

FREE GIS AND MULTICRITERIA DECISION ANALYSIS

GIS and Multicriteria Decision Analysis

From selecting sites for new hospitals, schools, and factories, to managing forests and rivers, to creating and maintaining highways and bridges, public and private organizations are often called on to make decisions on geographic questions that involve a multitude of alternatives and often conflicting evaluation criteria. This book presents a formal mechanism for dealing with these situations, capturing the information in a Geographic Information System and processing it to derive optimal recommendations for confronting these complex questions.

Spatial Multicriteria Decision Making and Analysis

First published in 1999, this volume consists of selected papers presented at the North American Meetings of the RSAI along with invited contributions from scholars active in the field of spatial multicriteria decision making and analysis. It is meant to present diverse lines of research in spatial multicriteria decision making and analysis under the multidisciplinary umbrella of Geographic Information Science. The first part explores selected theoretical and conceptual aspects of spatial multicriteria decision making and analysis not confined to any specific application domain. Part 2 consists of six chapters focusing on various forms of location decision and analysis problems. Finally, part 3 contains five chapters on various spatial decision problems whose systemic scope sets them apart from locational decision problems.

Multicriteria Decision Analysis in Geographic Information Science

This book is intended for the GIS Science and Decision Science communities. It is primarily targeted at postgraduate students and practitioners in GIS and urban, regional and environmental planning as well as applied decision analysis. It is also suitable for those studying and working with spatial decision support systems. The main objectives of this book are to effectively integrate Multicriteria Decision Analysis (MCDA) into Geographic Information Science (GIScience), to provide a comprehensive account of theories, methods, technologies and tools for tackling spatial decision problems and to demonstrate how the GIS-MCDA approaches can be used in a wide range of planning and management situations.

GIS-Based Multicriteria Decision Analysis for Land Evaluation

GIS has been very important in business, mapping and charting, geospatial intelligence, health services, tourisms, and natural resources management including land use planning, natural hazard assessment and etc... Urban planning is one of the main applications in which the advantages of GIS seem to be broadly accepted in general. GIS can provide the necessary planning platform for visualization, modeling, analysis, and collaboration. Other information systems for urban planning include database management systems (DBMS) and decision support systems (DSS). A database-oriented GIS, spatial and textual data can be stored and linked using the geo-relational model. Planners can also extract data from their databases and input them to other modeling and spatial analysis programs. When the planner's database is combined with data from other tabular databases or specially conducted surveys, geographical information can be used to make effective planning decisions. This book describes a methodology to calculate the land evaluation base on distance for reaching activity places. A series of \"subjective\" measures of accessibility based on distances made by road

network is built for Malayer City.

Trends in Multiple Criteria Decision Analysis

Multiple Criteria Decision Making (MCDM) is the study of methods and procedures by which concerns about multiple conflicting criteria can be formally incorporated into the management planning process. A key area of research in OR/MS, MCDM is now being applied in many new areas, including GIS systems, AI, and group decision making. This volume is in effect the third in a series of Springer books by these editors (all in the ISOR series), and it brings all the latest developments in MCDM into focus. Looking at developments in the applications, methodologies and foundations of MCDM, it presents research from leaders in the field on such topics as Problem Structuring Methodologies; Measurement Theory and MCDA; Recent Developments in Evolutionary Multiobjective Optimization; Habitual Domains and Dynamic MCDM in Changeable Spaces; Stochastic Multicriteria Acceptability Analysis; and many more chapters.

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Multicriteria Analysis for Land-Use Management

The idea of this book started at approximately 33,000 feet, somewhere above the Alps. On our way to a workshop in Venice we had the opportunity of appreciating the different types of landscapes and the complex patchwork of urban areas, agriculture, forests, rivers and lakes that can be seen from an aircraft. The complexity of this puzzle, and the complex task of managing its evolution, became the topic of conversation for the rest of the flight. It also became the topic of this book. Land-use management and multicriteria analysis offer countless opportunities for mutual reinforcement. These two fields have developed largely independently, but a trend towards the exploration of their synergies is now emerging. This is clear from the recent literature on land-use management, spatial analysis and spatial planning, which increasingly includes references to multicriteria methodologies and decision analysis. At the same time, a growing share of multicriteria applications now focus on environmental and land-use issues. This book includes contributions from authors coming from a variety of disciplines and backgrounds. All together they highlight current issues in multicriteria analysis and land-use management from theoretical, methodological and practical perspectives.

Encyclopedia of GIS

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.

