Python For Geospatial Data Analysis

Handling of Geospatial Data with QGISNext Generation Geospatial InformationBig Data Computing for Geospatial ApplicationsLearning R for Geospatial AnalysisPython for Geospatial Data AnalysisHandbook of Big Geospatial DataSmart Buildings and Cities with Remote Sensing and GISEncyclopedia of GISGeospatial Data Science Techniques and ApplicationsIntroduction to Geographic Information SystemsMalaysian Centre for Geospatial Data Infrastructure Corporate ProfileGeospatial Data InfrastructureSpatial Data on WaterExplainable Machine Learning for Geospatial Data AnalysisOpen Source Geospatial ToolsCartographyFundamentals of Spatial Data QualityGeospatial Data Science Quick Start GuideOpen Source Geospatial Science for Urban StudiesGeospatial Data Analytics and Urban Applications Ko Ko Lwin Peggy Agouris Zhenlong Li Michael Dorman Bonny P. McClain Martin Werner Shiv Mohan Shashi Shekhar Hassan A. Karimi Falguni Mukherjee Pusat Infrastruktur Data Geospatial Negara Richard Groot Hassane Jarar Oulidi Courage Kamusoko Daniel McInerney Menno-Jan Kraak Rodolphe Devillers Abdishakur Hassan Amin Mobasheri Sandeep Narayan Kundu

this textbook introduces qgis software and shows how to use it step by step using many illustrations some topics can be understood by viewing a figure without the need to read texts the purposes functions and potential applications of the software are also explained the book is a good first step to understand the theories on gis through practice with the increasing use of gis geographic information systems science in the arenas of education and research the need for this book is becoming apparent students and researchers in various disciplines have noted that gis is a powerful tool for acquiring exploring analyzing and visualizing geospatial data for their work some of their data come from geospace in the form of coordinates of course we are living in a world with coordinates wherever we move whatever we do we can be located by coordinates as everything is at rest moving or happening in space although gis has been used for a long time in many professional fields such as land surveying urban and regional development transportation planning hydrology environmental management and so on the use of gis by the public is fairly recent following the emergence of global positioning systems wireless communication technologies and nano scale microchip technologies gis is now a commonplace together with advanced technologies and user friendly software development the use of gis has moved from desktop to laptop to mobile devices and from professionals to academics to the public moreover qgis is increasingly used by students researchers and professionals on a daily basis due to its free and open source geographic information system community based software development user friendliness and the many plugins that are available to enhance the capabilities of this software

with the turn of the century our ability to collect and store geospatial information has increased considerably this has resulted in ever increasing amounts of heterogeneous geospatial data an issue that poses new challenges and opportunities as these rich sources of data are made available users rely now more than ever on the geospatial data

the convergence of big data and geospatial computing has brought forth challenges and opportunities to geographic information science with regard to geospatial data management processing analysis modeling and visualization this book highlights recent advancements in integrating new computing approaches spatial methods and data management strategies to tackle geospatial big data challenges and meanwhile demonstrates opportunities for using big data for geospatial applications crucial to the advancements highlighted in this book is the integration of computational thinking and spatial thinking and the

transformation of abstract ideas and models to concrete data structures and algorithms

this book is intended for anyone who wants to learn how to efficiently analyze geospatial data with r including gis analysts researchers educators and students who work with spatial data and who are interested in expanding their capabilities through programming the book assumes familiarity with the basic geographic information concepts such as spatial coordinates but no prior experience with r and or programming is required by focusing on r exclusively you will not need to depend on any external software a working installation of r is all that is necessary to begin

in spatial data science things in closer proximity to one another likely have more in common than things that are farther apart with this practical book geospatial professionals data scientists business analysts geographers geologists and others familiar with data analysis and visualization will learn the fundamentals of spatial data analysis to gain a deeper understanding of their data questions author bonny p mcclain demonstrates why detecting and quantifying patterns in geospatial data is vital both proprietary and open source platforms allow you to process and visualize spatial information this book is for people familiar with data analysis or visualization who are eager to explore geospatial integration with python this book helps you understand the importance of applying spatial relationships in data science select and apply data layering of both raster and vector graphics apply location data to leverage spatial analytics design informative and accurate maps automate geographic data with python scripts explore python packages for additional functionality work with atypical data types such as polygons shape files and projections understand the graphical syntax of spatial data science to stimulate curiosity

