaries of trends such as globalization, environmental destruction, new geospatial technologies, and cyberspace Decomposes geography into the six broad subject areas: physical geography; human geography; nature and society; methods, models, and GIS; history of geography; and geographer biographies, geographic organizations, and important social movements Provides hundreds of color illustrations and images that lend depth and realism to the text Includes a special map section Key Themes Physical Geography Human Geography Nature and Society Methods, Models, and GIS People, Organizations, and Movements History of Geography This encyclopedia strategically reflects the enormous diversity of the discipline, the multiple meanings of space itself, and the diverse views of geographers. It brings together the diversity of geographical knowledge, making it an invaluable resource for any academic library.

This book provides an overview of the latest developments in the fast growing field of tangible user interfaces. It presents a new type of modeling environment where the users interact with geospatial data and simulations using 3D physical landscape model coupled with 3D rendering engine. Multiple users can modify the physical model, while it is being scanned, providing input for geospatial analysis and simulations. The results are then visualized by projecting images or animations back on the physical model while

photorealistic renderings of human views are displayed on a computer screen or in a virtual reality headset. New techniques and software which couple the hardware set-up with open source GRASS GIS and Blender rendering engine, make the system instantly applicable to a wide range of applications in geoscience education, landscape design, computer games, stakeholder engagement, and many others. This second edition introduces a new more powerful version of the tangible modeling environment with multiple types of interaction, including polymeric sand molding, placement of markers, and delineation of areas using colored felt patches. Chapters on coupling tangible interaction with 3D rendering engine and immersive virtual environment, and a case study integrating the tools presented throughout this book, demonstrate the second generation of the system - Immersive Tangible Landscape - that enhances the modeling and design process through interactive rendering of modeled landscape. This book explains main components of Immersive Tangible Landscape System, and provides the basic workflows for running the applications. The fundamentals of the system are followed by series of example applications in geomorphometry, hydrology, coastal and fluvial flooding, fire spread, landscape and park design, solar energy, trail planning, and others. Graduate and undergraduate students and educators in geospatial science, earth science, landscape architecture, computer graphics and games, natural resources and many others disciplines, will find this book useful as a reference or secondary textbook. Researchers who want to build and further develop the system will most likely be the core audience, but also anybody interested in geospatial modeling applications (hazard risk management, hydrology, solar energy, coastal and fluvial flooding, fire spread, landscape and park design) will want to purchase this book.

A guide on how to assemble and use an Open source GIS toolkit explains how to select a platform and the right tools, integrate them within a system, and navigate through available options.

This symposium, which was held on March 10-11, 2003, at UNESCO headquarters in Paris, brought together policy experts and managers from the government and academic sectors in both developed and developing countries to (1) describe the role, value, and limits that the public domain and open access to digital data and information have in the context of international research; (2) identify and analyze the various legal, economic, and technological pressures on the public domain in digital data and information, and their potential effects on international research; and (3) review the existing and proposed approaches for preserving and promoting the public domain and open access to scientific and technical data and information on a global basis, with particular attention to the needs of developing countries.

Thoroughly updated with material related to the GRASS6, the third edition includes new sections on attribute database management and SQL support, vector networks analysis, lidar data processing and new graphical user interfaces. All chapters were updated with numerous practical examples using the first release of a comprehensive, state-of-the-art geospatial data set.

The wide range of challenges in studying Earth system dynamics due to uncertainties in climate change and complex interference from human activities is creating difficulties in managing land and water resources and ensuring their sustainable use. Mapping, Monitoring, and Modeling Land and Water Resources brings together real-world case studies accurately surveyed and assessed through spatial modeling. The book focuses on the effectiveness of combining remote sensing, geographic information systems, and R. The use of open source software for different spatial modeling cases in various fields, along with the use of remote sensing and geographic information systems, will aid researchers, students, and practitioners to understand better the phenomena and the predictions by future analyses for problem-solving and decision-making.