Multicriteria Analysis for Environmental Decision-Making

Multicriteria analysis, or MCA, has been increasingly used in environmental decision-making to support the identification of suitable courses of action by integrating factual information with value-based information collected through stakeholder engagement. *Multicriteria Analysis for Environmental Decision-Making* provides an introduction to the key concepts of MCA and includes a series of case studies that illustrate the application of MCA to a variety of environmental decision-making problems ranging from protected area zoning to landfill siting, and from forest restoration to environmental impact assessment of tourism infrastructures. A compact reference that can be used by researchers, practitioners and planners/decision makers, *Multicriteria Analysis for Environmental Decision-Making* can also serve as a textbook for undergraduate and postgraduate courses in a broad range of curricula.

Multi-Criteria Decision Analysis

Decision analysis has become widely recognized as an important process for translating science into management actions. With climate change and other systemic threats as driving forces in creating environmental and engineering problems, there is a great need for understanding decision making frameworks through a case-study based approach. Management of environmental and engineering projects is often complicated and multidisciplinary in scope and nature, thus issues that arise can be difficult to solve analytically. *Multi-Criteria Decision Analysis: Case Studies in Engineering and the Environment* provides detailed description of MCDA methods and tools and illustrates their applications through case studies focused on sustainability and system engineering applications. New in the Second Edition: Addresses current and emerging environmental and engineering problems Includes seven new case studies to illustrate different management situations applicable at the international level Builds on real case studies from recent and relevant environmental and engineering management experience Describes advanced MCDA techniques and extensions used by practitioners Provides corresponding decision models implemented using the DECERNS software package Gives a more holistic approach to teaching MCDA methodology with a focus on sustainable solutions and adoption of new technologies, including nanotechnology and synthetic biology Given the novelty and inherent applicability of this decision-making framework to the environmental and engineering fields, a greater number of teaching tools for this topic need to be made available. This book provides those teaching tools, covering the breadth of the applications of MCDA methodologies with clear explanations of the MCDA process. The case studies are implemented in the DECERNS software package, allowing readers to experiment and explore and to understand the full process by which environmental managers assess these problems. This book is a great resource for professionals and students seeking to learn decision analysis techniques and apply similar frameworks to environmental and engineering projects

Multiple Criteria Decision Analysis

The field of multiple criteria decision analysis (MCDA), also termed multiple criteria decision aid, or multiple criteria decision making (MCDM), has developed rapidly over the past quarter century and in the process a number of divergent schools of thought have emerged. This can make it difficult for a new entrant into the field to develop a comprehensive appreciation of the range of tools and approaches which are

available to assist decision makers in dealing with the ever-present difficulties of seeking compromise or consensus between conflicting interests and goals, i.e. the "multiple criteria". The diversity of philosophies and models makes it equally difficult for potential users of MCDA, i.e. management scientists and/or decision makers facing problems involving conflicting goals, to gain a clear understanding of which methodologies are appropriate to their particular context. Our intention in writing this book has been to provide a comprehensive yet widely accessible overview of the main streams of thought within MCDA. We aim to provide readers with sufficient awareness of the underlying philosophies and theories, understanding of the practical details of the methods, and insight into practice to enable them to implement any of the approaches in an informed manner. As the title of the book indicates, our emphasis is on developing an integrated view of MCDA, which we perceive to incorporate both integration of different schools of thought within MCDA, and integration of MCDA with broader management theory, science and practice.

Interdisciplinary Approaches to Spatial Optimization Issues

As metropolises continue to see a growth in population, planners are continually searching for trending methods for utilizing space and seeking the best geographical arrangements for these cities. Professionals have continually used geographic information systems (GIS) to solve these issues; however, limitations in this technology remain prevalent. Integrating multiple-criteria decision analysis and evolutionary computing tools with GIS has created an array of robust solutions for spatial optimization problems in densely populated areas. *Interdisciplinary Approaches to Spatial Optimization Issues* is a pivotal reference source that provides vital research on advancements within the field of GIS and evolutionary solutions for spatial optimization issues. While highlighting topics such as computing machinery, vehicular routing, and operational research, this publication is ideally designed for practitioners, technicians, developers, academicians, students, government officials, planners, and researchers seeking current research on applications and improvements within spatial optimization and GIS.

