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

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Open Source Approaches in Spatial Data Handling - Brent Hall 2008-09-27
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.

Emerging Trends in Open Source Geographic Information Systems - Srivastava, Naveenchandra N. 2018-05-25
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.

Deep Learning for Remote Sensing Images with Open Source Software - Rémi Cresson 2020-07-15
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.

Encyclopedia of Geography - Barney Warf 2010-09-21
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.

Geospatial Free and Open Source Software in the 21st Century - Erwan Bocher 2012-02-22
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.

Geoprocessing with Python - Christine Garrard 2016-05-05
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

Geospatial Technologies in Land Resources Mapping, Monitoring and Management - G. P. Obi Reddy 2018-09-11
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.

Gis Open Source - Luca Casagrande 2014-03-13T00:00:00+01:00
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.

Open Source Archaeology - Andrew T. Wilson 2015-01-01
Open Source Archaeology: Ethics and Practice' brings together authors and researchers in the field of open-source archaeology, defined as encompassing the ethical imperative for open public access to the results of publicly-funded research; practical solutions to open-data projects; open-source software applications in archaeology; public information sharing projects in archaeology; open-GIS; and the open-context system of data management and sharing. 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. Ben Edwards Ben Edwards was trained in archaeology at the University of Durham, achieving his BA, MA and PhD. His first commercial work was for Archaeological Services, Durham University, before moving on to become a Lecturer in Archaeological Practice at the University of Liverpool, where he taught for three years. During this time Ben began his project management work, undertaking both commercial and research excavations, and survey projects. His teaching (archaeological practice and heritage management) proved to be an excellent basis from which to develop his professional expertise. Ben now lectures at Manchester Metropolitan University in Archaeology and Heritage. He currently researches open source software and hardware for use in the field, and advanced 3D surveying techniques. Andrew Wilson Andrew Wilson was trained in archaeology at the University of Liverpool. Upon achieving his BA at the University, Andrew moved south to study Computer Applied Archaeology at the University of Southampton, where he was awarded an MSc. Andrew returned to the University of Liverpool where he has recently completed a PhD. During this time Andrew coordinated a number of projects both in the UK and Middle East, specialising in advanced surveying techniques of archaeological remains. Working in the the School of Computer Science, Bangor University Andrew has developed his keen interest in Open data policies and ethics. This interest was the starting point for this volume.

Deep Learning for Remote Sensing Images with Open Source Software - Rémi Cresson 2022-01-16
This is the first practical book to introduce deep learning techniques using free open source tools for processing real world remote sensing images. The approaches are generic and adapted to suit applications for various remote sensing images processing in landcover mapping, forestry, urban, in disaster mapping, image restoration, etc.

GeoServer Beginner's Guide - Brian Youngblood 2013-01-01
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.

Open Source Software Dynamics, Processes, and Applications - Koch, Stefan 2013-02-28
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.

Tangible Modeling with Open Source GIS - Anna Petrasova 2015-12-11
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.

Geocomputation with R - Robin Lovelace 2019-03-22
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.

An Introduction to Spatial Data Analysis - Martin Wegmann 2020-09-14
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. 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

Open Source GIS: A GRASS GIS Approach - Markus Neteler 2004-09-21
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.

Deep Learning for Coders with fastai and PyTorch - Jeremy Howard 2020-06-29
Deep learning is often viewed as the exclusive domain of math PhDs and big tech companies. But as this hands-on guide demonstrates, programmers comfortable with Python can achieve impressive results in deep learning with little math background, small amounts of data, and minimal code. How? With fastai, the first library to provide a consistent interface to the most frequently used deep learning applications. Authors Jeremy Howard and Sylvain Gugger, the creators of fastai, show you how to train a model on a wide range of tasks using fastai and PyTorch. You'll also dive progressively further into deep learning theory to gain a complete understanding of the algorithms behind the scenes. Train models in computer vision, natural language processing, tabular data, and collaborative filtering Learn the latest deep learning techniques that matter most in practice Improve accuracy, speed, and reliability by understanding how deep learning models work Discover how to turn your models into web applications Implement deep learning algorithms from scratch Consider the ethical implications of your work Gain insight from the foreword by PyTorch cofounder, Soumith Chintala

Open Source Geospatial Tools - Daniel McInerney 2016-09-10
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.

Research Anthology on Usage and Development of Open Source Software - Management Association, Information Resources 2021-06-25
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.

Springer Handbook of Geographic Information - Wolfgang Kresse 2022-06-24
This handbook provides an exhaustive, one-stop reference and a state-of-the-art description of geographic information and its use. This new, substantially updated edition presents a complete and rigorous overview of the fundamentals, methods and applications of the multidisciplinary field of geographic information systems. Designed to be a useful and readable desk reference book, but also prepared in various electronic formats, this title allows fast yet comprehensive review and easy retrieval of essential reliable key information. The Springer Handbook of Geographic Information is divided into three parts. Part A, Basics and Computer Science, provides an overview on the fundamentals, including descriptions of databases and encoding of geographic information. It also covers the underlying mathematical and statistics methods and modeling. A new chapter exemplifies the emerging use and analysis of big data in a geographic context. Part B offers rigorous descriptions of gathering, processing and coding of geographic information in a standardized way to allow interoperable use in a variety of systems; from traditional methods such as geodesy and surveying to state-of-the-art remote sensing and photogrammetry; from cartography to geospatial web services. Discussions on geosemantic interoperability and security of open distributed geospatial information systems complete the comprehensive coverage. The final part describes a wide array of applications in science, industry and society at large, such as agriculture, defense, transportation, energy and utilities, health and human services. The part is enhanced by new chapters on smart cities and building information modeling, as well as a complete overview of the currently available open-source geographic information systems. Using standardized international terminology, in accordance with ISO/TC 211 and INSPIRE, this handbook facilitates collaboration between different disciplines and is a must have for practitioners and new comers in industry and academia.