The authors are all prominent experts in Open Source GIS in Italy and, in many cases, the international community. They are all professionals with involvement in training and scientific research and are highly motivated by their common goal of supporting Free Software. This is, therefore, an innovative undertaking in that it provides the user with immediate access to the software tools and to the numerous resources and documents described in the text and available via the Internet. The first part of the book, which is divided into nine chapters, deals with describing reference systems and helping the user install the software packages on Microsoft, Apple, GNU/Linux operating systems. Subsequent chapters present the most important functionalities of well-known software, such as QGIS and GRASS GIS, and describe ways of managing geographic data using relational database engines (Spatialite). Next, a few examples and applications in landscaping, geomorphology, hydrology and geology are presented and the various online resources where users may obtain free help and support are described. The book closes with a few remarks on advanced functionalities.

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`.

This book offers an overview of geospatial technologies in land resources mapping, monitoring and management. It consists of four main sections: geospatial technologies - principles and applications; geospatial technologies in land resources mapping; geospatial technologies in land resources monitoring; and geospatial technologies in land resources management. Each part is divided into detailed chapters that include illustrations and tables. The authors, from leading institutes, such as the ICAR-NBSS&LUP, IIT-B, NRSC, ICRISAT, share their experiences and offer case studies to provide advanced insights into the field. It is a valuable resource for the scientific and the teaching community, extension scientists at research institutes and agricultural universities/colleges as well as those involved in planning and managing land resources for sustainable agriculture and livelihood security.

Provides information on how to create custom maps from tools available over the Internet.

If you are a GIS professional, a consultant, a student, or perhaps a fast learner who wants to go beyond the basics of QGIS, then this book is for you. It will prepare you to realize the full potential of QGIS. Desktop Geographic Information System (GIS) software gives you the ability to make maps and analyze geographic information. This book provides a foundational level of knowledge for understanding GIS and the open source desktop mapping applications that are available for use, for free, today. Learn about vector and raster data, how to convert data, interacting with spatial databases, creating new map data, geoprocessing, scripting, and more. Special sections include focused learning on the Quantum GIS and GRASS GIS software platforms but other packages are also introduced. The Geospatial Desktop is written by the creator of Quantum GIS, so you can rest assured that you will be led by one of the most knowledgeable authors on the subject.

The latest guide to using QGIS 2.14 to create great maps and perform geoprocessing tasks with ease About This Book Learn how to work with various data and create beautiful maps using this easy-to-follow guide. Give a touch of professionalism to your maps both for functionality and look and feel with the help of this practical guide. A progressive hands-on guide that builds on a geo-spatial data and adds more reactive maps by using geometry tools. Who This Book Is For This book is great for users, developers, and consultants who know the basic functions and processes of GIS and want to learn to use QGIS to analyze geospatial data and create rich mapping applications. If you want to take advantage of the wide range of functionalities that QGIS offers, then this is the book for you. What You Will Learn Install QGIS and get familiar with the user interface Load vector and raster data from files, databases, and web services Create, visualize, and edit spatial data Perform geoprocessing tasks and automate them Create advanced cartographic outputs Design great print maps Expand QGIS using Python In Detail QGIS is a user-friendly open source geographic information system (GIS) that runs on Linux, Unix, Mac OS X, and Windows. The popularity of open source geographic information systems and QGIS in particular has been growing rapidly over the last few years. Learning QGIS Third Edition is a practical, hands-on guide updated for QGIS 2.14 that provides you with clear, step-by-step exercises to help you apply your GIS knowledge to QGIS. Through clear, practical exercises, this book will introduce you to working with QGIS quickly and painlessly. This book takes you from installing and configuring QGIS to handling spatial data to creating great maps. You will learn how to load and visualize existing spatial data and create data from scratch. You will get to know important plugins, perform common geoprocessing and spatial analysis tasks and automate them with Processing. We will cover how to achieve great cartographic output and print maps. Finally, you will learn how to extend QGIS using Python and even create your own plugin. Style and approach A step by step approach to explain concepts of Geospatial map with the help of real life examples