A GIS Approach to Multi-criteria Decision Making

Multi-criteria decision making techniques are often used in the field of water resources. Their function is to facilitate decision making for the purpose of selecting the best solution to a particular problem from a set of potential alternatives. In order to assist in the selection, multicriteria decision making techniques evaluate each of the potential alternatives. The evaluation is based on an assessment of how well each of the alternatives satisfies specified criteria. These criteria typically are the characteristics of the alternatives, or consequences which would occur due to implementation of the potential alternatives. Often the measures of the criteria, or criteria values, associated with the alternatives have an uneven spatial distribution. For example, implementation of a particular alternative could produce favorable impacts in one location in a given region, while resulting in negative consequences for other areas. As a result, the best alternative for one area within the given region may not be the best solution for all locations in that region. In the evaluation of alternatives by conventional multi-criteria decision making techniques this spatial variability in the criteria values is often not taken into consideration. The criteria values used by conventional techniques typically represent the average characteristics of the alternatives, or total impacts produced by the alternatives for the entire region. Thus, in evaluating potential alternatives, the localized characteristics and impacts associated with the alternatives are not taken into consideration. As a result, the alternative selected as best using the multi-criteria decision making techniques may have significant negative characteristics or impacts in specific areas within the region. This shortcoming in conventional multi-criteria decision making techniques is demonstrated in this study using a floodplain analysis of the Red River Valley near the City of Winnipeg, Manitoba, Canada. In this study a set of potential flood protection alternatives are generated for a region within the Red River Valley. Each of the potential alternatives in the set are evaluated and ranked on the basis of multiple criteria. The criteria used in this evaluation are impacts to the region produced by flooding which would occur with implementation of each of the various alternatives. The evaluation of the alternatives is conducted using two multi-criteria decision making techniques. First, the alternatives are evaluated and ranked using the Compromise Programming technique. In this evaluation the spatial variation in the criteria

values associated with the alternatives is not considered. The second multi-criteria decision making technique used in this evaluation was the Spatial Compromise Programming technique. This new technique was developed as part of this research by combining GIS technology with the Compromise Programming technique. Using the Spatial Compromise Programming technique it was possible to account for spatial variability in the criteria values used in the evaluation of the potential flood protection alternatives. By comparing the results of the two multi-criteria decision making techniques it is shown that the spatial variation in the criteria values must be taken into consideration in order to provide an accurate evaluation of the potential alternatives.

Multiple Criteria Decision Analysis

In two volumes, this new edition presents the state of the art in Multiple Criteria Decision Analysis (MCDA). Reflecting the explosive growth in the field seen during the last several years, the editors not only present surveys of the foundations of MCDA, but look as well at many new areas and new applications. Individual chapter authors are among the most prestigious names in MCDA research, and combined their chapters bring the field completely up to date. Part I of the book considers the history and current state of MCDA, with surveys that cover the early history of MCDA and an overview that discusses the “pre-theoretical” assumptions of MCDA. Part II then presents the foundations of MCDA, with individual chapters that provide a very exhaustive review of preference modeling, along with a chapter devoted to the axiomatic basis of the different models that multiple criteria preferences. Part III looks at outranking methods, with three chapters that consider the ELECTRE methods, PROMETHEE methods, and a look at the rich literature of other outranking methods. Part IV, on Multiattribute Utility and Value Theories (MAUT), presents chapters on the fundamentals of this approach, the very well known UTA methods, the Analytic Hierarchy Process (AHP) and its more recent extension, the Analytic Network Process (ANP), as well as a chapter on MACBETH (Measuring Attractiveness by a Categorical Based Evaluation Technique). Part V looks at Non-Classical MCDA Approaches, with chapters on risk and uncertainty in MCDA, the decision rule approach to MCDA, the fuzzy integral approach, the verbal decision methods, and a tentative assessment of the role of fuzzy sets in decision analysis. Part VI, on Multiobjective Optimization, contains chapters on recent developments of vector and set optimization, the state of the art in continuous multiobjective programming, multiobjective combinatorial optimization, fuzzy multicriteria optimization, a review of the field of goal programming, interactive methods for solving multiobjective optimization problems, and relationships between MCDA and evolutionary multiobjective optimization (EMO). Part VII, on Applications, selects some of the most significant areas, including contributions of MCDA in finance, energy planning problems, telecommunication network planning and design, sustainable development, and portfolio analysis. Finally, Part VIII, on MCDM software, presents well known MCDA software packages.

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Regional and Urban GIS

This unique text shows students and professionals how geographic information systems (GIS) can guide

decision making about complex community and environmental problems. The authors' step-by-step introduction to GIS-based decision analysis methods and techniques covers important urban and regional issues (land, transportation, and water resource management) and decision processes (planning, improvement programming, and implementation). Real-world case studies demonstrate how GIS-based decision support works in a variety of contexts, with a special focus on community and regional sustainability management. Ideal for course use, the book reinforces key concepts with end-of-chapter review questions; illustrations include 18 color plates.