this handbook covers a wide range of topics related to the collection processing analysis and use of geospatial data in their various forms this handbook provides an overview of how spatial computing technologies for big data can be organized and implemented to solve real world problems diverse subdomains ranging from indoor mapping and navigation over trajectory computing to earth observation from space are also present in this handbook it combines fundamental contributions focusing on spatio textual analysis uncertain databases and spatial statistics with application examples such as road network detection or colocation detection using gpus in summary this handbook gives an essential

introduction and overview of the rich field of spatial information science and big geospatial data it introduces three different perspectives which together define the field of big geospatial data a societal governmental and governance perspective it discusses questions of how the acquisition distribution and exploitation of big geospatial data must be organized both on the scale of companies and countries a second perspective is a theory oriented set of contributions on arbitrary spatial data with contributions introducing into the exciting field of spatial statistics or into uncertain databases a third perspective is taking a very practical perspective to big geospatial data ranging from chapters that describe how big geospatial data infrastructures can be implemented and how specific applications can be implemented on top of big geospatial data this would include for example research in historic map data road network extraction damage estimation from remote sensing imagery or the analysis of spatio textual collections and social media this multi disciplinary approach makes the book unique this handbook can be used as a reference for undergraduate students graduate students and researchers focused on big geospatial data professionals can use this book as well as practitioners facing big collections of geospatial data

the built environment is undergoing a profound transformation driven by the integration of cutting edge geospatial technologies smart buildings and cities with remote sensing and gis serves as a comprehensive guide to navigating this transformation and bridges the gap between traditional architectural and planning practices and the innovative possibilities of remote sensing rs and geographic information systems gis the book demonstrates how architects planners and decisionmakers can use gis and rs to design smarter context aware and eco friendly urban spaces it explores innovative approaches for architecture focusing on geospatial site analysis net zero energy building designs heritage preservation innovative virtual campus planning methodologies and even futuristic concepts like habitat design on the lunar surface key features brings together contemporary geospatial technologies and their applications to address the challenges and opportunities in designing smart buildings and cities provides actionable solutions for professionals researchers and policymakers includes global contributions that provide diverse perspectives on smart city and building applications highlights how geospatial data driven insights can revolutionize decisionmaking processes in urban planning and building design the work is designed for postgraduate students and researchers in the departments of architecture planning and geomatics geoinformatics software engineering

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

data science has recently gained much attention for a number of reasons and among them is big data scientists from almost all disciplines including physics chemistry biology sociology among others and engineers from all fields including civil environmental chemical mechanical among others are faced with challenges posed by data volume variety and velocity or big data this book is designed to highlight the unique characteristics of geospatial data demonstrate the need to different approaches and techniques for obtaining new knowledge from raw geospatial data and present select state of the art geospatial data science techniques and how they are applied to various geoscience problems

geographic information systems gis is a rapidly advancing field that has become thoroughly integrated into our society and inseparable from our daily lives today gis is used by professionals in many different disciplines and fields such as public health disaster management law enforcement environmental management resource allocation forestry geology and more in this full color textbook author falguni mukherjee equips students with gis and spatial thinking skills applicable to this wide range of disciplines and fields preparing them for success in countless professions this comprehensive grounded introduction to the basics of geographic information systems and science is written in a clear and accessible style making the complex and sophisticated field of gis and spatial thinking comprehensible for beginners up to date with current gis trends and incorporating exercises using a number of gis software mukherjee covers a wide array of topics including the history of gis geospatial data models and analysis projections and coordinate systems database management systems cartography ethics in gis gis project management principles gis and society and digital transformation features of this exciting brand new text include chapter opening learning objectives to guide students course goalshelpful study aids such as key terms bolded in the text and compiled both at the end of each

chapter and in a comprehensive glossaryend of chapter questions and activities utilizing gis software to promote active learning and build useful skillsa stunning full color art program with detailed maps figures tables and photos to engage students as visual learners

an important part of the information needed for well informed decision making in today s complex society is spatially or geographically related this book provides the concepts some descriptive cases and recommended good practices for the design and implementation of geospatial data infrastructure gdi which facilitates sharing of geoinformation at affordable costs in support of well informed decision making in public and private enterprise endeavours

spatial data on water geospatial technologies and data management focuses on the worldwide corroborated difficulties in accessing data a major hindrance in conducting water related studies in several domains presents examples of research focused on water resource management includes a guide on how to manage water data using a geographic information system and a spatial data infrastructure provides several ideas and techniques to support integrated water data management