Geospatial Free and Open Source Software in the 21st Century - Erwan Bocher 2012-02-23
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.

Open Source GIS - Markus Neteler 2007-10-23
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.

QGIS By Example - Alexander Bruy 2015-06-29
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.

Web Mapping Illustrated - Tyler Mitchell 2005-06-17
Provides information on how to create custom maps from tools available over the Internet.

Desktop GIS - Gary E. Sherman 2008
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.

Open Source GIS - Markus Neteler 2013-04-18
Open Source GIS: A GRASS GIS Approach was written for experienced GIS users, who want to learn GRASS, as well as for the Open Source software users who are GIS newcomers. Following the Open Source model of GRASS, the book includes links to sites where the GRASS system and on-line reference manuals can be downloaded and additional applications can be viewed. The project's website can be reached at http://grass.itc.it and a number of mirror sites worldwide. Open Source GIS: A GRASS GIS Approach, provides basic information about the use of GRASS from setting up the spatial database, through working with raster, vector and site data, to image processing and hands-on applications. This book also contains a brief introduction to programming within GRASS encouraging the new GRASS development. The power of computing within Open Source environment is illustrated by examples of the GRASS usage with other Open Source software tools, such as GSTAT, R statistical language, and linking GRASS to MapServer. Open Source GIS: A GRASS GIS Approach is designed to meet the needs of a professional audience composed of researchers and practitioners in industry and graduate level students in Computer Science and Geoscience.

Learning GIS Using Open Source Software - Kakoli Saha 2021-12-07
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 courses 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.

Encyclopedia of GIS - Shashi Shekhar 2007-12-12
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.

Open Source Geospatial Science for Urban Studies - Amin Mobasheri 2020-09-07
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.

Open Source Geospatial Tools - Daniel McInerney 2014-11-22
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.

Geospatial Analysis - Michael John De Smith 2007
Addresses a range of analytical techniques that are provided within modern Geographic Information Systems and related geospatial software products. This guide covers: the principal concepts of geospatial analysis; core components of geospatial analysis; and, surface analysis, including surface form analysis, gridding and interpolation methods.

Learning QGIS - Anita Graser 2016-03-10
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

Geospatial Intelligence: Concepts, Methodologies, Tools, and

Applications - Management Association, Information Resources 2019-03-01
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.

Open Access and the Public Domain in Digital Data and Information for Science - National Research Council 2004-06-14
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.

Spatial Modeling in GIS and R for Earth and Environmental Sciences - Hamid Reza Pourghasemi 2019-01-18
Spatial Modeling in GIS and R for Earth and Environmental Sciences offers an integrated approach to spatial modelling using both GIS and R. Given the importance of Geographical Information Systems and geostatistics across a variety of applications in Earth and Environmental Science, a clear link between GIS and open source software is essential for the study of spatial objects or phenomena that occur in the real world and facilitate problem-solving. Organized into clear sections on applications and using case studies, the book helps researchers to more quickly understand GIS data and formulate more complex conclusions. The book is the first reference to provide methods and applications for combining the use of R and GIS in modeling spatial processes. It is an essential tool for students and researchers in earth and environmental science, especially those looking to better utilize GIS and spatial modeling. Offers a clear, interdisciplinary guide to serve researchers in a variety of fields, including hazards, land surveying, remote sensing, cartography, geophysics, geology, natural resources, environment and geography Provides an overview, methods and case studies for each application Expresses concepts and methods at an appropriate level for both students and new users to learn by example

Introduction to QGIS - Scott Madry 2021-05-17
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.

Mapping, Monitoring, and Modeling Land and Water Resources - Pravat Kumar Shit 2021-06-28
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.

Mastering Geospatial Development with QGIS 3.x - Shammunul Islam 2019-03-28
Go beyond the basics and unleash the full power of QGIS 3.4 and 3.6 with practical, step-by-step examples Key FeaturesOne-stop solution to all of your GIS needs Master QGIS by learning about database integration, and geoprocessing toolsLearn about the new and updated Processing toolbox and perform spatial analysis Book Description QGIS is an open source solution to GIS and widely used by GIS professionals all over the world. It is the leading alternative to proprietary GIS software. Although QGIS is described as intuitive, it is also, by default, complex. Knowing which tools to use and how to apply them is essential to producing valuable deliverables on time. Starting with a refresher on the QGIS basics and getting you acquainted with the latest QGIS 3.6 updates, this book will take you all the way through to teaching you how to create a spatial database and a GeoPackage. Next, you will learn how to style raster and vector data by choosing and managing different colors. The book will then focus on processing raster and vector data. You will be then taught advanced applications, such as creating and editing vector data. Along with that, you will also learn about the newly updated Processing Toolbox, which will help you develop the advanced data visualizations. The book will then explain to you the graphic modeler, how to create QGIS plugins with PyQGIS, and how to integrate Python analysis scripts with QGIS. By the end of the book, you will understand how to work with all aspects of QGIS and will be ready to use it for any type of GIS work. What you will learnCreate and manage a spatial databaseGet to know advanced techniques to style GIS data Prepare both vector and raster data for processing Add heat maps, live layer effects, and labels to your maps Master LAStools and GRASS integration with the Processing Toolbox Edit and repair topological data errors Automate workflows with batch processing and the QGIS Graphical Modeler Integrate Python scripting into your data processing workflows Develop your own QGIS pluginsWho this book is for 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.

Remote Sensing and GIS for Ecologists - Martin Wegmann 2016-02-08
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.

The Geospatial Desktop - Gary E. Sherman 2012
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.