Geographical Information Systems for Urban and Regional Planning

In August 1989, a Summer Institute was held at the Academie van Bouwkunst, the seventeenth century home of Amsterdam's School of Architecture, Town Planning and Landscape. The meeting brought together experts in Geographical Information Systems from throughout the world to address an international audience of planners. The contents of this book reflect many of the themes that were presented and discussed at the conference. The Summer Institute, let alone this volume, would not have been possible without the support of the International Association for the Development and Management of Existing and New Towns (INTNAIVN), the International Society of City and Regional Planners (ISoCaRP), The National Physical Planning Agency of the Netherlands (RPD) and the Berlage Studio. We wish to acknowledge the assistance provided by these organisations and by the various sponsors: The Ministry of Housing, Physical Planning and Environment, the Municipality of Amsterdam, Logisterion b.v., ESRI, UNISYS, MABON b.v., SPSS, PRIME Computer Inc., PANDATA. The provision of hardware facilities by the various computer companies allowed immensely valuable 'hands on' experience to be gained by all the participants.

Multi-criteria Decision Analysis

This book presents an introduction to MCDA followed by more detailed chapters about each of the leading methods used in this field. Comparison of methods and software is also featured to enable readers to choose the most appropriate method needed in their research. Worked examples as well as the software featured in the book are available on an accompanying website.

Advances in Intelligent Systems and Computing IV

This book reports on new theories and applications in the field of intelligent systems and computing. It covers computational and artificial intelligence methods, as well as advances in computer vision, current issues in big data and cloud computing, computation linguistics, and cyber-physical systems. It also reports on important topics in intelligent information management. Written by active researchers, the respective chapters are based on selected papers presented at the XIV International Scientific and Technical Conference on Computer Science and Information Technologies (CSIT 2019), held on September 17–20, 2019, in Lviv, Ukraine. The conference was jointly organized by the Lviv Polytechnic National University, Ukraine, the Kharkiv National University of Radio Electronics, Ukraine, and the Technical University of Lodz, Poland, under patronage of Ministry of Education and Science of Ukraine. Given its breadth of coverage, the book provides academics and professionals with extensive information and a timely snapshot of the field of intelligent systems, and is sure to foster new discussions and collaborations among different groups.

Spatial Modeling in GIS and R for Earth and Environmental Sciences

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

Spatial Data Analysis

Spatial Data Analysis introduces key principles about spatial data and provides guidance on methods for their exploration; it provides a set of key ideas or frameworks that will give the reader knowledge of the kinds of problems that can be tackled using the tools that are widely available for the analysis of spatial data.

Collaborative Geographic Information Systems

"This book provides a comprehensive treatment of collaborative GIS focusing on system design, group spatial planning and mapping; modeling, decision support, and visualization; and internet and wireless applications"--Provided by publisher.

2018 6th International Renewable and Sustainable Energy Conference (IRSEC)

The sixth Edition of the International Renewable and Sustainable Energy Conference (IRSEC 18) aims to provide an international forum to facilitate discussion and knowledge exchange of the state of the art research findings and current and future challenges and opportunities related with all facets and aspects of renewable and sustainable energy The target public of IRSEC 18 includes all interested people from academia, industry and government, particularly, researchers, policy makers, engineers, PhD and Masters students and other specialists interested in all issues related to renewable and sustainable energy The scope of IRSEC 18 covers a broad range of hot topics including renewable energy technologies, energy efficiency, green energy, climate change, sustainable energy systems and smart grid

Geographic Information Systems: Concepts, Methodologies, Tools, and Applications

Developments in technologies have evolved in a much wider use of technology throughout science, government, and business; resulting in the expansion of geographic information systems. GIS is the academic study and practice of presenting geographical data through a system designed to capture, store, analyze, and manage geographic information. Geographic Information Systems: Concepts, Methodologies, Tools, and Applications is a collection of knowledge on the latest advancements and research of geographic information systems. This book aims to be useful for academics and practitioners involved in geographical data.