This book showcases selected conference papers addressing the sustainable future of ASEAN from the perspectives of science and technology disciplines. In addressing the 17 Sustainable Development Goals (SDGs) envisioned by the United Nations in the domains of environment, health and well-being, posing potential means of reducing inequalities globally, the authors target specific issues and challenges confronting the fast-growing region of ASEAN and present suggestions for co-operation and commitment from governments, non-governmental organisations (NGOs) and society at large, in line with the ASEAN Vision 2020. Papers are selected from the 3rd International Conference on the Future of ASEAN (ICoFA) 2019, organised by Universiti Teknologi MARA in Malaysia, whose conference theme "Charting the Sustainable Future of ASEAN" enables intellectual discourse on sustainability issues from science and technology, as well as business and the social sciences. The selection of papers is published in two books, comprised of scholarly and practical insights on sustainability in ASEAN. This book from science and technology scholars is of interest to researchers and policymakers interested in sustainability developments in the ASEAN region.

This book introduces the usage, functionality, and application of data in Geographic Information Systems (GIS) for geo-spatial analysis. It offers knowledge on GIS tools and techniques and explains how they can be applied in real-world project to architects and planners in the Indian and the greater South Asian context using open-source software. The volume explains concepts on planning and architectural tasks, their data, methods, and requirements followed and includes GIS-related exercises on the same tasks. It takes the reader through the concepts of geo-spatial analysis and its referencing system while quoting examples from India. Further, the content of the book will help the planners involved in preparing GIS-based Master Planning for AMRUT Cities. A practical guidebook providing a step by step guide to learn open source GIS, this book will be useful for students, scholars and professionals from the field of architecture and planning, geography and other spatial sciences, instructors of GIS course on planning and architecture, Urban and Regional Planners, Transport Planners, Urban design, Landscape Architects, Environmental Planners, Departments of Town and Country Planning, and Development Authorities. It will also be useful for anyone interested in the geospatial analysis.

This is a book about how ecologists can integrate remote sensing and GIS in their research. It will allow readers to get started with the application of remote sensing and to understand its potential and limitations. Using practical examples, the book covers all necessary steps from planning field campaigns to deriving ecologically relevant information through remote sensing and modelling of species distributions. An Introduction to Spatial Data Analysis introduces spatial data handling using the open source software Quantum GIS (QGIS). In addition, readers will be guided through their first steps in the R

programming language. The authors explain the fundamentals of spatial data handling and analysis, empowering the reader to turn data acquired in the field into actual spatial data. Readers will learn to process and analyse spatial data of different types and interpret the data and results. After finishing this book, readers will be able to address questions such as “What is the distance to the border of the protected area?”, “Which points are located close to a road?”, “Which fraction of land cover types exist in my study area?” using different software and techniques. This book is for novice spatial data users and does not assume any prior knowledge of spatial data itself or practical experience working with such data sets. Readers will likely include student and professional ecologists, geographers and any environmental scientists or practitioners who need to collect, visualize and analyse spatial data. The software used is the widely applied open source scientific programs QGIS and R. All scripts and data sets used in the book will be provided online at [book.ecosens.org](http://book.ecosens.org). This book covers specific methods including: what to consider before collecting in situ data how to work with spatial data collected in situ the difference between raster and vector data how to acquire further vector and raster data how to create relevant environmental information how to combine and analyse in situ and remote sensing data how to create useful maps for field work and presentations how to use QGIS and R for spatial analysis how to develop analysis scripts

This book contains papers presented at the first Open Source Geospatial Research Symposium held in Nantes City, France, 8-10 July, 2009. It brings together insights and ideas in the fields of Geospatial Information and Geoinformatics. It demonstrates the scientific community dynamism related to open source and free software as well as in defining new concepts, standards or tools.