explainable machine learning xml a subfield of ai is focused on making complex ai models understandable to humans this book highlights and explains the details of machine learning models used in geospatial data analysis it demonstrates the need for a data centric explainable machine learning approach to obtain new insights from geospatial data it presents the opportunities challenges and gaps in the machine and deep learning approaches for geospatial data analysis and how they are applied to solve various environmental problems in land cover changes and in modeling forest canopy height and aboveground biomass density the author also includes guidelines and code scripts r python valuable for practical readers features data centric explainable machine learning ml approaches for geospatial data analysis the foundations and approaches to explainable ml and deep learning several case studies from urban land cover and forestry where existing explainable machine learning methods are applied descriptions of the opportunities challenges and gaps in data centric explainable ml approaches for geospatial data analysis scripts in r and python to perform geospatial data analysis available upon request this book is an essential resource for graduate students researchers and academics working in and studying data science and machine learning as well as geospatial data science professionals using

gis and remote sensing in environmental fields

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

this fourth edition of cartography visualization of geospatial data serves as an excellent introduction to general cartographic principles it is an examination of the best ways to optimize the visualization and use of spatiotemporal data fully revised it incorporates all the changes and new developments in the world of maps such as openstreetmap and gps global positioning system based crowdsourcing and the use of new web mapping technology and adds new case studies and examples now printed in colour throughout this edition provides students with the knowledge and skills needed to read and understand maps and mapping changes and offers professional cartographers an updated reference with the latest developments in cartography written by the leading scholars in cartography this work is a comprehensive resource perfect for senior undergraduate and graduate students taking courses in gis geographic information system and cartography new in this edition provides an excellent introduction to general cartographic visualization principles through full colour figures and images addresses significant changes in data sources technologies and methodologies including the movement towards more open data sources and systems for mapping includes new case studies and new examples for illustrating current trends in mapping provides a societal and institutional framework in which future mapmakers are likely to operate based on un global development sustainability goals

this book explains the concept of spatial data quality a key theory for minimizing the risks of data misuse in a specific decision making context drawing together chapters written by authors who are specialists in their particular field it provides both the data producer and the data user perspectives on how to evaluate the quality of vector or raster data which are both produced and used

it also covers the key concepts in this field such as how to describe the quality of vector or raster data how to enhance this quality how to evaluate and document it using methods such as metadata how to communicate it to users and how to relate it with the decision making process also included is a foreword written by professor michael f goodchild

discover the power of location data to build effective intelligent data models with geospatial ecosystems key featuresmanipulate location based data and create intelligent geospatial data modelsbuild effective location recommendation systems used by popular companies such as ubera hands on guide to help you consume spatial data and parallelize gis operations effectivelybook description data scientists who have access to vast data streams are a bit myopic when it comes to intrinsic and extrinsic location based data and are missing out on the intelligence it can provide to their models this book demonstrates effective techniques for using the power of data science and geospatial intelligence to build effective intelligent data models that make use of location based data to give useful predictions and analyses this book begins with a quick overview of the fundamentals of location based data and how techniques such as exploratory data analysis can be applied to it we then delve into spatial operations such as computing distances areas extents centroids buffer polygons intersecting geometries geocoding and more which adds additional context to location data moving ahead you will learn how to quickly build and deploy a geo fencing system using python lastly you will learn how to leverage geospatial analysis techniques in popular recommendation systems such as collaborative filtering and location based recommendations and more by the end of the book you will be a rockstar when it comes to performing geospatial analysis with ease what you will learnlearn how companies now use location dataset up your python environment and install python geospatial packagesvisualize spatial data as graphsextract geometry from spatial dataperform spatial regression from scratchbuild web applications which dynamically references geospatial datawho this book is for data scientists who would like to leverage location based data and want to use location based intelligence in their data models will find this book useful this book is also for gis developers who wish to incorporate data analysis in their projects knowledge of python programming and some basic understanding of data analysis are all you need to get the most out of this book

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

this book highlights advanced applications of geospatial data analytics to address real world issues in urban society with a connected world we are generating spatial at unprecedented rates which can be harnessed for insightful analytics which define the way we analyze past events and define the future directions this book is an anthology of applications of spatial data and analytics performed on them for gaining insights which can be used for problem solving in an urban setting each chapter is contributed by spatially aware data scientists in the making who present spatial perspectives drawn on spatial big data the book shall benefit mature researchers and student alike to discourse a variety of urban applications which display the use of machine learning algorithms on spatial big data for real world problem solving

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