GIS for Group Decision Making

In today's society, it is very common for decisions that influence us all to be made by a combination of interested parties, all with their own agenda. In this instance, how can we be sure that the decision is the correct one, not just decided by the group with the most political influence or most money? Such groups have now become fundamental deci

Agricultural Non-point Source Nitrate Pollution Control by Land Use Optimisation

Employing state-of-the art quantitative models and case studies, Location Theory and Decision Analysis provides the methodologies behind the siting of such facilities as transportation terminals, warehouses,

housing, landfills, state parks and industrial plants. Through its extensive methodological review, the book serves as a primer for more advanced texts on spatial analysis, including the monograph on Location, Transport and Land-Use by the same author. Given the rapid changes over the last decade, the Second Edition includes new analytic contributions as well as software survey of analytics and spatial information technology. While the First Edition served the professional community well, the Second Edition has substantially expanded its emphasis for classroom use of the volume. Extensive pedagogic materials have been added, going from the fundamental principles to open-ended exercises, including solutions to selected problems. The text is of value to engineering and business programs that offer courses in Decision and Risk Analysis, Muticriteria Decision-Making, and Facility Location and Layout. It should also be of interest to public policy programs that use geographic Information Systems and satellite imagery to support their analyses.

Location Theory and Decision Analysis

Stress on natural resources has recently increased due to commercialization and the need to provide livelihoods for locals. Because they are such core parts of everyday life, ensuring sustainability in resource management is of paramount importance. Only by integrating the tools of spatial information science can an effective course for preserving and protecting natural resources be created. Spatial Information Science for Natural Resource Management is a pivotal reference source that explores coordinated approaches to sustainable development and management of natural resources to keep a balance of the environment, ecology, and human livelihood. Featuring coverage on a wide range of topics including crop yield estimation, ecosystem services, and land information systems, this book covers interdisciplinary techniques in monitoring and managing natural resources. This publication is ideally designed for urban planners, environmentalists, policymakers, ecologists, researchers, academicians, students, and professionals in the fields of remote sensing, civil engineering, social science, computer science, and information technology.

Spatial Information Science for Natural Resource Management

Multi-Criteria Decision Making (MCDM) has been one of the fastest growing problem areas in many disciplines. The central problem is how to evaluate a set of alternatives in terms of a number of criteria. Although this problem is very relevant in practice, there are few methods available and their quality is hard to determine. Thus, the question 'Which is the best method for a given problem?' has become one of the most important and challenging ones. This is exactly what this book has as its focus and why it is important. The author extensively compares, both theoretically and empirically, real-life MCDM issues and makes the reader aware of quite a number of surprising 'abnormalities' with some of these methods. What makes this book so valuable and different is that even though the analyses are rigorous, the results can be understood even by the non-specialist. Audience: Researchers, practitioners, and students; it can be used as a textbook for senior undergraduate or graduate courses in business and engineering.

Multi-criteria Decision Making Methods

Multicriteria analysis is one of the most important fields of decision science. This book gives an outline of the formulation of an appropriate model and presents a comprehensive summary of the most popular methods for solving multicriteria decision problems. In addition to the classical approach the book introduces fuzzy and stochastic methodology, models with uncertainty, social choice and conflict resolution. All methods are illustrated with easy to follow simple examples. At the end of each chapter detailed case studies are given in water and environment management including inter-basin water transfer, urban water management, water allocation, groundwater quality management, forest treatment, ranking water resources projects, reservoir planning, water distribution network design and long-term watershed management. The new methodology and the wide variety of case studies are not easily accessible elsewhere.

Multicriteria Analysis

Low Carbon Energy Technologies for Sustainable Energy Systems examines, investigates, and integrates current research aimed at operationalizing low carbon technologies within complex transitioning energy economies. Scholarly research has traditionally focused on the technical aspects of exploitation, R&D, operation, infrastructure, and decommissioning, while approaches which can realistically inform their reception and scale-up across real societies and real markets are piecemeal and isolated in separate literatures. Addressing both the technical foundations of each technology together with the sociotechnical ways in which they are spread in markets and societies, this work integrates the technoeconomic assessment of low carbon technologies with direct discussion on legislative and regulatory policies in energy markets. Chapters address issues, such as social acceptance, consumer awareness, environmental valuation systems, and the circular economy, as low carbon technologies expand into energy systems sustainability, sensitivity, and stability. This collective research work is relevant to both researchers and practitioners working in sustainable energy systems. The combination of these features makes it a timely book that is useful and attractive to university students, researchers, academia, and public or private energy policy makers. Combines socio-cultural perspectives, environmental sustainability, and economic feasibility in the analysis of low carbon energy technologies Assesses regulatory governance impacting the environmental protection and the social cohesion of environmentally-directed energy markets Reviews the carbon trade exchange, attributing economic value to carbon and enabling its trading perspectives by people, companies or countries invested in low carbon technologies

Low Carbon Energy Technologies in Sustainable Energy Systems

Practitioners of policy analysis will better understand the tools of their trade, and the broader contexts in which analysis contributes.