This book introduces the usage, functionality, and application of data in geographic information systems (GIS) for geo-spatial analysis. It offers knowledge on GIS tools and techniques and explains how they can be applied in real-world project to architects and planners in the Indian and the Greater South Asian context using open-source software. The volume explains concepts on planning and architectural tasks, their data, methods and requirements followed, and includes GIS-related exercises on the same tasks. It takes the reader through the concepts of geo-spatial analysis and its referencing system while quoting examples from India. Further, the content of the book will help the planners involved in preparing GIS-based master planning for cities under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme (see Glossary for details). A practical guidebook providing a step-by-step guide to learn open source GIS, this book will be useful for students, scholars and professionals from the field of architecture and planning, geography and other spatial sciences, instructors of GIS course on planning and architecture, urban and regional planners, transport planners, urban design, landscape architects, environmental planners, departments of town and country planning, and development authorities. It will also be useful for anyone interested in the geospatial analysis.

Open access to information of geographic places and spatial relationships provides an essential part of the analytical processing of spatial data. Access to connected geospatial programs allows for improvement in teaching and understanding science, technology, engineering, and mathematics. Emerging Trends in Open Source Geographic Information Systems provides emerging research on the applications of free and open software in geographic information systems in various fields of study. While highlighting topics such as data warehousing, hydrological modeling, and software packages, this publication explores the assessment and techniques of open software functionality and interfaces. This book is an important resource for professionals, researchers, academicians, and students seeking current research on the different types and uses of data and data analysis in geographic information systems.

PostGIS in Action, Third Edition shows you how to solve real-world geodata problems. You'll go beyond basic mapping, and explore custom functions for your applications. Summary In PostGIS in Action, Third Edition you will learn: An introduction to spatial databases Geometry, geography, raster, and topology spatial types, functions, and queries Applying PostGIS to real-world problems Extending PostGIS to web and desktop applications Querying data from external sources using PostgreSQL Foreign Data Wrappers Optimizing queries for maximum speed Simplifying geometries for greater efficiency PostGIS in Action, Third Edition teaches readers of all levels to write spatial queries for PostgreSQL. You'll start by exploring vector-, raster-, and topology-based GIS before quickly progressing to analyzing, viewing, and mapping data. This fully updated third edition covers key changes in PostGIS 3.1 and PostgreSQL 13, including parallelization support, partitioned tables, and new JSON functions that help in creating web mapping applications. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology PostGIS is a spatial database extender for PostgreSQL. It offers the features and firepower you need to take on nearly any geodata task. PostGIS lets you create location-aware queries with a few lines of SQL code, then build the backend for mapping, raster analysis, or routing application with minimal effort. About the book PostGIS in Action, Third Edition shows you how to solve real-world geodata problems. You'll go beyond basic mapping, and explore custom functions for your applications. Inside this fully updated edition, you'll find coverage of new PostGIS features such as PostGIS Window functions, parallelization of queries, and outputting data for applications using JSON and Vector Tile functions. What's inside Fully revised for PostGIS version 3.1 and PostgreSQL 13 Optimize queries for maximum speed Simplify geometries for greater efficiency Extend PostGIS to web and desktop applications About the reader For readers familiar with relational databases and basic SQL. No prior geodata or GIS experience required. About the author Regina Obe and Leo Hsu are database consultants and authors. Regina is a member of the PostGIS core development team and the Project Steering Committee. Table of Contents PART 1 INTRODUCTION TO POSTGIS 1 What is a spatial database? 2 Spatial data types 3 Spatial reference systems 4 Working with real data 5 Using PostGIS on the desktop 6 Geometry and geography functions 7 Raster functions 8 Spatial relationships PART 2 PUTTING POSTGIS TO WORK 9 Proximity analysis 10 PostGIS TIGER geocoder 11 Geometry and geography processing 12 Raster processing 13 Building and using topologies 14 Organizing spatial data 15 Query performance tuning PART 3 USING POSTGIS WITH OTHER TOOLS 16 Extending PostGIS with pgRouting and procedural languages 17 Using PostGIS in web applications