Site Selection of Potential Gold Deposit by Using GIS Based Multi-criteria Decision Analysis (MCDA)

The book examines an integrated approach for addressing decisions about the location of healthcare facilities. Supported by Geographic Information Systems (GIS) and Multi-Criteria Decision Analysis (MCDA), the approach provides comprehensive information on territory, taking into account the spatial dimensions. Due to the multiple criteria involved, site selection for urban facilities is a crucial topic in planning decision processes, especially for healthcare facilities. Healthcare provision policies generally fail to address the distribution of facilities within cities, entrusting decisions to various stakeholders. Moreover current evaluation tools focus on the intrinsic performances of healthcare structures, disregarding the extrinsic characteristics, namely those related to the location. Starting with a cross-disciplinary literature review, the book describes a multi-methodological approach for decision-making regarding the location of healthcare facilities, and presents an innovative evaluation tool that simultaneously considers functional, locational, environmental and economic issues, providing a comprehensive overview of the areas under investigation.

Theory and Practice in Policy Analysis

This book is the product of five and a half years of research dedicated to the understanding of radar interferometry, a relatively new space-geodetic technique for measuring the earth's topography and its deformation. The main reason for undertaking this work, early 1995, was the fact that this technique proved to be extremely useful for wide-scale, fine-resolution deformation measurements. Especially the interferometric products from the ERS-1 satellite provided beautiful first results—several interferometric images appeared as highlights on the cover of journals such as Nature and Science. Accuracies of a few millimeters in the radar line of sight were claimed in semi-continuous image data acquired globally, irrespective of cloud cover or solar illumination. Unfortunately, because of the relative lack of supportive observations at these resolutions and accuracies, validation of the precision and reliability of the results remained an issue of

concern. From a geodetic point of view, several survey techniques are commonly available to measure a specific geophysical phenomenon. To make an optimal choice between these techniques it is important to have a uniform and quantitative approach for describing the errors and how these errors propagate to the estimated parameters. In this context, the research described in this book was initiated. It describes issues involved with different types of errors, induced by the sensor, the data processing, satellite positioning accuracy, atmospheric propagation, and scattering characteristics. Nevertheless, as the first item in the subtitle “Data Interpretation and Error Analysis” suggests, data interpretation is not always straightforward.

Decision Support System for the Location of Healthcare Facilities

This book introduces readers to multicriteria decision aiding (MCDA) interventions used in complex situations. In each chapter, expert analysts propose a piece of the puzzle, while the final, complete puzzle offers an interesting reflection of the main challenges and difficulties associated with decision aiding interventions, as well as the different tools adopted in response. Particular attention is given to the approaches used to identify and overcome specific difficulties. Designed for analysts familiar with several multicriteria methods but seeking detailed information and experience, this book helps to elaborate and validate MC models in real-life decision aiding interventions. In addition, it helps novice analysts appreciate the difficulty of decision aiding and use the available methods to reduce or control them with the help of socio-technical approaches.

Radar Interferometry

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

Guidelines for Applying Multi-criteria Analysis to the Assessment of Criteria and Indicators

Portfolio Decision Analysis: Improved Methods for Resource Allocation provides an extensive, up-to-date coverage of decision analytic methods which help firms and public organizations allocate resources to 'lumpy' investment opportunities while explicitly recognizing relevant financial and non-financial evaluation criteria and the presence of alternative investment opportunities. In particular, it discusses the evolution of these methods, presents new methodological advances and illustrates their use across several application domains. The book offers a many-faceted treatment of portfolio decision analysis (PDA). Among other things, it (i) synthesizes the state-of-play in PDA, (ii) describes novel methodologies, (iii) fosters the deployment of these methodologies, and (iv) contributes to the strengthening of research on PDA. Portfolio problems are widely regarded as the single most important application context of decision analysis, and, with its extensive and unique coverage of these problems, this book is a much-needed addition to the literature. The book also presents innovative treatments of new methodological approaches and their uses in applications. The intended audience consists of practitioners and researchers who wish to gain a good understanding of portfolio decision analysis and insights into how PDA methods can be leveraged in different application contexts. The book can also be employed in courses at the post-graduate level.

Multicriteria Decision Aiding Interventions

Progress in Geospatial Analysis

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