Over the past few decades the world has been organized through the growth and integration of geographic information systems (GIS) across public and private sector industries, agencies, and organizations. This has happened in a technological context that includes the widespread deployment of multiple digital mobile technologies, digital wireless communication networks, positioning, navigation and mapping services, and cloud-based computing, spawning new ways of imagining, creating, and consuming geospatial information and analytics. GIS: An Introduction to Mapping Technologies is written with the detached voices of practitioner scholars who draw on a diverse set of experiences and education, with a shared view of GIS that is grounded in the analysis of scale-diverse contexts emphasizing cities and their social and environmental geographies. GIS is presented as a critical toolset that allows analysts to focus on urban social and environmental sustainability. The book opens with chapters that explore foundational techniques of mapping, data acquisition and field data collection using GNSS, georeferencing, spatial analysis, thematic mapping, and data models. It explores web GIS and open source GIS making geospatial technology available to many who would not be able to access it otherwise. Also, the book covers in depth the integration of remote sensing into GIS, Health GIS, Digital Humanities GIS, and the increased use of GIS in diverse types of organizations. Active learning is emphasized with ArcGIS Desktop lab activities integrated into most of the chapters. Written by experienced authors from the Department of Geography at DePaul University in Chicago, this textbook is a great introduction to GIS for a diverse range of undergraduates and graduate students, and professionals who are concerned with urbanization, economic justice, and environmental sustainability.

Summary Geoprocessing with Python teaches you how to use the Python programming language, along with free and open source tools, to read, write, and process geospatial data. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology This book is about the science of reading, analyzing, and presenting geospatial data

programmatically, using Python. Thanks to dozens of open source Python libraries and tools, you can take on professional geoprocessing tasks without investing in expensive proprietary packages like ArcGIS and MapInfo. The book shows you how. About the Book Geoprocessing with Python teaches you how to access available datasets to make maps or perform your own analyses using free tools like the GDAL, NumPy, and matplotlib Python modules. Through lots of hands-on examples, you'll master core practices like handling multiple vector file formats, editing geometries, applying spatial and attribute filters, working with projections, and performing basic analyses on vector data. The book also covers how to manipulate, resample, and analyze raster data, such as aerial photographs and digital elevation models. What's Inside Geoprocessing from the ground up Read, write, process, and analyze raster data Visualize data with matplotlib Write custom geoprocessing tools Three additional appendixes available online About the Reader To read this book all you need is a basic knowledge of Python or a similar programming language. About the Author Chris Garrard works as a developer for Utah State University and teaches a graduate course on Python programming for GIS. Table of Contents Introduction Python basics Reading and writing vector data Working with different vector file formats Filtering data with OGR Manipulating geometries with OGR Vector analysis with OGR Using spatial reference systems Reading and writing raster data Working with raster data Map algebra with NumPy and SciPy Map classification Visualizing data Appendixes A - Installation B - References C - OGR - online only D - OSR - online only E - GDAL - online only

Step-by-step instructions are included and the needs of a beginner are totally satisfied by the book. The book consists of plenty of examples with accompanying screenshots and code for an easy learning curve. You are a web developer with knowledge of server side scripting, and have experience with installing applications on the server. You have a desire to want more than Google maps, by offering dynamically built maps on your site with your latest geospatial data stored in MySQL, PostGIS, MsSQL or Oracle. If this is the case, this book is meant for you.

This edited volume is designed to discuss important issues around open access to data and software in academic and commercial archaeology, as well as to summarise both the current state of theoretical engagement, and technological development in the field of open-archaeology.

Since the first edition of Open Source GIS: A GRASS GIS Approach was published in 2002, GRASS has undergone major improvements. This second edition includes numerous updates related to the new development; its text is based on the GRASS 5.3 version from December 2003. Besides changes related to GRASS 5.3 enhancements, the introductory chapters have been re-organized, providing more extensive information on import of external data. Most of the improvements in technical accuracy and clarity were based on valuable feedback from readers. Open Source GIS: A GRASS GIS Approach, Second Edition, provides updated information about the use of GRASS, including geospatial modeling with raster, vector, and site data, image processing, visualization, and coupling with other open source tools for geostatistical analysis and web applications. A brief introduction to programming within GRASS encourages new development. The sample data set used throughout the book has been updated and is available on the GRASS web site. This book also includes links to sites where the GRASS software and on-line reference manuals can be downloaded and additional applications can be viewed.

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